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The
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THIRD SERIES.

VOLUME XI.

1880-81.

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THE ORIGIN OF THE "GUM" OF QUEBRACHO COLORADO.

BY DR. AUGUST VOGL,

Honorary Member of the Pharmaceutical Society.

Through the kindness of my friend, Mr. J. Wibiral, head of the firm "Pfantzert's Successor" here, I obtained a piece of the wood, about two decimetres long, known under the name of "quebracho colorado," now much in request as a tanning material, and to a certain extent employed medicinally. It is generally referred to *Loxopterigium Lorentzii*, Anacardiaceæ, Grisebach (Argentine Republic).

The piece of wood in question showed crevices and hollow spaces about eight centimetres long and four centimetres broad, the walls of which were deeply cleft and covered with a remarkable friable, almost black, resinous mass, reminding one of certain species of kino, ruby red at the angles, transparent, breaking with a conchoidal fracture, and strongly astringent.

This evidently was the so-called quebracho gum, with reference to which there is an interesting communication by Pedro N. Arata in the *Pharmaceutical Journal and Transactions*, 1878, p. 531 (from the *Anal. de la Sociedad Cientifica Argentina*, July, 1878).

The conditions under which this substance, which can very well be named quebracho-kino, appears, and which are quite analogous to those which afford the so-called "angelin-pedraharz"* and the well known "araroba,"† lead to the supposition that they owe their origin to a disorganization of the wood, which supposition is in fact confirmed by a further histological investigation. I will briefly communicate my results as a supplement to the work of Arata above quoted.

The heavy, tough, and very hard wood possesses on the whole a bright brownish-red colour. In a polished transverse section it shows bright medullary rays very near to each other, and in the narrow wood rays very numerous vessels as bright spots, and at long intervals from each other run narrow rays of wood parenchyma. About the crevices, above mentioned as being covered with excretion, the wood takes an almost black colour, which renders the coarse structure relatively indistinct, and which finally quite disappears in the clefts upon which the mass of excretion lies or into which it rather flows.

The structure of the wood of quebracho colorado has been briefly described by me (in 'Der Gerber,' 1878) and more fully later by J. Möller ('Berichte über die Weltaustellung,' Paris, 1878, part 8). Only the most important characteristics need be here referred to. The principal medullary rays, generally three cells broad and usually accompanied on either side by cells containing crystals, consist on the whole of pitted cells, not thick walled, extended in a radial direction (fig. 1, *m*); together with these are secondary rays one cell broad. The wood rays have as a ground tissue libriform fibres (fig. 1, *l*), besides to a small extent wood parenchyma, partly standing alone, partly in simple layers surrounding the vessels.

The latter are generally very broad, thick walled, with bordered pits and large thyllen, sometimes containing crystals, either alone or in radiate groups of two to five, seldom more. The oxalate of lime crystals occurring in the wood are, in part, very large, frequently double, and belong to the klinorhombic system.

Sections from the unaltered (bright brownish-red portion of the wood show, under water, as contents of the tissue, an amorphous mass coloured olive-green by ferric chloride, completely soluble in water, alcohol, and with heat in solution of potash. This mass is more granular and bright red in colour in the libriform cells and wood parenchyma, and homogeneous, clotted, and brownish-red in the vessels and medullary rays.

The cell walls appear to be yellowish or reddish-yellow, and indeed the primary (the border layers *a*) are intensely coloured.

Long continued warming in water decolorizes the above, and at the same time there appears considerable swelling of the secondary layers (*b*), especially in the vessels and libriform cells. Chloriodide of zinc colours them (but not the primary membrane) violet; iodine with sulphuric acid renders them blue.

Sections from the black portion of the wood show an essentially different behaviour of the elementary tissues. All are so densely filled with the brownish-red contents that without further treatment it is difficult to understand the structure. This can only be done by removing the contents of the cells with one of the above solvents. The most remarkable change is shown in the libriform fibres. In a transverse section boiled in water (fig. 4) the secondary layers remarkable by their swelling in the same preparation from the unaltered wood (fig. 2) are not visible; but inside the brownish-red primary membrane lie merely the remains of the above in the form of a shrunken colourless skin, separated from the cell wall by a distinct interval (fig 4, *b*).

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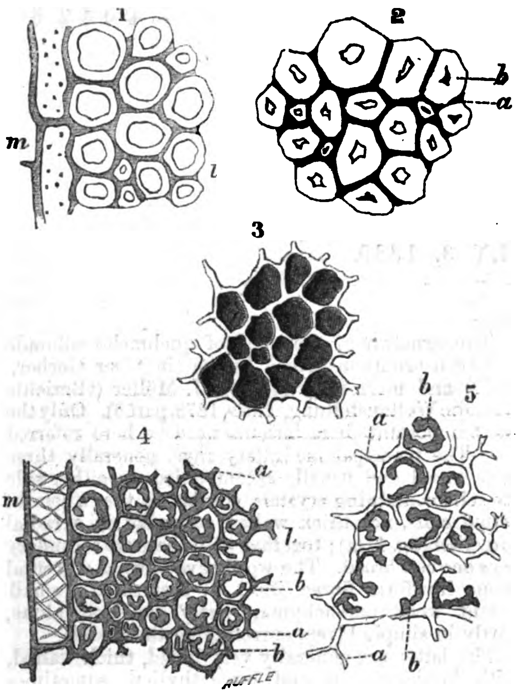
* 'Pringsheim's Jahrb. für Bot.,' ix.

† 'Comment. zur oester. Pharm.,' third edition, p. 436.



Explanation of the Accompanying Drawings.

Part of a transverse section from the wood of Quebracho Colorado strongly magnified.

m, m, medullary rays.

l, l, libriform cells.

a, a, primary membrane.

b, b, secondary layers (second cell membrane).

Figs. 1 and 2, from the unaltered (bright brownish-red), figs. 3 to 5, from the altered (black) portion of the wood.

Fig. 2. Boiled in water.

b, much swollen.

Fig. 3. Libriform cells under water, densely filled with amorphous brown-red contents.

Fig. 4. After boiling in water. Libriform cells with the shrivelled remains of the secondary layers separated from the cell wall. Medullary rays with spiral bands.

Fig. 5. Boiled in water. Libriform cells more changed than in fig. 4. Primary membrane partly torn.

In a longitudinal section these remains of the secondary deposits appear as thin, thick, or narrow spiral bands. The cells also of the medullary rays in the transverse section (fig. 4, *m*) show spiral bands.

The nearer to the excreted gum, the more evident the changes become. Finally, a part is reached where in a transverse section, after solution of the cell contents, a thin brown cellular network with polygonal meshes is met with, formed from primary membrane, and corresponding to the fundamental tissue. This shows numerous disruptions (fig. 5), especially as it appears in a radial direction.

The remains of the secondary layers are visible in single cells only. In the vessels, and especially in the border cells, a withering away of the cell membrane is observed.

In the mass of gum which lies immediately on the wood are found only more or less numerous pieces of tissue in a very shrivelled condition, besides the above remains, and on the exterior the perfectly homogeneous kino-like mass of excretion is seen. If a small portion of the brick-red powder be treated with solution of potash under the microscope, only single crystals of oxalate of lime, of the same form as that in which they occur in the wood, and a few colourless membranous flakes are observed. The latter, after neutralization with acetic acid and treatment with chloriodide of zinc, are coloured blue, by which they are known as remains of cell tissue and their origin recognized.

The above mentioned facts indicate that the so-called "gum" forming constituents appear first of all as cell contents in the wood, that these under certain conditions, and in some parts, are increased at the cost of the cell wall, and further that, in the first place, secondary layers undergo this metamorphosis, and, lastly, the primary membrane.

Vienna.

CHARACTERISTICS OF ACONITINE AND ALLIED ALKALOIDS.

BY C. R. ALDER-WRIGHT, D.SC. LOND.

Aconitine $(C_{33}H_{43}NO_{12} \text{ or } C_{26}H_{35}NO_7 \left\{\begin{array}{l}(OH)_3\\ O\cdot CO\cdot C_6H_5\cdot\end{array}\right.)$—This alkaloid appears to be the chief, if not the only active alkaloidal ingredient in the roots of *A. Napellus*, occurring therein together with amorphous alkaloids of lower molecular weight, and containing a higher percentage of carbon. From these alkaloids the free base partially separates by solution in ether and spontaneous evaporation, the ether being preferable previously mixed with very light petroleum spirit, as recommended by Duquesnel. If the amount of aconitine present relatively to the amorphous bases is not considerable it is often impossible to get the former to crystallize at all (at any rate on the small scale); in any case a considerable amount of aconitine is retained in solution permanently by the agency of the amorphous alkaloids, which thus cause considerable loss, much as alkaline salts do in the case of sugar crystallization. Even after repeated crystallization from ether or ether-petroleum spirit, aconitine retains mechanically minute quantities of the amorphous bases, which, however, can be wholly eliminated by conversion into a salt, crystallization thereof, and regeneration of the alkaloid (by treatment with an alkali and crystallization from ether) from the salt thoroughly freed from the mother liquor which contains the amorphous base as salt: the hydrochloride, hydrobromide, and nitrate are salts answering well for this purpose, especially the two last.

When perfectly pure, aconitine melts in a capillary tube at 183°—184° (corrected), the melting point being lowered by the presence of amorphous bases; the final complete melting is preceded by a slight fritting, beginning a few degrees below the melting point, and is accompanied by only very slight darkening with the pure base, by more if impure.

This test together with the following constitute the two simplest criteria of purity. The alkaloid to be examined is dissolved in a few drops of some dilute acid, some puae ether added, and then some sodium carbonate solution in excess and the whole well agitated in a stoppered bottle; the ethereal solution is decanted and allowed to evaporate spontaneously; when only a small quantity is left this is decanted from the crystals that have formed into another vessel and allowed to evaporate to dryness. If the aconitine were tolerably pure the last drops of ethereal mother liquor will dry up to crystals; but if more than minute quantities of amorphous bases were present these will accumulate in the mother liquor, the last portions of which will dry up not to crystals, but to a varnish or gum-like mass.

The gold salt of aconitine should not darken on drying over sulphuric acid in the dark (presence of amorphous alkaloids often causes decomposition to a small extent on drying); after desiccation, first over sulphuric acid till visibly dry and finally in the water-bath, it should contain a trifle under 20·00 per cent. of gold (theoretical percentage 19·92). If the base contain traces of amorphous alkaloids, the gold percentage is a little higher, specimens purified only by crystallization from ether generally containing 20·2 to 20·3 per cent. of gold.

On heating for some hours to 100° in a closed vessel with alcohol and a little caustic potash, aconitine should yield close to 19 per cent. of benzoic acid (theoretical percentage 18·92), which can be extracted and estimated by evaporation of the alkaline fluid to dryness, solution in water, treatment with hydrochloric acid and ether, and spontaneous evaporation of the ethereal solution, with purification of the residue from resinous bye-products if necessary. The acid thus formed should not produce any substance capable of giving a green colour to ferric chloride on fusion at 250° with caustic potash, and treatment of the "melt" with hydrochloric acid and ether, and evaporation to dryness of the ethereal solution (indicates freedom from pseudaconitine).

Pure aconitine should contain close to the theoretical amounts of carbon and hydrogen, viz. 61·39 and 6·67 per cent. respectively. These analytical figures are the only reliable means of distinguishing aconitine from the closely allied alkaloid recently described under the provisional name "japaconitine" (*vide infra*), which agrees very closely with aconitine in all the other above named points.

Pseudaconitine—

$$\left(C_{36}H_{49}NO_{12} \text{ or } C_{27}H_{37}NO_5 \left\{ \begin{array}{l} (OH)_3 \\ O{\cdot}C_9H_9O_3 \end{array} \right. \right)$$

the chief if not the only active ingredient in *A. Ferox* roots. Considerably less easily crystallizable than aconitine; melting point when pure near to 104°—105° (not very distinctly marked, fritting commencing a few degrees lower), no darkening in colour accompanying the final fusion. No conclusions as to purity can be drawn from the incomplete crystallizability of the base (or its nitrate), as infinitesimal amounts of impurity, too small for analytical determination, and other circumstances greatly affect the crystallizing power. Should yield on "saponification" with alcoholic potash near to the theoretical amount of veratric (dimethylprotocatechuic) acid,

$$C_6H_3 \left\{ \begin{array}{l} O{\cdot}CH_3 \\ O{\cdot}CH_3 \\ CO{\cdot}OH \end{array} \right.$$

(viz. 26·49 per cent.), especially after purification of the acid formed from resinous bye-products; and should give analytical numbers near to the following theoretical values:—

Carbon in base (anhydrous) . . .	62·88
Hydrogen in base „ . . .	7·13
Gold in Gold Salt „ . . .	19·10

Slightly higher percentages of gold being found (as with aconitine) when the base is only purified by crystallization from ether, and hence retains minute quantities of the amorphous bases occurring together with it in the roots.

Japaconitine ($C_{66}H_{88}N_2O_{21}$).—Provisional name applied to a base occurring in aconite roots (query as to species) recently imported into England from Japan. First examined by Paul and Kingzett, who attributed to it the formula $C_{29}H_{43}NO_9$. Exhibits very close similarity to aconitine, furnishing almost exactly the same amount of benzoic acid on saponification (theoretical percentage 19·6), and melting at almost the same temperature, but slightly higher (184°—186° instead of 183°—184° corrrected). Crystallizes from ether just about as readily as aconitine, furnishes very similar salts, and can only be distinguished conveniently by analytical numbers, the theoretical values being uniformly higher than with aconitine, viz.:—

Carbon in free base	63·67
Hydrogen in free base	7·07
Gold in Gold Salt	20·39

ETHYL BROMIDE.*

BY LAWRENCE WOLFF, M.D.

Progressive medicine has again confronted the pharmacist in this substance with a new remedial agent, which promises fair to stand the test of time much better than the host of new remedies which are almost daily pressed into the ranks of our therapeutic allies, and it is therefore I think it merits closer investigation, in order that it be offered to the medical profession in its highest possible perfection.

In view that already our literature shows a great deal of research and a thorough knowledge of the production of this new agent, I do not claim to here propose radical innovations, but merely desire to call attention to such modifications as will assist in obtaining it in its pure state at the lowest possible price.

Ethyl bromide, the hydrobromic ether of older chemists, discovered by Serullas in 1827, shortly after the discovery of bromine itself, received but little attention as a therapeutic agent until Dr. Nunnelly, of Leeds, England, called attention to it as a useful anæsthetic in 1865. Rabuteau, of Paris, again created considerable interest by his experiments with it on the lower animals in 1876, but the credit of bringing it out prominently, and, as it now seems, permanently, is due to Dr. Lawrence Turnbull, and the hearty co-operation, persevering efforts and experiments of Dr. R. J. Levis, both of Philadelphia. The latter has already used it in hundreds of cases, and as yet no untoward accident has occurred at his hands.

Its early preparation by the discoverer was based upon the action of phosphorus on bromine in presence of alcohol, which Personne, in 1861, modified by substituting amorphous phosphorus instead, and which was subsequently more rationally conducted by Professor Remington. The process of De Vrij, by decomposing potassic bromide with sulphuric acid in presence of alcohol, was an improvement which was followed out by Dr. Greene, but which never served me, in the proportions mentioned, to obtain any appreciable quantity of the ethyl bromide.

Its chemical composition was early determined to be C_2H_5Br, its specific gravity 1·40, and its boiling point 106° F.; it will not burn, and its vapours will even extinguish flame.

Finding considerable objection to the product of the earlier process on account of its alliaceous odour, probably due to free phosphorus or an ethyl phosphide, I was soon led to produce it by De Vrij's method, which, however, I found deficient in the amount of sulphuric acid, and it was not until I had almost trebled its quantity that I succeeded in completely converting the entire amount of alcohol into ethyl bromide.

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* Read before the Philadelphia College of Pharmacy. From the *American Journal of Pharmacy*, May, 1880.

The process I employed, and, after various experiments and modifications, found to answer best, is as follows:—

Twenty-four ounces of potassic bromide, coarsely powdered, are added to a mixture of 64 ounces of sulphuric acid and 32 ounces of water. After the mixture has sufficiently cooled, 16 fluidounces of alcohol (95 per cent.) are added thereto, the whole placed in a large flask contained in a sand-bath, and connected with a Liebig's condenser, heat applied sufficiently that the contents of the flask should be at about 200° F., and there to be maintained until the reaction, which will go on quite lively for a while, shall have ceased, and the ethyl, which has rapidly been gathering in a receiver containing about 1 ounce of water, has ceased to come over, as can easily be detected when it fails to further sink to the under surface of the layer of water. The ethyl bromide so obtained will amount to about 20 ounces, and should be shaken with a solution of potassic bicarbonate, subsequently washed with water, and purified by redistillation, as described below.

The chemistry of this process is quite plain, the sulphuric acid forming acid potassium sulphate, the bromine taking the place of the oxygen in the ethyl oxide, forming water with the hydrogen present, which expressed in symbols would read as follows:—

$$KBr + H_2SO_4 + C_2H_6O = KHSO_4 + H_2O + C_2H_5Br.$$

The operation is in itself so simple, so rapid, and so totally devoid of all danger, that its advantages over the earlier ones are readily obvious. It can easily be conducted on the laboratory table of most any pharmacy, and will yield a product which possesses all the characteristics as described above. Its cost is an item of the greatest importance to the pharmacist, in view of the very high price asked for it at one time, and perhaps yet. The potassic bromide at 68, the sulphuric acid at 15, and the alcohol at 30 cents, will make the expense for material per pound only 90 cents, while any young man can make this amount in two hours' time, besides attending to his various other duties, and it will enable him to emancipate himself from the manufacturing chemist, adding by it to his self-esteem and the elevation of his profession.

But when larger quantities are required, and when it is a matter of importance to reduce the price as much as possible, I have found it to advantage to deviate from the above process, which, however, to the pharmacist may prove most suitable for its preparation on a small scale.

As the first step in the manufacture of potassic bromide is that of ferrous bromide, I made use of the latter at once to obtain the desired ethyl in the following manner:—

In a stone jug containing about 1 gallon of water and 2½ pounds of iron turnings or wire, 5 pounds of bromine are gradually added, care being taken not to allow the temperature to rise too high, the jug besides being placed in cold or iced water, and as soon as the reaction has ceased the solution of the green ferrous bromide is filtered off, the remaining iron being well washed out with warm or boiling water, and to it, in a leaden or glass flask (I have found the acid globe of a carboy a most useful vessel), 15 pounds of commercial sulphuric acid are added; after the mixture has sufficiently cooled, 6 pints of alcohol (95 per cent.) are intermixed, the mixture well agitated and distilled at a temperature as in the before-mentioned operation. I have in this way obtained from these amounts 7 pounds ethyl bromide at a cost of material of not over 4·30 dollars, or about 60 cents per pound.

Again, in this reaction the chemistry is quite simple, the sulphuric acid uniting with the iron to form ferrous sulphate, while the two bromine again take the place of two oxygen in the two ethyl oxide, the four hydrogen with the two oxygen of the ethyl oxide forming two water, and may be expressed in symbols as follows:—

$$FeBr_2 + 2C_2H_6O + H_2SO_4 = FeSO_4 + 2H_2O + 2C_2H_5Br.$$

Although the ethyl bromide thus obtained is by far purer and has less odour than most of the articles found in the market, I have observed that, on evaporating a quantity of it, it left a heavy acrid odour behind which in anæsthesia was bound to prove objectionable if not actually deleterious, and I concluded, therefore, that, after washing, I would re-distill it at a low temperature, which I effected by placing it in a gallon bottle contained in a water-bath, and connected with a condenser. The bath was heated to a temperature of not over 125° F., at which brisk ebullition ensued, and a stream of pure ethyl bromide was received, which was devoid of any and all disagreeable odour, colourless and limpid, of a specific gravity of 1·40, boiled at 106° F., and did not burn.

The remains in the bottle were about one-half ounce of a brown acrid liquid, of which I have not yet recovered a sufficient amount to make a more complete examination. To the taste it is extremely unpleasant, pungent, and representing the disagreeable odour generally found in the ethyl bromide offered in the market.

As regards the stability of pure ethyl bromide, which has been questioned, I can fully confirm Dr. Levis's experience. I have kept samples of my earlier experiments, made almost two months ago, which to-day present the same appearance they had then; and far from a spontaneous decomposition, I have not succeeded, by either alkalies or acids, or other chemical means, to liberate the bromine from this ethyl, or to effect its exchange in double decomposition,* and cannot say, therefore, that it deserves the name of a loosely molecular article. (Dr. Squibb, *Medical Record*, April 3, 1880, p. 379.)

In concluding my remarks on its manufacture, I would point out the simple and cheap manner in which, by my process, a pure and reliable article (which already has been thoroughly tested by many physicians) can be produced by the pharmacist himself, without having to submit to the exorbitant prices generally asked for it.

Actuated by a desire to further study the effects of the ethyl bromide, I was led to make a series of experiments on the lower animals and on ourselves, conjointly with my friend Dr. J. G. Lee, the physician to the coroner of this city. Regarding the safety of it as an anæsthetic, as well as to after effects produced by its use, we made numerous investigations, the results of some of which I will give condensed below.

As an article from the pen of Dr. J. Marion Sims seems to indicate that a most disastrous result has recently occurred from its use (*Medical Record*, April 3, 1880, p. 361), and that being the only and first instance of the kind reported, the ethyl bromide used in that case, as well as the most of it produced heretofore, was presumably obtained in a very imperfect manner, and it seems but reasonable to review the case.

That death occurred only twenty-one hours after the use of the anæsthetic seems to imply that it was not its immediate presence which caused this lethal effect. The presence of an odour of ethyl bromide forty-one hours after its administration is hardly in conformity with its volatile character, but seems to point to the presence of some heavier and less diffusible substance contained therein.

Judging from these facts that the deleterious effects might be due to the heavy distillate above mentioned, we gave 20 drops of it to a rabbit, with the result of causing gastro-intestinal irritation, general malaise, and subsequent death in eighteen hours afterwards; while, in the same animal, 30 drops of pure ethyl bromide, given on a previous occasion, produced no worse effects than slight intoxication. A *post-mortem* examination showed the decided odour of the acrid heavy distillate pervading the intestinal tract and kidneys, while the brain, which unfortunately in the autopsy of Dr. Sims's case has not been mentioned, presented a congested appearance, explaining probably the cerebral trouble which Dr. Sims's patient complained of so much. This congestion is totally absent in immediate death produced by the anæsthetic on animals, the brain in such contingencies being generally pale and somewhat anemic. The abdominal viscera also showed signs of irritation and congestion.

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* I have since observed a reaction with a strong solution ammonia, yielding ethylamine bromide.

To further satisfy ourselves as to the effects of pure ethyl bromide, we continued our experiments as follows:—

A rabbit of 4 pounds 3 ounces weight; anæsthesia induced in one minute by 20 drops of ethyl bromide; pupils first contracted, and then dilated; heart acting well, with slight increase in number of beats. By withdrawing and reapplying the anæsthetic as required, the animal was kept under the effects of it for twenty minutes, and on withdrawing it the animal recovered entirely in five minutes.

Another rabbit, weighing 3¾ pounds, was made to inhale 1 drachm of ethyl bromide, producing complete anæsthesia in one minute, causing first contraction, followed by dilatation of the pupil; heart beating normally; voluntary muscles relaxed. The anæsthesia being pushed on by the use of another drachm of the ethyl, the beating of the heart was accelerated, number of respirations increased, and in six minutes heart ceased to beat, after losing perceptibly in impulse. Attempts at resuscitation proved fruitless, but electromotoric sensibility well preserved. *Post-mortem* examination showed the brain in a state of anemia, lungs pale and healthy, right ventricle and auricle distended, and filled with *ante-mortem* clots; no odour of the ethyl perceptible after death.

The above experiments demonstrate that with the cautious use of ethyl bromide, rabbits, which are with difficulty maintained in anæsthesia, can be successfully ethylized without much danger to their lives.

Satisfied as to this, we were determined to obtain information as to its action when administered internally, and for that purpose gave to three of the animals respectively 10, 20 and 30 minims of the ethyl. While producing in the larger doses more markedly a slight intoxication, no other serious symptoms arose. Encouraged by this, we commenced taking it ourselves, well diluted, first in doses of 5 and 10, and then 25 and 30 drops, without discovering any noticeable effect, save that of slight sleepiness induced by the larger doses. A nervous headache, existing during these experiments, seems by the ethyl to have been entirely relieved, which, however, might have been the case had any other bromide been taken instead. That it may prove of decided benefit in nervous irritation and hysteria is readily to be inferred herefrom.

To the taste it is sweet and pleasant, but heating to the mucous surfaces, and it should be well diluted before it is administered.

The next case for experiment was that of a rabbit, which we injected hypodermically with 5 minims of the ethyl, producing, however, no marked effect, save a very slight intoxication. Another, subsequently injected with 10, 15 to another, and 30 to still another, had again the effect of producing intoxication, with a decided somnolence and relaxation of the muscles, all of the animals recovering, however, completely within one hour. As a comparative experiment, another rabbit was injected with 15 minims of chloroform, which produced most marked and threatening effects and complete somnolence, from which the animal could not be roused, and only recovered after three hours, remaining for hours afterwards in a stupefied condition.

It is to be remarked here, that in all cases where the animals were injected with ethyl bromide the number of respirations were largely increased.

Determined to ascertain the manner in which the ethyl bromide should prove fatal if injected hypodermically, we injected into one of them, a healthy female rabbit of 5 pounds weight, within half an hour, in broken quantities, 2¾ drachms of the article, failing, however, to inflict death, nor more serious symptoms within the next three hours than those above noted; found, however, that the animal had expired during the following night.

A *post-mortem* examination revealed a congested brain, but showed nothing beyond that to account for its death.

The inference from these experiments may be set down that, internally as well as hopodermically, the ethyl bromide has no toxic effect on the animal organism beyond that of ether or alcohol.

The absence of any odour of it in intestines, kidneys and liver, admits the theory that it is totally eliminated through the lungs; that by its presence in large quantities in the system, and if not readily eliminated through the lungs, it acts as a decided stimulant, and may, when used in excess, like ether and alcohol, cause death by cerebral congestion.

Finally, and with a view to test its adaptability and safety as an anæsthetic in comparison with ether and chloroform, we experimented on three healthy rabbits of about the same weight, simultaneously administering by inhalation to one ether, ethyl bromide to another, and chloroform to the third, sufficient being used to maintain profound anæsthesia.

The first one, under ether, was completely under its effect in one minute; heart's action rapidly increased in number of beats, diminished in impulse, death occurring in three minutes.

The second one was in complete anæsthesia from ethyl bromide in thirty seconds; pupils first contracted then dilated; muscles relaxed; accelerated action of heart, gradually failing impulse; death in seven minutes.

Third rabbit received chloroform, producing rapidly anæsthesia in fifty seconds; heart feeble; at the expiration of one minute fifty seconds heart suddenly ceased to beat.

Post-mortem appearance showed the animal killed by ether presenting congested membranes and investments of brain, heart apparently arrested in diastole, clot in right auricle and ventricle, which were largely distended; odour of ether thought to be faintly perceptible on opening abdominal cavity; *post-mortem* hypostasis well marked in lungs.

Rabbit died of ethyl bromide presented on *post-mortem* examination a brain somewhat paler than normal, clots in both ventricles and auricles of heart; death apparently from over-stimulation of this organ; lungs normal; no odour of the ethyl perceptible in viscera.

Chloroformed animal showed on *post-mortem* examination an anemic brain, small clots in right auricle and ventricle, heart apparently arrested in incomplete systole, due to clot; lungs markedly congested; no odour of chloroform noticeable.

The inferences from these cases seem to impress us as follows:—

The first and second rabbits, which had been treated respectively with ether and with ethyl bromide, died under similar circumstances. The modes of death appear to have been occasioned by a gradual paralysis of the cardiac inhibitory motor centres, while the sudden heart failure in the third, which is typical of chloroform accidents, seems to indicate paralysis of the cardiac motor centres.

While it is hardly justifiable to infer from experiments on animals as to the effect on the human organism, it is not to be denied that they go far, along with the many trials on human beings and those upon ourselves, to show that a direct toxic influence from pure ethyl bromide on the organism need not be apprehended.

That pure ethyl bromide is *per se* an absolutely safe anæsthetic can as yet not be positively stated, but that its action appears to be quite as safe as ether, and certainly more so than the treacherous and dangerous chloroform, seems to us, as deduction from above-related experiments, out of question.

We can certainly hail this new-comer as another agent destined to alleviate sufferings, which, by its own merits, will win its way into the ranks of those we now hold as recognized measures for combating disease, and as such, propose that by this body it be recommended for a position in the National Pharmacopœia about to be revised.

THE BITTER PRINCIPLE AND RESIN OF HOPS.*

BY DR. MAX ISSLEIB.

The nature of the bitter principle, as well as of the other constituents of hops, has already several times been the subject of investigation. These investigations, at least in respect to the bitter principle, have hitherto led to no satisfactory results.

Etti,† in his memoir upon the tannic acid of hops, at the close mentions also the bitter principle, which according to him can be obtained in the following manner. The hops are extracted with ether, when there pass into solution essential oil, chlorophyll, and a crystalline white and an amorphous brown resin. Of these the white resin alone remains undissolved when the evaporation residue of the ethereal solution is treated with alcohol. The resin that is dissolved in the alcohol is separated from the bitter substance adhering to it by the addition of water to the alcoholic solution. From the turbid liquid, which is not rendered clear by filtration, the resin separates, whilst the bitter substance remains in watery solution. If this solution be evaporated in a vacuum over sulphuric acid it yields well-formed colourless crystals; but if it be evaporated in a water-bath only small crystals are formed in an extract-like mass. The crystals, as well as the syrup, have a strong bitter taste, and are completely soluble in water, especially when warmed. According to this author it is possible, by repeated re-dissolving and re-precipitation, to separate the resin and bitter substance so completely that the resin no longer tastes bitter. He says further, "These experiments, which can easily be controlled, are contrary to the frequently expressed opinion that the bitter resin of hops is only brought into watery solution by the help of sugar, tannic acid, gum, essential oil, etc. The brown amorphous resin and the bitter substance of hops are two essentially different substances."

A repetition of this investigation appeared to me to be indicated because of the want of more exact information respecting the crystalline hop-bitter so obtained.

The best Bohemian hops were exhausted with ether. After removal of the ether there remained a greenish-black aromatic resin-like extractive residue. Of this the greater part was dissolved by alcohol and there were left behind white indistinctly crystalline flocks, which were identical with the white crystalline resin of Etti. These flocks, collected on a filter, appeared as a voluminous greenish-coloured residue. This residue was dissolved in ether and repeatedly recrystallized; it was not, however, completely freed from the adhering green colouring matter.

The alcoholic solution of the ethereal hop extract was mixed with half its volume of water. It became at once milky turbid, and after standing the greater part of the resin it contained separated as a brown amorphous mass. This separated resin was re-dissolved five times in alcohol and precipitated with water. The united aqueous liquids did not become clear by filtration. When carefully concentrated on a water-bath there was a separation of a considerable quantity of resin still suspended in it. Crystals were not obtained after the concentrated liquid had been evaporated in a vacuum over sulphuric acid to a syrupy consistence, neither when, as directed by Etti, the syrup had been re-dissolved in alcohol and again separated. Moreover the syrup did not taste like a pure bitter, but strongly acid, nauseous, and afterwards bitter. Further, the alcoholic solution of the resin that had been five times precipitated by water still had a strong bitter taste. These results consequently do not correspond completely with those obtained by Etti.

The previous investigations on the preparation of the hop bitter, so far as the literature is accessible to me, are as follows:—

Ives* first called attention to the presence in hops of a yellow powder, resembling vegetable cells, which occurs on the inner base of the scaly bracts of the hop strobile. It also forms on the young leaves when just bursting, but it falls off from them as they grow older. Ives named these granules "lupulin," and he obtained from dried hops that had been rubbed together in a sack, nearly one-sixth of their weight of this substance. According to his analysis lupulin contained in 100 parts:—

Tannin	5 parts.
Extract insoluble in alcohol	10 „
Peculiar bitter substance, soluble in water and in alcohol	11 „
Wax	12 „
Resin	36 „
Insoluble ligneous residue	46 „

Essential oil was not detected in lupulin by Ives. The substance named wax was soluble only in ether and alkaline liquids. The hop bitter dissolved more easily in hot water than in cold. According to Ives when hops are completely deprived of lupulin they no longer contain any of the peculiar bitter. He therefore proposed that lupulin should be used in the place of hops in medicine and brewing.

In 1826, Pelletier, Payen and Chevallier,† who had previously written on the same subject,‡ published their renewed comprehensive investigation upon the constituents of hops. They extended their investigations both to the herbaceous and woody portions of the hop plant, and to the yellow hop glands. According to them the herbaceous portion and the stem contain the same constituents if carefully freed from lupulin. They impart no bitterness to water, but a disagreeable astringent taste, and a smell resembling that of ordinary vegetable infusions. In the watery extract a series of organic and inorganic salts were detected, which need not be further referred to here.

In the yellow secretion, on the other hand, an abundance of bitter substance was found. The quantity of hop glands amounted to 13 per cent. of the hops; of this, however, 4 per cent. was sand, so that there was left 9 per cent. of pure yellow secretion that floated upon water. From these pure hop glands they obtained 2 per cent. of a white volatile persistently acrid tasting oil, which was assumed to contain sulphur, since polished silver was blackened by water with which the oil had been in contact.

Infusion of hop glands, prepared with heat, has an aromatic bitter taste, and contains essential oil, resin, some fatty matter, organic and inorganic salts, and a peculiar bitter substance, which these authors on their part named "lupulin." They described this bitter substance as yellowish white, drawing moisture from the air, and more soluble in warm water than in cold. The saturated aqueous solution frothed when shaken, had a neutral reaction, and was not altered by acids and alkalies. The bitter substance was prepared by treating the watery extract after addition of lime with alcohol, filtering off the alcohol and evaporating. The residue was exhausted with water, warmed, washed with ether, and carefully dried. The use of ether is unnecessary if the watery extract be repeatedly treated with alcohol and water.

Further the hop glands contained, according to these authors 50 to 55 per cent of resin, soluble in alcohol and ether, having an aromatic smell and taste, and burning with a smokeless flame.

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* Communication from the Laboratory of E. Reichardt. From the *Archiv der Pharmacie* for May.

† *Dingl. Polyt. Journ.*, 1878, 228.

* *American Journal of Science*, vol. ii., p. 302.

† *Journal de Chim. med.*, 1826, vol. ii., p. 527.

‡ *Geiger's Magazin*, vol. xvii.

These investigations were very valuable, in the state of chemical science at that time. Now it is known that in the preparation of the bitter substance nothing should be used—in this case lime—which would induce its decomposition.

Wagner* corrected the statement of Payen and Chevallier as to the presence of sulphur in hop oil. He obtained from hops 0·8 per cent. of a light brownish oil, having a strong smell of hops, a burning slightly bitter taste recalling that of thyme and origanum, sp. gr. 0·908, and slightly acid reaction. In this oil Wagner was unable to detect sulphur and he came to the opinion that Payen and Chevallier had worked with sulphured hops. By fractional distillation the oil was separated into several parts. The portion passing over between 175° and 225° C. had the composition $C_{10}H_{18}O$, consequently differed only by H_2O from the hydrocarbon $C_{10}H_{16}$. Upon mixing the hop oil with alcoholic solution of potash, it became brown, and in distillation a hydrocarbon, having the formula $C_{10}H_{16}$ and smelling like rosemary, passed over. From the behaviour of the oil with acid sulphite of ammonia, it giving no crystalline compound, it was considered not to be an aldehyde.

Personne† made further experiments upon lupulin. In distilling it with water an acid and a volatile oil passed over. The former proved to be valerianic acid, and the volatile oil was by treatment with nitric acid converted into valerianic acid and a resinous substance. Dropped upon fused potash the oil yielded a hydrocarbon $C_{10}H_{16}$, besides carbonate and valerianate of potash. Personne assumed, therefore, the presence in hop oil of a hydrocarbon, $C_{10}H_{16}$, and valerol, $C_{10}H_{18}O_2$. Personne found also in hop oil an organic acid and a bitter nitrogenous substance, neither of which was more closely examined.

Lermer‡ renewed the investigation of the hop bitter. His comprehensive communication mentions of former work only that of Ives. Lermer exhausted hops repeatedly with ether. From the ethereal extract there separated after standing a considerable quantity of a crystalline body, which according to him was myricin. It was easily obtained perfectly white through washing with cold alcohol and recrystallization from hot alcohol. The alcohol solution filtered from the myricin was again distilled, the residue taken up with ether, and shaken repeatedly with strong potash solution until this was no longer coloured deep yellow. The resin, etc., passed principally into the lower watery potash layer; in the upper was found the potash combination with the hop bitter, together with adherent resin. Upon shaking the deep brown ethereal layer it yielded the hop bitter alkali to the water. From the watery solution a copper compound of the hop bitter, soluble in ether, was precipitated by $CuSO_4$. Upon treating the ethereal solution of the copper salt with sulphuretted hydrogen and evaporating the filtrate in a current of carbonic anhydride a brown residue was obtained, in which crystals quickly formed that were freed from adhering mother-liquor by nitrobenzol and spreading them on gypsum. The bitter substance so obtained was insoluble in water, but readily soluble in alcohol, ether, chloroform, carbon bisulphide, benzol, turpentine oil, and similar solvents. The crystals had an acid reaction; the potash and copper salts were also acid. The formula of the copper salt, according to Lermer was $CuO,C_{32}H_{25}O_7$.

Lermer further mentions the occurrence of some other crystalline body in hops, which however was not more closely examined.

The same objection which was raised against the investigation of Payen and Chevallier must be repeated with greater emphasis against that of Lermer. The use of concentrated solution of potash in the preparation of undecomposed hop bitter has been proved by more recent investigations upon the bitter substances inadmissible.

If the properties of the bitter substances previously obtained from the hop be compared no slight differences are manifest. Whilst Ives only mentioned the occurrence in lupulin of a bitter substance which was soluble in water and alcohol, Payen and Chevallier described the nature of the bitter substance named by them "lupulin" as soluble in water and alcohol, neutral and uncrystallizable, and not altered by acids or alkalies. Personne spoke of a bitter nitrogenous substance. Lermer prepared a bitter substance insoluble in water and soluble in ether, alcohol and similar solvents, having an acid reaction. The crystalline bitter substance of Etti was soluble in water and alcohol, though he failed to give nearer information upon its special properties.

These entirely divergent results have their basis in the use of imperfect methods.

In the isolation of bitter substances in the present day their behaviour towards tannic acid, lead salts and animal charcoal is utilized.

Only a few are precipitated by tannic acid; the bitter substance being withdrawn from the precipitate produced by means of alcohol, after the tannic acid has been combined by previous treatment of the precipitate with lead oxide.

Acetate and subacetate of lead are suitable principally for the acid-reacting bitter substances. The bitter substance lead precipitate, stirred in water, is decomposed with sulphuretted hydrogen; the bitter substance is then found either in the watery solution or with the lead sulphide, which possesses the peculiarity of obstinately retaining many bitter substances. Frequently the watery extract is precipitated first with acetate of lead and then with subacetate, in order to ensure the separation of the precipitable acids.

Animal charcoal is advantageous in the preparation of both the neutral and the acid bitter substances. Hopf, Warington, Weppen and others observed the power of vegetable and animal charcoal to remove the bitter substance from bitter vegetable extracts, and Lebourdois and Bley made practical use of the observation. Freshly burnt previously boiled granular animal charcoal is best suited for the purpose. The vegetable extract is treated with the charcoal either in the cold or with heat until the bitter is removed; the charcoal is then washed with cold water and gently dried. The bitter substance is withdrawn by means of boiling alcohol, and other substances going into solution must be removed by suitable reagents. The great advantage of this method is that it is not necessary to concentrate the voluminous vegetable extract, and easily occurring alterations are avoided.

This method was also indicated in this case, because the bitter substance of hops is not isolated by tannic acid and lead salts. If an aqueous extract of hops prepared with heat be treated with tannic acid a plentiful precipitate generally results. This, however, is not a combination of the hop bitter with tannic acid, since if the precipitate be decomposed with lead and exhausted with alcohol, the alcohol leaves upon evaporation a dark brown coloured residue, which has a very disagreeable astringent, but only slightly bitter taste. A very considerable precipitate is also produced in extract of hops or of lupulin by lead acetate and subacetate; but after decomposition by means of sulphuretted hydrogen there remains after the evaporation of the watery solution a body similar to that obtained with tannic acid. If the lead sulphide be exhausted with boiling absolute alcohol there remains upon evaporation of the alcohol generally some slightly yellowish coloured crystals, which consist of sulphur derived from the decomposed sulphuretted hydrogen.

Before I refer to the experiments which led to the decision as to the best means of extraction and the most suitable method of isolating the bitter substance, it will be as well to define the term "bitter substance" somewhat more precisely.

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* *Journal für practische Chemie*, vol. lviii., 351.

† *Journ. Pharm.*, vol. xxvi., pp. 241, 321; vol. xxvii., p. 22,

‡ *Vierteljahrsschrift für pract. Pharmacie*, vol. xii., p. 505.

At present this name is applied to a class of bodies very widely spread through the vegetable kingdom, but also occurring in the animal kingdom, which almost always by boiling with acids or alkalies, sometimes also under the influence of ferments, by the taking up of water, break up into sugar or a body resembling it, and another decomposition product. They belong therefore, mostly, to the large group of glucosides. These are taken as ethers of the sugars or sugar-like compounds; most of them taste bitter or astringent and have a neutral or slightly acid reaction. Besides carbon, hydrogen and oxygen, a few contain nitrogen, and only myronic acid contains sulphur also. From the alkaloids, allied to them by their bitter taste, they are distinguished by the reaction, the almost constant absence of nitrogen and their less powerful action upon the organism. Only picrotoxin, helleborin, digitalin, antiarin and colchicin are exceptions. Those families of plants that are rich in alkaloids,—for instance, papaveraceæ and solanaceæ,—are poor in bitter substances. It is interesting that it is possible still further to split up one of the two original decomposition products, as is the case with phloridzin and salicin.

A scientific arrangement of the glucosides is at present not yet possible. Kromayer divided them according to the difference in their taste into two great divisions, the bitter substances and the acrid tasting substances. Each of these has various subdivisions. Scholemmer* attempted the division of glucosides into the fatty series,—containing at present only myronic acid,—and the aromatic series. From the latter he separates the tannic acids by their behaviour towards salts of iron and albumen solution. Marquardt divided the bitter substances into—

A. Picroglucosides, yielding sugar or some other saccharine body upon decomposition.

B. Pure picrides, yielding no saccharine body to the action of acids.

Both these classes are again split up into—

(1) Chromogens,
(2) Ozogens,
(3) Retinogens,

according as they yield upon treatment colouring matter, odorous matter (essential oil, etc.), or resin.

Preparation of the Hop Bitter.—In order to make clear the best means of extracting the bitter substance from the hop, experiments were made with different solvents.

Behaviour of Lupulin and Hops towards Cold Water.—Hops were exhausted by extracting them four or five times with cold distilled water; a strongly bitter tasting, aromatic smelling yellowish liquid was obtained. When lupulin was rubbed as fine as possible—which caused it to agglutinate together very much and thereby to present resistance to the penetration of the water—a liquid was obtained by similar treatment, which manifested the bitter taste and aromatic odour in a higher degree than that obtained from the hop. The complete exhaustion of the lupulin is only effected with difficulty on account of its resinous nature. Upon the evaporation of the liquids so obtained there remained a small quantity of light-brown extract, which tasted strongly bitter, but herbaceous also.

Behaviour of Lupulin and Hops towards Warm Water.—Upon pouring boiling water upon lupulin and hops strongly coloured extracts were obtained. They tasted bitter, but were also disagreeable and astringent. They left upon evaporation a considerable quantity of brown extract.

Behaviour of Lupulin and Hops towards Alcohol.—10 grams of hops exhausted with 85 per cent. spirit yielded a brown bitter tasting filtrate, which upon evaporating left 2·67 grams = 26·7 per cent. of resin-like extract. 10 grams of lupulin were submitted to similar treatment; the filtrate was deep brown, tasted bitter and left 5·53 grams, or 55·3 per cent. of extract.

According to the statement of Etti and my own observations alcohol dissolves only the brown resin of hops. In order to determine the identity of the resins obtained from the hops and from lupulin, they were both purified with water from adhering extractive matter. The elementary analysis of this resin will be given subsequently. The resin dissolved with difficulty in benzine and light petroleum spirit, but readily in ether, alcohol and chloroform. The hop resin is precipitated from alcoholic solution by subacetate of lead, barium and calcium hydrates. The hydrates of sodium and potassium convert the resin into a resin-soap soluble in water.

Behaviour of Lupulin and Hops towards Ether.—The ethereal extracts of lupulin and hops are green coloured, appear red in transmitted light, and leave upon evaporation of the ether a blackish-green resinous residue that does not impart a bitter taste to water.

From these experiments it appears that the bitter taste both of hops and lupulin can be entirely removed by cold distilled water. The pure bitter aromatic taste of the cold extract, as compared with the bitter disagreeable herbaceous taste of the hot, the lighter colour and the smaller quantity of the cold extract, were advantages that tell in favour of cold water as the means of extraction of the bitter substance.

Further experiments showed that the cold extracts of hops and lupulin can be almost completely deprived of bitter taste by freshly burnt animal charcoal. A larger quantity of hops was therefore placed in a roomy extraction cylinder, with a sieve bottom, and exhausted as rapidly as possible with cold distilled water. The extracts obtained being left in contact with freshly burnt animal charcoal in closed vessels had after two days lost their bitter taste. The charcoal was afterwards washed with cold water and gently dried, and then exhausted with boiling 90 per cent. alcohol as long as the latter was coloured by it. From the wine-yellow strongly bitter-tasting extract most of the alcohol was removed by distillation. The residuary liquid became turbid, but again cleared upon further evaporation, a brownish-black resinous body separating from the reddish-yellow liquid.

Indeed it was by the separation of this—as subsequent elementary analysis demonstrated—brown amorphous resin that the clearing of the watery extract was effected, it not being filtered, but only decanted, so that finely divided resin in the extract is capable of being absorbed by the charcoal.

The reddish-yellow watery liquid from which the resin had separated tasted very strongly bitter; nevertheless this was followed by a disagreeable astringency. It was evidently a solution of the pure bitter substance, or the pure substance must have been contained in it. Carefully brought to the consistence of a syrup upon a water-bath it became turbid, and upon further concentration there was a separation of dark flocks and it did not again dissolve clear in water. From this behaviour it became probable that besides the bitter substance another body was present. A separation of this body by various solvents was attempted, but frustrated by their equal solubility in water, alcohol, choloform benzin and petroleum spirit. But upon shaking, the aqueous solution of the bitter tasting extract with ether this takes up the bitter substance alone, whilst the other body being insoluble in ether remains in the aqueous solution. The ether is faintly yellow coloured, and upon its removal there remains usually a very small quantity of an extraordinarily bitter strongly aromatic smelling body, whilst the watery solution of the extract which has been shaken with ether possesses only an insipid disagreeable taste.

The very small amount of bitter substance obtained from the hops amounted to 0·004 per cent., which induced me to submit lupulin to the same treatment. The lupulin was obtained in Bonn; it was of a yellowish-green colour and very aromatic smell, and left upon incineration 19·8 per cent. of residue, which is probably not to be looked upon as an adulteration, since in the collection of lupulin an admixture of sand, etc., from the hop field is hardly to be avoided.

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* 'History of the Carbon Compounds.'

The lupulin was rubbed as fine as possible, which caused it to agglutinate together. As in this condition it could not be perfectly penetrated by water, it was mixed with three to four times its quantity of pure quartz sand that had been freed from soluble matter with acid. In other respects the process followed was as before.

Five kilos of lupulin yielded 5·5 grams of bitter substance, equal to 0·11 per cent., quite similar in its properties to that obtained from hops. The hop bitter is therefore present more abundantly in lupulin than in the whole hop; which is a confirmation of the earlier statement of Payen and Chevallier that the bitter substance of hops has its seat exclusively, or at least principally, in lupulin.

Properties of the Pure Bitter Substance.—The bitter substance remains after the evaporation of the ether as a ight-yellow mass, of the thickness of an extract, which upon heating to over 60° C. assumes a reddish-yellow colour. If it be kept a longer time at this temperature it can be rubbed after cooling into a yellowish-white powder. In cold water the bitter substance when of a syrupy consistence is tolerably easily soluble; but in the powder form it dissolves much more difficultly. When dissolving in warm water the bitter substance melts together to a resin-like mass, which rotates for a long time on the surface of the water; it always becomes darker in colour and the latter portions are only very difficultly soluble.

Alcohol, benzine, carbon bisulphide and ether dissolve the bitter substance readily; but all attempts to crystallize it from one of these solvents were without result. Evaporated during a week under the air pump there always remained an amorphous mass. The taste is a very intense pleasant bitter, recalling quinine; the smell is very aromatic and resembling hops. Upon heating it to over 100° it puffs up and decomposes with evolution of a peculiar aromatic odour; and upon stronger heating it burns with a bright sooty flame, without leaving any ash.

The bitter substance contains no nitrogen and has an extremely slight acid reaction. Concentrated sulphuric acid dissolves it with a black, and concentrated hydrochloric acid and nitric acid with a yellow-brown colour. Upon treating a warmed aqueous solution with dilute acids it becomes turbid, giving off a strongly aromatic smell. Upon longer standing there separates at the bottom of the vessel a brown resin-like substance insoluble in water. A decomposition of the hop bitter is consequently caused by dilute acids, but no sugar can be detected in the supernatant liquid. Alkalies dissolve the bitter substance with an intense yellow colour. Acetate and subacetate of lead and tannic acid produce turbidity in hop bitter solution, without a clear precipitation following. Ferrous and ferric salts produce no change of colour in a solution. The reagents for alkaloids, iodo-iodide of potassium solution, phosphomolybdic acid, phosphotungstic acid, platinic chloride, and mercuric chloride cause no precipitation.

Elementary Analysis of the Hop Bitter.—As the change of colour that takes place in the hop bitter when heated above 60° C. indicates the beginning of decomposition an elementary analysis was made of some that had been dried at this temperature until the weight remained constant. The combustion was made by means of cupric oxide in a current of oxygen gas.

I. 0·2314 gram gave 0·1703 H_2O=0·018922 H; and 0·5340 CO_2=0·145636 C.

II. 0·2268 gram gave 0·1679 H_2O=0·018955 H; and 0·5194 CO_2=0·141654 C.

III. 0·2204 gram gave 0·1670 H_2O=0·018555 H; and 0·5068 CO_2=0·138218 C.

	Found.			Calculated for $C_{29}H_{46}O_{10}$.
	I.	II.	III.	
C =	62·93	62·45	62·71	C = 62·81
H =	8·17	8·22	8·42	H = 8·31
O =	28·90	29·33	28·87	O = 28·88
	100·00	100·00	100·00	100·00

Decomposition of the Hop Bitter.—When a warm aqueous solution of hop bitter is mixed with twenty times diluted SO_4H_2 in great excess, it at once becomes very turbid. After standing twelve hours a resinous mass separates upon the bottom and sides of the vessel, whilst the supernatant liquid appears yellow coloured. The quantity of the separated insoluble body amounted in one case to 8·4, and in another to 8·7 per cent of the hop bitter used. The filtrate was as exactly as possible neutralized with $Ba(OH)_2$, and after filtering off the $BaSO_4$ evaporated. After cooling the syrupy liquid solidified to a crystalline paste. The crystals contained a considerable quantity of baryta, but were neutral in reaction, a formation of a barium salt had therefore taken place. There was no indication of sugar.

The insoluble resinous body produced by SO_4H_2 may be named "lupuliretin," and the acid formed simultaneously, "lupulinic acid."

After purification of the lupuliretin from adhering sulphuric acid by careful washing with warm water it appears as a brownish-black aromatic-smelling resin-like body. Its chemical relations resemble those of hop resin; it cannot be obtained crystalline from either alcoholic or ethereal solution. It gave on analyses results corresponding with the formula $C_{10}H_{16}O_4$.

	Found.		Calculated for $C_{10}H_{16}O_4$.
	I.	II.	
C =	60·14	59·93	C = 60·00
H =	7·85	8·29	H = 8·00
O =	32·01	31·78	O = 32·00

Lupulinate of barium is extremely soluble in water, dissolving equally in ether, alcohol, chloroform and water. It was not found possible to deprive it of its yellow colour by recrystallization from any of these solvents. Dried over calcium chloride until constant in weight and analysed it gave results corresponding with the formula $C_{48}H_{90}BaO_{24}$.

	Found.		Calculated for $C_{48}H_{90}BaO_{24}$.
	I.	II.	
C =	48·23	48·08	C = 48·53
H =	7·47	7·66	H = 7·58
Ba =	11·56	11·56	Ba = 11·54
O =	32·74	32·70	O = 32·35

When heated to 80° C. this salt lost five equivalents of water; therefore $C_{48}H_{90}BaO_{24} = C_{48}H_{80}BaO_{19} + 5H_2O$. Upon stronger heating it decomposed with evolution of vapour having an acid reaction, and at a temperature of about 300° C. it burnt with an aromatic odour.

Upon exactly neutralizing 0·3 gram of lupulinate of barium with sulphuric acid the concentrated filtrate left a faintly yellow-coloured crystalline bitter-tasting residue.

Elementary Analysis of the Hop Resin.—Resin obtained both from hops and lupulin was analysed.

	Found.			Calculated for $C_{10}H_{14}O_3$.
	I.	II.	III.	
C =	65·67	65·81	66·09	C = 65·93
H =	7·68	7·69	8·04	H = 7·68
O =	26·65	26·50	25·87	O = 26 39
	Resin from Hops.		From Lupulin.	

For the confirmation of the empirical formula $C_{10}H_{14}O_3$ for hop resin experiments were made in the preparation of compounds. It is necessary, however, to remember that these compounds of resins frequently do not show a constant composition.

Upon treating a spirituous solution of hop resin with subacetate of lead a voluminous precipitate appeared, which after careful washing and drying formed a greenish-yellow powder. Upon analysis it gave results corresponding with the formula $C_{30}H_{40}PbO_9 + 3OH_2$. The composition found would probably be more correctly expressed by the formula—

$$(C_{20}H_{26}PbO_6 + C_{10}H_{14}O_3) + 3OH_2.$$

A barium compound was prepared by decomposing the soda soap of hop resin by means of baryta water. This gave results corresponding with the formula—

$$(C_{20}H_{26}BaO_6 + C_{10}H_{14}O_3) + 7OH_2.$$

The calcium compound was obtained by decomposing the soda soap with lime water. It formed a greenish-grey powder and yielded results corresponding to the formula $C_{20}H_{26}CaO_6 + 6OH_2$.

Substance Insoluble in Ether.—As before stated there occurs in the spirituous extract from the animal charcoal besides the bitter substance a body that is insoluble in ether, whilst the bitter substance is dissolved by it. When this insoluble substance is dried and powdered it forms a red-brown hygroscopic powder, having a disagreeable smell and taste. Submitted to elementary analysis it gave results corresponding with the formula $C_{10}H_{18}O_6$. An aqueous solution treated with subacetate of lead yielded a voluminous yellowish-green precipitate, which after careful washing and drying was analysed and gave results corresponding with the formula $C_{10}H_{16}PbO_6$.

Conclusions.—From the results of the foregoing investigation it appears that there exists in hops and in lupulin a peculiar bitter substance. It is decomposed by acids, but as no sugar is yielded it must be placed among the pseudo-glucosides. The decomposition takes place according to the following equation:—

$$2C_{29}H_{46}O_{10} + 3OH_2 = C_{10}H_{16}O_4 + C_{48}H_{82}O_{19}.$$

The lupuliretin obtained by the decomposition of the hop bitter is related to the resin and the essential oil. From hop resin it differs by H_2O.

$$\underbrace{C_{10}H_{14}O_3}_{\text{Hop resin.}} + OH_2 = \underbrace{C_{10}H_{16}O_4}_{\text{Lupuliretin.}}.$$

It may be that hop resin is derived from the essential oil as follows:—

$$\underbrace{C_{10}H_{18}O}_{\substack{\text{Essential Oil}\\ \text{of Hop.}}} + O_4 = \underbrace{C_{10}H_{14}O_3}_{\text{Hop resin.}} + 2H_2O.$$

The substance insoluble in ether is a simple oxidation product of the hop oil; thus:—

$$\underbrace{C_{10}H_{18}O}_{\text{Essential Oil.}} + O_5 = \underbrace{C_{10}H_{18}O_6}_{\substack{\text{Substance Inso-}\\ \text{luble in Ether.}}}.$$

The hop resin stands, however, in certain relation to the substance insoluble in ether, so that the assumption is permissible that in the oxidation of the essential oil of hop first resin is found, and afterwards, by further oxidation, the substance insoluble in ether, which is richer in hydrogen and oxygen.

THE CONSTITUENTS OF JAPANESE BELLADONNA (SCOPOLIA JAPONICA).*

Scopolia japonica, which is called by the Japanese rôtô, or onishirikusa, or omisikusa, or omekikusa, or hashiridokoro (which last term is the most usual one), is a member of the natural family Solanaceæ and is highly poisonous. Its root has been employed for a very long time by Japanese physicians, and there can be no doubt that it possesses valuable therapeutic properties.

The latter reside in two alkaloids, which were obtained in the following manner:—The dried root was powdered and several times extracted with alcohol, the alcohol was distilled off from the united tinctures, the residue dissolved in water and filtered to remove the separated fat. The clear filtrate was now precipitated with solution of acetate of lead, the precipitate removed by filtration, the filtrate freed from excess of lead by sulphuretted hydrogen, and after again filtering the solution concentrated, at a moderate heat, on a water-bath. The thin liquid residue was mixed with sulphuric acid, the mixture shaken with chloroform and the chloroformic solution separated. On evaporation, the latter left behind slender colourless needles which were contaminated with a yellow, smeary mass. The whole residue was boiled with water, the liquid (after cooling) was filtered, the filtrate concentrated on the water-bath at a low temperature and cautiously mixed with ammonia. This produced a white precipitate, which was collected on a filter, washed with a little water and then dissolved in alcohol, which, on evaporation, left behind colourless crystals. These had the characteristics of an alkaloid. Owing to the minute proportion in which this alkaloid exists in the root, the quantity obtained was insufficient for an accurate investigation of its properties and nature. A few drops of the aqueous solution of the sulphate of this alkaloid dropped into the eye of a rabbit produced dilatation of the pupil. I propose to name this alkaloid rotoine (from the Japanese name, rôtô), and reserve to myself its further study.

The second alkaloid, which I term scopoleïne, exists in the root in larger proportion. It is obtained by adding an excess of soda solution to the acid liquid left after shaking with chloroform and by again shaking the now alkaline liquid with chloroform. The latter takes up the alkaloid and deposits it, on evaporation, in an impure condition, as a yellowish-brown, resinous mass. In order to purify it it was dissolved in dilute sulphuric acid and the solution carefully mixed with sodium carbonate, as long as the precipitate was dirty and slimy. After filtering, a further quantity of sodium carbonate was added as long as a precipitate was formed. The latter was collected on a filter, washed and dissolved in chloroform. On evaporating the latter, the alkaloid was obtained as a yellowish, resinous mass, which, when perfectly dry, may be rubbed up to a yellowish-grey powder, possessing a great tendency to run together. I have been unable to obtain this alkaloid in a crystalline condition or to form crystallized salts. It is difficultly soluble in water, easily in acidulated water, also easily in chloroform and alcohol. All these solutions (except when supersaturated with acid) have a strong alkaline reaction. It yields precipitates with nearly all alkaloidal reagents.

Regarding its effect on the animal organism, I can at present (July 22, 1878, at a meeting held in Tenkion, Yedo, Japan—ED. N. R.) only say that it seems to act similarly to atropia. What relation it bears to the latter, however, I am not at present prepared to say, but hope to be soon able to give a fuller account of its composition, products of decomposition and physiological effects.—Dr. A. Langgaard, from *Mittheilungen der Deutschen Gesellschaft für Natur- und Völkerkunde Ost-Asiens*, fol. Yokohama. No. 16 (December, 1878); p. 267.

Note by ED. N. R.—A short account of the root of *Scopolia japonica* and its uses, by Dr. G. Martin, of Tokio, Japan, may be found in the *Archiv der Pharmacie*, December, 1878, p. 336. Dr. Martin states that it is called Japanese belladonna, but that its narcotic effects are much less marked than those of true belladonna. He says it contains solanine, but no atropine. The plant is further remarkable from the fact that it communicates to liquids a stronger fluorescence than any other known plant.

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The Pharmaceutical Journal.

SATURDAY, JULY 3, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE AUTUMN SCIENTIFIC MEETINGS.

THOUGH it has not been until after the days had begun to shorten that we have been so fortunate as to enjoy weather that could fairly be called summer-like, the experience of the past week has been sufficient to bring to mind the fact that the excursion season is again coming round, and that before six weeks are over there will be special inducements for those whose business is more or less connected with scientific subjects to take part in some of the annual gatherings that have for their object the promotion of science and its applications as well as the increase of social intercourse between the cultivators of particular branches.

The coming month of August will leave little to be desired in this respect if it be only possible to take advantage of all the opportunities to be presented. First in order of date there will be the meeting of the British Medical Association, to be held at Cambridge from the 10th to the 13th, under the presidency of Dr. G. M. HUMPHRY, Professor of Anatomy in the University of Cambridge, and during which addresses upon Medicine, Surgery and Physiology will be delivered by Dr. J. B. BRADBURY, Mr. TIMOTHY HOLMES and Professor MICHAEL FOSTER. In addition to the usual business of the sections specially devoted to various subjects there is to be an exhibition of surgical instruments, microscopes, pharmaceutical preparations, dietetics and sanitary appliances, and excursions will be made to Ely, Peterborough and Audley End on Saturday, the 14th.

After the lapse of a week from that time will succeed the meeting of the British Pharmaceutical Conference at Swansea, commencing on Tuesday, the 24th, under the Presidency of Mr. WILLIAM SOUTHALL, of Birmingham, and continuing during that day and the next for the reading of papers and transaction of general business. On the Thursday it is proposed to have a marine excursion in the bay, and if the weather is propitious this opportunity of seeing the fine coast scenery in the neighbourhood of Swansea will be a source of much enjoyment to lovers of the picturesque, while botanists and geologists will no less meet with numerous objects of special interest to them.

The extent and variety of the industrial enterprise in the neighbourhood of Swansea cannot fail to furnish many attractions for those who visit the Conference, and we understand that arrangements are to be made for the members to inspect some of the most interesting manufacturing establishments. Last year the visitors of Sheffield enjoyed a great treat of this kind in going through the BESSEMER Steel Works and the Electro-Plate Works that could scarcely be surpassed; but when it is remembered that in the Swansea district there is another highly interesting steel-making process in operation, besides iron works, silver, nickel, cobalt and zinc refineries; since, moreover, it is an important centre of copper ore smelting, of tin-plate making, and of "patent fuel" manufacture, there is every reason to anticipate in this respect a result no less satisfactory than that experienced last year at Sheffield.

Mr. JAMES HUGHES, the Local Secretary of the Swansea Committee, is, we understand, about to issue a circular to the members of the Conference offering to give information as to hotel and other accommodation for intending visitors, and in order that this may be secured satisfactorily it is desirable that early application should be made to him.

As compared with some of the places that have been visited by the Conference, Swansea is but a small town, and though we do not doubt that good and ample accommodation will be found by all who attend the meeting, the fact that the British Association meeting will be held at the same time will naturally make this more difficult. In our report of the proceedings of the Executive Committee of the Conference last week it will have been noticed that from considerations of this kind it has become a standing question whether the advantages of holding the Conference meeting at the same place and at the same time as the meeting of the British Association are not now more than counterbalanced by the attendant disadvantages of that plan.

During the early years of the Conference it would scarcely have been possible to have a meeting otherwise than with the support of those who were mainly brought together by the attractions of the British Association; in fact the Conference was then little more than incidental to the Association meeting. But now that it has attained a considerable degree of independent vitality it does not seem to be essential that the meetings should coincide. The attendance at the meetings is now much greater than it was originally, and, in a small town especially, this circumstance is likely to produce some degree of inconvenience on both sides, if not actual antagonism, in the attempts to procure places of meeting and lodging accommodation.

On the other hand, there is no doubt that to some members of the Conference the simultaneous meetings are a great convenience, as pointed out by Mr. SCHACHT, but we are disposed to think that the number of those influenced in this way is very small as compared with aggregate of the visitors to the Conference. This argument in favour of continuing the previous practice seems moreover to be somewhat beside the real question to be considered.

This year the meeting of the British Association is to be presided over by Professor Ramsay, the Director General of the Geological Survey, and the special features of interest will be lectures on Primeval Man, by Professor W. Boyd Dawkins; on Mental Imagery, by Mr. F. Galton, and on the North-East Passage, by Mr. Henry Seebohm.

REGISTRATION UNDER THE DENTAL ACT.

At the recent meeting of the Medical Council a letter from the Honorary Secretary of the Dental Association was read, calling attention to an accompanying list of persons who have been registered in the Dentists' Register upon their declaration that they were at the time of the passing of the Act "in the *bonâ fide* practice of dentistry with pharmacy," but whose names are not to be found in the Register of Chemists and Druggists for 1878, and who in an "opinion" of counsel that had been obtained are consequently all liable to have their names struck off the Register. After consideration it was resolved that a reply should be sent that for the purpose of the removal of names from the Dentists' Register it is necessary that evidence with respect to each name should be submitted to the General Council who will thereupon take such steps as it may see fit, in conformity with the provisions of the Act.

This resolution is in accord with our expectation, as it has been expressed to correspondents that have consulted us upon the subject.

A further indication of the course which the Medical Council will be disposed to follow is given in its decision with respect to a case in which a person whose connection with pharmacy had been limited to assisting in a homœopathic pharmacy and who had received a warning letter from the Dental Association because his name was not on the Register of Chemists and Druggists. He had now forwarded a certificate from a medical man that he had for three years been earning his living in the practice of dentistry in conjunction with the homœopathic pharmacy, and asked that his declaration might be amended. The application was granted, and instructions were given that in future issues of the Dentists' Register the words "with pharmacy" should be omitted after this person's name.

THE CONFERENCE TESTIMONIAL TO PROFESSOR ATTFIELD.

It will be remembered that at the last meeting of the British Pharmaceutical Conference at Sheffield, it was resolved that under the circumstances of Professor Attfield's announced retirement from the post he now occupies, it is desirable to institute some permanent recognition of the invaluable services to the Conference rendered by him as its Senior General Honorary Secretary since its establishment sixteen years ago.

An influential General Committee was formed last October for the purpose of taking the necessary measures to carry out this resolution. At its first meeting the General Committee appointed a small Executive Committee, consisting of Messrs. Schacht, Benger, Brady, T. Hyde Hills, R. Reynolds, M. Carteighe and Professor Redwood, to carry out the details of the scheme.

As the subscription list will shortly close, subscribers who have not yet paid their subscriptions are invited to send the amount without delay. Subscriptions of any amount not exceeding 10*s.* 6*d.* should be forwarded to the Honorary Secretary and Treasurer, Mr. Michael Carteighe, 180, New Bond Street, London, W.

THE CATALOGUE OF THE SOCIETY'S LIBRARY.

We are requested by the Secretary to say that the new edition of the Catalogue of the Library of the Pharmaceutical Society is now ready, and that in accordance with the resolution passed by the Council a copy has been forwarded through the post to every Member and Associate in Business of the Society. Associates not in Business and Apprentices or Students of the Society will be supplied with copies of the Catalogue upon applying for them to the Secretary.

It may further be mentioned that there are still some copies left of the recently published Index to ten volumes of this Journal, and that copies of this work also will be supplied to persons connected with the Society who have not yet received them, upon their expressing a wish to that effect to the Secretary.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The last ordinary meeting of this session will be held on Thursday next, 8th inst., at 8.30 p.m. A Report on Organic Chemistry (postponed from the last meeting) will be made by the Secretary on "The Relation between the Chemical Constitution of certain Organic Compounds and their Action upon the Ultra-Violet Rays." A Report on Materia Medica will be made by Mr. R. H. Parker, on "Spurious Gums imported with Myrrh." A Report on Inorganic Chemistry will be made by Mr C. H. Hutchinson, F.C.S., on "The Formulæ of some Inorganic Substances."

THE CHEMISTS' ASSISTANTS' ASSOCIATION.

A special meeting of the above Association will be held at 32a, George Street, Hanover Square, on Wednesday next, July 7, when there will be an exhibit of microscopes and other objects of interest by its members.

Provincial Transactions.

LEEDS CHEMISTS' ASSOCIATION.

The seventeenth annual meeting of this Association was held in the Library of the Association, at the Church Institute, on June 3, Mr. R. Reynolds in the chair.

The Honorary Secretary presented the financial statement, which showed a balance in favour of the Association of £31 11*s.* 1*d.*

The number of members was reported as having fallen during the year from thirty-six to twenty-nine, and that of associates from twenty-six to twenty. The use made of the library and reading-room by some of the associates had been considerable, and the Committee would wish to see a more general advantage taken of the valuable collection of books relating to chemistry, botany and pharmacy.

The collection of materia medica specimens has been in rather frequent use by students.

The lectures delivered during the year have not been numerous; but the attendance has been more encouraging than in some previous sessions.

The papers read on these occasions have been as follows:—November 12, by Mr. J. Abbott, on "Ergot;" December 12, T. Fairley, Esq., F.C.S.E., "Glass, its Manufacture and Mode of Working;" February 11, Mr. E. O. Brown, on "Aerated Waters, and Simple Methods of Detecting Impurities therein;" March 10, Mr. Bothamley on "Flame."

The following officers were elected for the current year:—President, Mr. Councillor T. B. Stead; Vice-President, Mr. S. Taylor; Treasurer, Mr. J. A. Hirst; Honorary Secretary, Mr. J. Hellowell; Librarian, Mr. J. Exley; other Members of Committee, Messrs. Abbott, Chadwick, Jefferson, R. Reynolds, Smeeton, Yewdall; Auditors, Messrs. G. Exley and F. Reynolds.

The best thanks of the Association were tendered to Mr. J. Land, who has for many years acted as Treasurer.

MEETING AT NOTTINGHAM.

THURSDAY HALF-HOLIDAY MOVEMENT.

At a general trade meeting of the chemists and druggists of Nottingham, held at the Flying Horse Hotel, on Wednesday, June 23, Mr. W. H. Parker in the chair, the following resolution was unanimously carried:—"That in the opinion of this meeting it is desirable that the chemists should close their establishments on Thursday afternoon, and that the following gentlemen, Messrs. Fitzhugh, Rayner, W. H. Parker, C. Warriner, W. Widdowson, R. Widdowson, Humphreys, Oldershaw, Wilford and Normel be a Committee to strive to bring this object about."

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, June 24, Professor Attfield, F.R.S., in the chair.

Mr. W. A. H. Naylor, F.C.S., read a paper on "The Green Extracts of the Pharmacopœia." It is intended to publish a *résumé* of this paper in a future number.

A discussion followed the reading of the paper, in which the President, Messrs. Parker, Arnold, Hooper, Postans, Hardwick, James and Wright joined.

Mr. Holland said that he considered the taste which Mr. Naylor had referred to in ext. taraxaci is owing (assuming that it has been properly prepared) to the season in which the root has been collected. The extract prepared from roots gathered in September and October would be very different from that made from roots collected in February. As regarded the preparation of the green extracts of hemlock, henbane, nightshade, etc., remembering the experiments which were made previously to the publication of the British Pharmacopœia in 1864, and having taken part in a discussion on the subject shortly afterwards, Mr. Holland was sorry to find that Mr. Naylor had reopened the question in his paper as to whether or not it is prudent to discard the albumen from the finished extract. He had always considered the albumen an inert and valueless adjunct to the extract and although it might not very materially affect the keeping qualities of the product, the quantity thrown down varied so much in different stages in the growth of the plants that it would be very unwise to allow it to be retained in the extract or rejected at the discretion of the manufacturer. Mr. Naylor had said that the syrup should be thick, and not thin, when the green matter is added. Mr. Holland thought that it was a matter of very little importance provided the temperature were kept low enough; but he strongly urged that the liquor from the preparation, after being strained, as Mr. Naylor suggested, should be heated on a water-bath so that the green juice could never come in contact with the side of the pan where the heat is above 130° F. This must be the case if the juice were heated in a high pressure steam pan, which should in no case be employed until the green colouring matter had been separated. The proper time for collecting the plant for making into extracts was very accurately described in Squire's 'Companion to the Pharmacopœia,' which was followed by Mr. Naylor in his paper.

A vote of thanks was accorded to Mr. Naylor for his practical pharmaceutical paper.

Mr. Stewart Hardwick then read the following paper upon "Boracic Acid Ointment":—

BORACIC ACID OINTMENT.

BY STEWART HARDWICK.

A short time ago a prescription for a lotion was given me to dispense, containing borax, carbonate of soda, glycerine and water. On mixing the ingredients there was evident decomposition with strong effervescence. Examination of the glycerine of borax of the Pharmacopœia proved it to be strongly acid, and on treating borate of calcium with glycerine it dissolved, and on addition of carbonate of soda effervescence occurred. I am not at present in a position to say what this reaction is, but one result is the liberation of boracic acid.*

Thus finding boracic acid to be soluble in glycerine, I endeavoured to prepare a solution that might be used to mix with a fatty base to form a perfectly smooth ointment; but found, when the proportion of acid ordered is large, the quantity of glycerine required is greater than is desirable to introduce into an ointment. I then turned my attention to solidifying solutions of the acid in glycerine by means of gelatine and starch, and made preparations varying in strength from 2 to 1 drachm in the ounce. The latter, I believe, is quite as strong as the ointment usually employed. The form I used for the jelly is:—

Gelatine	15 gr.
Water	2 dr.
Glycerine	6 dr.
Boracic Acid . .	as much as is ordered.

The gelatine is soaked in the water for two or three hours, and then added to the boracic acid dissolved in the glycerine by aid of a gentle heat.

The water is necessary on account of the hygroscopic nature of the glycerine; but its addition reduces the solvent power of the mixture, consequently when made much stronger than 1 drachm in the ounce part of the acid crystallizes out. Glycerine jelly does not, however, form a good base.

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* An explanation of this reaction was given in a paper read before the Students' Association by Dr. Senier and Mr. Lowe, in April, 1878. See *Pharm. Journ.*, [3], viii., p. 819.—ED. PH. J.

A far better preparation is made by use of starch, which might be named glycerine of boracic acid. The form for its preparation is:—

Starch	1 drachm.
Glycerine	1 ounce.
Boracic Acid . .	as much as is ordered.

Dissolve the acid in the glycerine, add the starch, and heat to the boiling point. When made a drachm in an ounce this preparation leaves nothing to be desired; the base is of good consistence, the active ingredient is in a state of perfect solution, and on that account may be expected to have a quick and effective action. When made 2 drachms to the ounce a small part of the acid separates out in microscopic crystals; but even then the state of division is far greater than can be obtained by trituration.

When it is desired to incorporate boracic acid with lard or other fatty base, the addition of a few drops of glycerine (about 20 minims to a drachm) materially facilitates its pulverization.

After a discussion, a vote of thanks was passed to Mr. Hardwick.

SOCIETY OF ARTS.

THE CHEMISTRY OF BREAD-MAKING.*

BY PROFESSOR GRAHAM, D.SC.

(*Continued from page* 1051, *Vol. X.*)

Lecture III.

The albuminoids in cereals may be very conveniently divided into two chief categories, those which are soluble in water, and those which are, at least at first, not soluble. Those which are insoluble consist of glutin and fibrin. Glutin differs from fibrin, inasmuch as it is slightly soluble in cold water—more so in hot water; but that which distinguishes it from fibrin is that it dissolves in spirit of wine, whereas the other material, fibrin, which constitutes 71 per cent. of crude gluten, does not. There are yet other forms of albuminoids, but these are soluble in water. They consist of albumen, which, of course, is soluble in water. It is precipitated by strong alcohol and by boiling, and differs therefore from the next member, legumin, which resembles albumen in every other respect, except that on boiling it is not precipitated. Lastly, there is a form of soluble albuminoid matter, contained more especially in the husk or skin of the berry of the wheat, which has been called cerealin. This is a very active diastasic ferment, and resembles to a great extent the peculiar diastasic ferment which is obtained from malting barley, and infusing the result of that malting.

These three varieties of albuminoids are found, one or more of them, more or less in all seeds, and for this reason. You remember I pointed out to you the nature of the caryopsis of barley, and I compared that with the rich, thick, fleshy cotyledons of the bean and pea, and I said that when you considered the bean and pea or the caryopsis of the barley and wheat, we have in either case a mass of matter stored up by the parent plant for the future nourishment of the young embryo lying at the bottom in both cases. Now, the function played by these soluble albuminoids is to convert the insoluble cellulose matter, the woody fibre, and after that has been to a great extent used up, then to attack the starch, the amylaceous matter, in the grain or in the seed, and convert it into soluble nourishment for the young growing embryo. The amount of soluble albuminoids we shall presently see, in well-matured and well-garnered grain, is not large, whereas, in ill-matured grain, and still more, of course, in sprouted grain, the amount of these albuminoid ferments is considerable.

I shall call your attention now to a very interesting experiment, because we shall find that it has a considerable bearing upon the very ingenious process of fermentation that bakers have discovered for themselves. If we take yeast, which is a powerful and active ferment when added to dextro or lævo-glucose, or maltose sugar, and add it to the unbroken starch cells, we shall find that, even after an hour in the cold, there is comparatively little action; whereas if we add to that yeast, and that unbroken starch—ordinary starch before it is boiled, and while the cells are not burst—a small quantity of the cold water infusion of any of the cereals, we shall find that, inasmuch as that cold water infusion contains soluble albuminoids, these are acted upon by the yeast, and are converted from their complex molecular structure into bodies of less complexity in their structure. In other words, they are less colloidal or gummy; they are more mobile. That peculiar molecular disturbance having been brought about, among the soluble albuminoid bodies in the cold water infusion of any of the cereals, by the peculiar action of yeast, these degraded albuminoids have the power of passing through the lining of the starch cell, and in that way the hydration of the starch is brought about, so that maltose sugar and dextrin of the various kinds I have told you about are formed; whereas, if we do not make use of these soluble albuminoids obtained from a cold water infusion of one of the cereals, if we take starch itself unboiled, we shall find that yeast has, in the same time, comparatively little action. Now, that is a matter of considerable interest, and we shall find that the baker has acquired all that knowledge practically long ago. I am only pointing it out to you now on account of its scientific interest. Mr. Lewis has, in one tube, some water, unbroken starch cells and yeast; in the other, in addition to the yeast and starch, he has added a small quantity of cold aqueous infusion of flour. These two tubes have stood one hour, and on testing a filtered portion of each, you will find that, whereas the yeast and starch alone have no action, or but little, on Fehling's solution when boiled with it, that in the other case, where a little cold infusion of flour was added, the Fehling's solution will show considerable reduction, proving that sugars have been formed by the intervention of the soluble albuminoids of flour. We may gather, then, from this that the yeast cell is itself unable to pierce the starch cell, and that the action brought about by the yeast is indirect; by first of all degrading the form of the soluble albuminoids, and then causing them to ooze through the sac or wall of the starch cell.

The tendency of all albuminoids, even those which are insoluble in water, and even that which is the most complex in its structure, namely, fibrin, is to degrade, to become less and less complex, and ultimately, of course, to become soluble in water. The degradation of molecular structure is communicated to the complex molecular structure of starch, so that the complexity of starch undergoing the peculiar degrading action which goes on in the albuminoid molecule is itself converted into molecules less complex than starch, namely, into maltose and dextrin; in some cases there may be also the production of other sugars. We see then, that the albuminoids are powerful degraders, or breakers down of the complexity of molecular structures. But that is not the only interesting point connected with nitrogen. Curiously enough, we speak of nitrogen as being inert, and as being merely used for the purpose of diluting the oxygen of the atmosphere, hence we are all very liable to look upon nitrogen as playing a comparatively unimportant *rôle* in the phenomena of nature; and yet, strangely enough, were it not for the action of nitrogen, or rather for the compounds of nitrogen, there would be no life whatever in this world; there could be no simple cell even built up without the action of this marvellous architect, the nitrogenous compound. Every cell structure, and of course every large aggregation of cell structures, such as an oak tree, or a man, containing many millions of cell structures, is all built up by the wonderful agency of nitrogen, or rather of its compounds. But while nitrogen is so important an agent, so marvellous a builder up, it is for very similar reasons equally powerful in breaking down. Wherever you have albuminoids present, if there be moisture sufficient, and if there be warmth sufficient, there you have the agent ready for degradation. And hence it follows that man has been obliged to use two chief methods for the purpose of preventing this wonderful degrading power possessed by albuminoids. One method man adopts is heat. By the simple action of heat, some albuminoids are rendered insoluble, and, therefore, inert. You know that if you take ordinary white of egg and boil it, you will, to some extent, prevent the degradation of the albumen, and it will last, or withstand putrefaction, longer than if you had not so boiled it. Heat, together with drying, is a still more powerful method of preventing the attack of these albuminoids. If you were to take perfectly pure cellulose, which exists so largely in woody structure—if it were absolutely free from all kinds of albuminoids—you would find even in moisture it would not decay; it would last for ages, I may say; but we also know perfectly well that ordinary wood decays rapidly, especially if there be moisture. Now, the plan adopted in order to overcome this tendency to decay, is either to heat the wood, so as to char a portion of it, as used to be done when wood was charred on the outside to convert it into charcoal. That plan, however, has been replaced to a great extent by the still more efficacious way of acting on the albuminoids so as to precipitate them. Tannic acid and creasote precipitate the albuminoids, and that is why the leather maker uses the tannic acid in oak bark or Bombay cutch, and why railway companies take care to creasote their sleepers. The creasote precipitates the albuminoid matters, and therefore those albuminoid matters are not able to degrade the cellulose matter of the wood. So in the same way fish is cured; the Finnon haddock is preserved for a certain time by the action of smoke; hams are also so preserved for a certain time. Other methods have been employed, such as the use of salt, and you will find that the baker made use of this agent to prevent, to some extent, the degrading action of the albuminoids. The Egyptians, in the preparation of their mummies, had recourse to the same system, partly by drying and partly by the employment of certain aromatic principles, so that we find that heat, especially dry heat, is one of the means by which we can prevent the degrading action of albuminoids. The other method consists in the employment of chemical reagents, such as corrosive sublimate, tannic acid, creasote, and other matters of that kind, which prevents their activity by the precipitation of albuminoids. We shall presently see more of this when I come to speak of the rationale and object of the kiln-drying of grain.

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* Cantor Lectures: Delivered November and December, 1879. Reprinted from the *Journal of the Society of Arts.*

We have seen the great diversity of character of the albuminoids found in the different cereals, and I wish to draw your attention this evening to the degrading influences which are brought about in the character of the albuminoids of wheat by climatic influences. I have here the result of the researches of the eminent chemist, Péligot, on different wheats, taken chiefly from his own country, but to some extent from countries outside France.

ANALYSIS OF WHEAT (PÉLIGOT).

	Flemish.	Provence.	Odessa.	Hérisson.	Poulard Roux.	Poulard Bleu.	Poulard Bleu. Dry year.	Midi.	Polish.	Hungarian.	Egyptian.	Spanish.	Taganrogg.
Water	14·6	14·6	15·2	13·2	13·9	14·4	13·2	13·6	13·2	14·5	13·5	15·2	14·8
Fat	1·0	1·3	1·5	1·2	1·0	1·0	1·2	1·1	1·5	1·1	1·1	1·8	1·9
Insoluble albuminoids .	8·3	8·1	12·7	10·9	8·7	13·8	16·7	14·4	19·8	11·8	19·1	8·9	12·2
Soluble albuminoids . .	2·4	1·8	1·6	1·7	1·9	1·8	1·4	1·6	1·7	1·6	1·5	1·8	1·4
Dextrin	9·5	8·1	6·3	6·8	7·8	7·2	5·9	6·4	6·8	5·4	6·0	7·3	7·9
Starch	62·7	66·1	61·3	67·1	66·7	59·9	59·7	59·8	55·1	65·6	59·8	63·6	57·9
Cellulose	1·8	...	...	...	...	1·5	...	1·4	...	...	...	...	2·3
Saline matter	...	...	1·4	...	...	1·9	1·9	1·7	1·9	...	...	1·4	1·6

By looking at this table we shall learn some very useful facts. In the first place, if we take the analysis of Flemish wheat, we find the insoluble albuminoids are 8·3, the soluble 2·4; in the case of Odessa wheat there are 12·7 insoluble and 1·5 soluble; Poulard blue, 8·7 insoluble and 1·6 soluble; in the case of another variety of Poulard wheat we have 13·8 insoluble and 1·8 soluble. He gives also the analysis of the same wheat, but the product of a very dry year, in which the soluble albuminoids are only 1·4. I wish to draw your attention particularly to two or three points of this analysis. First of all, by dividing the insoluble by the soluble, so as to convert the soluble into unity, we shall have the following ratio:—In the case of the Flemish, the ratio of insoluble to soluble is 4½ to 1; Odessa, 9 to 1; Poulard, 8½ to 1; Midi, 10 to 1; Polish, 12½ to 1, a very large ratio; Hungarian, 8½ to 1; Egyptian, 14 to 1; Spanish, 6 to 1; and Taganrogg, 10 to 1. We shall see afterwards the importance of this to the miller when he has to consider the best method of mixing his wheats, for the purpose of producing a high-class flour A very interesting point about these analyses of Péligot is this. I have not had an opportunity of of referring to the original paper, and therefore I do not know whether he himself pointed out this interesting relation or not, but if you compare the soluble albuminoids with the amount of what he calls dextrin—of course the methods of analysis thirty-six years ago were not quite so perfect as we have now at our disposal, but still, taking this dextrin, which is now called maltose, together with dextrin, and comparing it with the soluble albuminoids—you will find a very strange ratio appears, and which is very constant throughout. The ratio of soluble albuminoids to dextrin in the case of Flemish wheat is 1 to 4. Taking the Odessa, which is so very different in character to the Flemish, so large is the amount of insoluble albuminoids compared with that in Flemish, still we have also the ratio of soluble albuminoids to dextrin as 1 to 4. In the case of Poulard blue, there also we have 1 to 4, and so you will find in all cases 1 to 4, until we come to the Hungarian, where the ratio is not quite 1 to 4, but 1 to 3½. This, probably is due to some slight error in the analytical process, not to any real difference in the nature of the compounds formed. So it goes on again in the Egyptian and Spanish as 1 to 4, until we come to the Taganrogg, and there it is 1 to 5½. Possibly, this is also due to some error of analysis. With this exception, in a long list, we have the ratio of soluble albuminoids to dextrin always as 1 to 4, evidently indicating some definite combination of the albuminoid matter with the sugar bodies.

I wish to draw your attention now to some important results published a good many years ago by Messrs. Lawes and Gilbert. Doubtless, to some of you the names of Lawes and Gilbert are well known, but to those who are not so well acquainted with them, I may say that the agricultural interests of England lie under a great debt to the public spirit and enterprise of Mr. Lawes, who has for more than thirty years spent some £4000, if, indeed, it is not nearer £5000 a year, on an elaborate series of researches not merely into the influence of season upon wheat, but, into an immense number of matters connected with agricultural chemistry. He has been most ably assisted in this great national work by his scientific *collaborateur*, Dr. Gilbert.

INFLUENCE OF SEASONS ON THE CHARACTER OF WHEAT CROPS. (LAWES AND GILBERT.)

Harvests.	Particulars of the Produce.				Composition of Grain.			Composition of Straw.		
	Total Corn and Straw per Acre in lbs.	Per cent. Corn in Total Produce.	Per cent. Dressed Corn in Total Corn.	Weight per bushel of Dressed Corn in lbs.	Per cent. Dry (212° F.).	Per cent. Ash in Dry.	Per cent. Nitrogen in Dry.	Per cent. Dry (212°).	Per cent. Ash in Dry.	Per cent. Nitrogen in Dry.
— 1845 . . .	5545	33·1	90·1	56·7	80·8	1·91	2·25	...	7·06	0·92
+ 1846 . . .	4114	43·1	93·2	63·1	84·3	1·96	2·15	...	6·02	0·67
1847 . . .	5221	36·4	93·6	62·0	...	...	2·30	...	5·56	0·73
— 1848 . . .	4517	36·7	89·0	58·5	80·3	2·02	2·39	...	7·24	0·78
+ 1849 . . .	5320	40·9	95·5	63·5	83·1	1·84	1·94	82·6	6·17	0·32
/ 1850 . . .	5496	33·6	94·3	60·9	84·4	1·99	2·15	84·4	5·88	0·87
+ 1851 . . .	5279	38·2	92·1	62·6	84·2	1·80	1·98	84·7	5·88	0·78
— 1852 . . .	4299	31·6	92·1	56·7	83·2	2·00	2·38	82·6	6·53	0·79
— 1853 . . .	3932	25·1	85·9	50·2	80·8	2·24	2·35	81·0	6·27	0·20
/ 1854 . . .	6803	35·8	95·6	61·4	84·9	1·93	2·14	83·7	5·08	0·69
Means . .	5053	35·4	92·1	59·6	82·9	1·98	2·20	83·2	6·17	0·82

On referring to this table, you will notice that I have marked certain years, 1846, 1849, and 1851, with a +. Those years were remarkable for the dryness of the summer, the great amount of heat, the long continued heat, and the favourable conditions, not merely in the maturing period, but also in the harvesting period. If we look to the figures there given us by Lawes and Gilbert, we shall find, firstly, that the total weight of produce per acre is very high; secondly, that there is a high ratio of dressed corn to the total weight of corn; and, thirdly, that there is a high relative weight of corn. It is put here in pounds per bushel, and those who are well acquainted with agricultural matters will see, of course, that 63 lbs. per bushel, or 62½ lbs., indicates considerable excellence. Now, while the harvest was a favourable one, and the crop was good, we find that the amount of ash in the grain of 1846, was 1·9; in 1849, 1·8; in 1851, 1·89; which are low numbers compared with what we shall find in the bad years. But that is not all, a high produce or a valuable crop, and a high state of maturation of the grain, in other words, considerable excellences in the wheat, are accompanied by a comparatively low ratio of nitrogen—in 1846, 2·15; in 1849, 1·94; and in 1851, 1·98.

Now, let us take the other aspect of the question. The bad years are marked with a —; 1845 was a bad year; 1848, the year of political troubles, was also a year of great trouble to the farmers; 1852 and 1853 were also bad years. Now, if you look at these years, you will see that whilst the total corn is low, the weight of dressed corn is also low. In one year it is only 58 lbs. to the bushel, and in another case 50 lbs. But if we consider the ash, we find it is comparatively high. Take the case of 1848, which is a comparatively bad year, it is 2·02; in 1852, 2·0; in 1853, 2·24; and so on. The nitrogen is very high as well as the ash—I should say the ratio or percentage of nitrogen was high, not the actual amount produced per acre, but there is a high ratio to the corn itself—in 1845, 5·25; in 1852, 2·38; in 1853, 2·35. Consequently, you see that a high ratio of nitrogen, so far from being coincident with a good character of wheat, is rather coincident with a bad character of wheat, and the same applies to the ash; a high ash is rather indicative of a low quality of grain.

The analyses, given by Dr. Gilbert, were made after drying the corn, so that there is no moisture given here for you to compare with Péligot's results, but if you look at Péligot's results, you will find about 14 per cent., or one-seventh of the whole, consist of water. If we deduct this one-seventh from the nitrogen column of Lawes and Gilbert, we shall then obtain, by simply multiplying what remains by 6·33, the amount of albuminoids, as in the instances given by Péligot. Now, in the years 1846, 1849, and 1851, when that correction is made, if we compare Lawes and Gilbert's with Péligot's results, we find that, in those three years, 10·85 was the average amount of the total albuminoids, soluble and insoluble put together. We see in the years 1845, 1848, 1852, and 1853, the bad years, that the average total amount of the albuminoids, soluble and insoluble, amounts to 12·7. Thus, therefore, we find that the wheats of the bad years have two per cent. more albuminoid matters than the wheats of the good years. In other words, wheats of bad elaboration have the greatest amount of nitrogen. That, at least, refers to our own country; and not only is the amount of nitrogen or albuminoids high in bad years, but there is one other very serious matter for the miller, namely, that these albuminoids are not well elaborated. A considerable quantity of them are soluble, like cerealin and albumin, and are high in proportion to the insoluble variety that the miller or baker requires.

(*To be continued.*)

Parliamentary and Law Proceedings.

ARSENICAL COLOURS.

In a case which was tried at Guildhall, on June 17, in the High Court of Justice, Queen's Bench Division, before Mr. Justice Bowen and a common jury, Messrs. Steinhoff sued the defendants, Messrs. W. Woollams and Co., wall paper manufacturers, of High Street, Manchester Square, W., for certain sums said to be due for colours supplied to the latter. Defendants refused payment, on the ground that the colours were verbally guaranteed by the plaintiff's agent as non-arsenical, whereas one of them, called "Imitation Azure Blue," did, in fact, contain a large quantity of arsenic. Previously to discovering this fact, defendants had used the pigment in the manufacture of wall papers, and as it has been a strict rule with them for years past to allow no arsenical colours to be used in their factory, they were thrown between the alternatives of endangering their reputation by the sale of goods detrimental to the public health, or of having the stock of arsenical paper they had unwittingly manufactured left on their hands. They chose the latter course, and now made a counter claim on the plaintiffs for £370, as compensation for the loss incurred.

Mr. Charles Barton Cobbe, traveller to the plaintiff, denied most positively that he had guaranteed the "Imitation Azure Blue" to be free from arsenic. Mr. W. Muir, partner with the plaintiff, said Mr. Cobbe had no authority to guarantee.

His Lordship summed up, and after directing the jury that any statement intended to be a warranty made at the time of sale was a warranty in law, and that if Mr. Cobbe, although not authorized in words, was by his position in the plaintiff's service authorized in their opinion to do all things needful to sell the colours, and that he did guarantee the colour to be free from arsenic, his employer would be bound by what he said, left it to the jury to say whether the colour was sold free from arsenic by the plaintiff's agent, and whether he was authorized to give a warranty.

The jury found for the defendants Messrs. Woollams on both points, and a verdict was entered accordingly, the amount of damages to be settled by arbitration.

Review.

PHARMACEUTISCHE CHEMIE. Von F. A. FLÜCKIGER. Erster und zweiter Theile. Berlin, 1879. Verlag von Rudolph Gærtner.

PHARMACEUTICAL CHEMISTRY. By F. A. FLÜCKIGER. In two volumes. Berlin, 1879. Published by Rudolph Gærtner.

Professor Flückiger is well and favourably known to British pharmacy, not only as co-author of a standard work on materia medica, but as a contributor to this Journal, and it is with interest of a very active kind that we inquire to what degree is his reputation supported or raised by the material now before us?

The plan of 'Pharmaceutische Chemie' is one with which we do not think English readers will find themselves familiar, though the point of view which we believe to have been taken in framing it shows much that may be advanced in its favour. The author has set to work in a very matter-of-fact way. His material has been obtained from the shelves and cupboards of a well-appointed pharmacy, and his classification of it has all the simplicity of nature improved, and occasionally complicated, by art.

A list of the classes in vol. i. will illustrate the plan:—

1. Non-metallic elements.
2. Metals.
3. Binary compounds of non-metals, except acids and hydrocarbons.
4. Cyanogen group.
5. Hydrocarbons derived from methane.
6. Alcohols.
7. Non-aromatic organic acids.
8. Fat, soap and wax.
9. Carbohydrates.
10. Resins.
11. Benzols.
12. Ethereal oils.
13. Alkaloids.

To complete the scheme,—in vol. ii. class xiv. is devote to the inorganic bases and peroxides; class xv., to inorganic acids and acid anhydrides; classes xvi. to xxxiii., to a consideration of the various metallic salts, and class xxxiv., which is the last, to short biographical notices of authors quoted.

The selection of material for a work of this character depends not less upon the information than upon the judgment of the compiler. If we did not know that Professor Flückiger's information was of a very extended character, and if we had not already good reason for believing that the judgment associated with it was correct, the volumes before us would be assurance of both. Speaking strictly in view of the plan of the work, we do not find that what is excluded would have added materially to its value, or that anything it contains could well be spared. Apparently, the author has worked within sharply defined lines which rarely shade off into indistinctness, as though, commencing with the determination of admitting nothing but what was obviously within the domain of pharmacy he had yet been tempted to include outlying though related substances by an artistic desire of giving roundness and completeness to his work. Hydrogen and oxygen are rigorously excluded, though the former is actually employed in the preparation of reduced iron and the latter is of such universal importance that it would seem to call loudly for notice in a work on Pharmaceutical Chemistry, even though such notice be only historical. We find the key to the style of procedure, of which the instance just cited is the most notable, in an examination of the material itself, which to our mind is not treated so as to teach chemistry at all, either pharmaceutical or any other. It affords a vast mass of information on substances used in medicine laid down in that indicative mood of which Professor Flückiger is master and is obviously intended for men who already possess a good knowledge of chemistry; to any other the value is greatly reduced by an almost total want of reference to the *science* of chemistry. Almost the only feature which is inconsistent with this idea of the intent of the volumes is afforded by the way in which the atomic weight of an element is indicated. This is given not as a number attached to the name or symbol, but by saying as in the case of chlorine "the specific gravity is 35·5 times more than that of hydrogen." Whilst this statement is more than enough for the educated student who finds it in what is for him a work of reference, it is not enough for the student who is learning chemistry. Our attention is all the more arrested by this circumlocution in that the acknowledged power of the writer to express himself with illuminating terseness is largely exhibited in the rest of the book. It is true that in the present instance his power is exercised on the objective side of a science whose only footing is in visible nature, but even under such favouring circumstances, compact diction is sufficiently rare to be admired when met with.

Professor Flückiger has in these volumes bestowed a wealth of information on pharmacy in its chemical relations which cannot fail to be of the greatest possible value to those engaged in the practice of it, whether in Germany or England. Sulphur, most important both as an element and a natural product, though disposed of in six pages, receives a share of attention and is the subject of treatment in detail which corresponds to its many and varied applications in pharmaceutical and general chemistry. Appearing in the class of non-metallic elements, it is comprised in three sections, of which section 4 gives the sources, production and characters; section 5 is on sublimed sulphur and includes a notice of washed sulphur, whilst section 6 treats of the preparation, properties and testing of precipitated sulphur and closes with a general historical note. A peculiarity of the arrangement is that washed and precipitated sulphur have each a section to themselves and are as distinct from sulphur as the latter is from phosphorus or iodine.

The short biographical notices are short indeed, and names of many living men are omitted. For example, although Groves and Wright are quoted on page 406, they do not appear amongst these notices, but when we find that an illustrious name is disposed of thus:—

"Cavendish, Heinrich, 1731—1810. London. Mitglied der Royal Society, sections 29, 39, 529, 729."

we are more inclined to congratulate than pity them.

The nine hundred or more pages are well printed, and the equations in particular stand out in clear bold type which catches the eye at once. The index is not so complete as could be desired though it includes the most important substances mentioned.

Obituary.

Notice has been received of the death of the following:—

On the 20th of May, 1880, Mr. John Hird, Chemist and Druggist, Pembroke. Aged 47 years.

On the 9th of June, 1880, Mr. Joseph Henry Williams Rees, Chemist and Druggist, Belmont, Bath. Aged 30 years.

On the 18th of June, 1880, Mr. Miles Thomas Lewis, Chemist and Druggist, Strand, W.C. Aged 38 years.

On the 19th of June, 1880, Mr. Charles Edward Stansmore, Chemist and Druggist, Marchmont Street, W.C. Aged 54 years.

On the 22nd of June, 1880, at Edgbaston, Mr. Morris Banks, Chemist and Druggist, formerly of Birmingham. Aged 75 years.

On the 22nd of June, 1880, Mr. David McDowell, Chemist and Druggist, South Shields. Aged 47 years.

BOOKS, PAMPHLETS, ETC., RECEIVED.

ALPHABETICAL MANUAL OF BLOW-PIPE ANALYSIS, showing all known Methods, Old and New. By Lieut.-Col. W. A. Ross. London: Trubner and Co. 1880. From the Publishers.

KELLY'S DIRECTORY OF CHEMISTS AND DRUGGISTS, including Chemical Manufacturers, Wholesale Druggists, Drysalters, Patent Medicine Vendors, and other Trades connected therewith, of England, Scotland and Wales, and the principal Towns of Ireland. Fourth edition. London: Kelly and Co. 1880. From the Publishers.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

Replies.

[412]. If the prescription was written as represented H. H. R. would be right in directing two teaspoonfuls for a dose.

SQUARE.

[421]. Strained manna with or without the pulv. acaciæ and made up with mucilage will answer.

SQUARE.

[421]. In dissolving zinci chlor. it is advisable to have it as dry as possible before adding to the water. A very weak solution of HCl added drop by drop will dissolve any flocculent matter. The above is adopted in some West-end houses. To filter would be wrong.

SQUARE.

[422]. "Bdfrd." did quite right in the absence of any directions on prescription

SQUARE.

[423]. Provided "Bdfrd." powdered the sacch. lact. as finely as possible prior to mixing with the hyd. c. creta (otherwise the gritty powder may separate the hy. from the ca.) he was correct, as dispensers are supposed to weigh and not guess each powder.

SQUARE.

Queries.

[424].

℞ Quinæ Sulph. . . . . ℈j.
Tinct. Ferri Perchlor. . . . . ʒj.
Acid. Sulph. Dil. . . . . q.s.
Aq. . . . . ad ℥ij.

The ʒj of tinct. ferri is sufficient to dissolve the quinine. Should any acid. sulph. dil. be added? This mixture, after standing some time, deposits a thick sediment. Can it be dispensed so as to avoid this, and of what does the sediment consist?

VIS.

[425]. What is the best mode of dispensing the following, and what appearance should it present?—

℞ Potass. Iodid. . . . . ʒiiss.
Ferri et Quin. Citrat. . . . . . . ʒij.
Tinct. Nucis Vomic. . . . . ʒij.
Sp. Ammon. Arom. . . . . ℥ss.
Aquam. . . . . ad ℥viij.

G. H.

[426]. Ought the following to appear as clear as water or slightly turbid?—

℞ Liq. Am. et Bism. Cit. . . . . . . ℥j.
Lithiæ Citrat . . . . ʒss.
Tr. Nucis. Vom. . . . . ʒss.
Tr. Colchici. . . . . ʒss.
Aquæ . . . . ℥vij.
M.

The mixtures that I prepared were slightly turbid, like tr. aurant. et aquæ, but elsewhere they have been perfectly clear and transparent, and not so strong in flavour.

QUERY.

[427]. C. B. would like the opinions of some of our senior dispensers on the following prescription:—

℞ Spt. Vini. Rectif . . . . ʒij.
Ung. Zinci Benzoat. . . . . ℥ij.
M. Ft. ung.

Should the B.P. ung. zinci be used or one (of the same strength) made with zinci benzoas? Is the latter a definite salt or only a mixture of zinc oxide and benzoin or benzoic acid?

[428]. What is the best method of dispensing the following formula:—

℞ Quiniæ Salicylatis . . . . gr. xij.
Sp. Chlor. . . . . ʒij.
Inf. Aurant. Co. . . . . ad ℥8
M. Ft. mist. Capt. ʒj. ter die.

I have made it different ways and cannot send out a presentable mixture.

A. A. F.

[429].

℞ Tinct. Ferri Mur. . . . . ℥ss.
Tinct. Digitalis . . . . ℥ss.
Acid. Phosph. Dil. . . . . ℥ss.
Potass. Acet. . . . . ʒij.
Aquam . . . . ad ℥vj.
M. Sig. A teaspoonful in a large wineglassful of water three times a day.

In dispensing the above prescription I obtained a dense white precipitate as the result of various methods of mixing the ingredients. Can this result be obviated? What reaction takes place? And does the following equation correctly represent the reaction?—

$$Fe_2Cl_6 + 6KC_2H_3O_2 = Fe_2 6C_2H_3O_2 + 6KCl.$$

$$Fe_2 6C_2H_3O_2 + 2H_3PO_4 = 2FePO_4 + 6HC_2H_3O_2.$$

PHARMAKON.

[430]. What is the best method of dispensing the following prescription?—

℞	Plumbi Acetat.	℥iij.
	Zinci Sulph.	ʒiv.
	Acid. Phenic. Xtal.	ʒiv.

M. Ft. pulv. et sign. One teaspoonful to half a pint of water, to be used as directed.

SAMUEL LAWRENCE.

[431]. Is there any excipient for ½ gr. of permanganate potash in pill, all organic matters reducing it? A prescriber is in great perplexity as to some suitable excipient.

OXYGEN.

[432]. What is is the best way to make up the following:—

℞	Pot. Iod.	gr. iij.
	Quinæ Sulph.	gr. j.
	Syr. Aurant.	ʒss.
	Aquam	ad ℥ij.

H. HYNE.

[433]. "Jacque" would like to know what colour the following mixture should be. As it was dispensed in London it presented a greenish appearance, but his own appeared a brownish yellow:—

℞	Potass. Citratis	ʒv ℈j.
	Tr. Nucis Vom.	♏ 80.
	Quiniæ Sulph.	gr. xvj.
	Tr. Ferri Acetatis	ʒv ♏ xx.
	Aquæ Camph.	ad ℥8.

Notes and Queries.

[657]. Some years ago, in one of those brilliant but unpublished remarks at our evening meetings by the late Mr. Morson, he said, "I do not know the reason why substances should change their character when uncombined, but I do know this, nature is very particular before she makes that complex body morphia to have plenty of meconic acid ready to take care of it directly it is formed, and in the young poppy plant you may constantly find the acid without the morphia." Just so with ammonia. I do not like, and would not take if I knew it, liq. am. acet. or liq. amon. cit. prepared from liquor ammoniæ. I decidedly prefer that from the carbonate, especially "the volcanic."

GEORGE MEE.

[662]. BLACK STAIN.—Will some one kindly inform me what is used for staining cane black? I have tried several things, viz., logwood and ferri sulph. boiled, black dye, acid. sulph., etc., without success. The same method that is adopted in staining horn combs might suffice, but I am not acquainted with it. The object of staining the cane is that it might be used instead of whalebone in stays.

W. J. TUCK.

[663]. ZINCOGRAPHIC TRANSFER PROCESS.—Will any of your readers kindly inform we what is the best method of charging the zinc plate with gum in the zincographic transfer process?

PHARMACIST.

[664]. HAIR RESTORER.—Will some kind reader of the Journal furnish me with a thoroughly reliable formula for hair restorer, clean to use and harmless?

GREY LOCKS.

[665]. TICKET INK.—Can you give me a form for the brilliant black ink used by window ticket writers?

H. W. TUNLEY.

Correspondence.

CRYSTALLIZED *versus* AMORPHOUS ACONITINE.

Sir,—Having been requested by Dr. C. Rice, of New York, Chairman of the Committee of Revision of the U.S.A. Pharmacopœia, to draw up an account of the characteristics of pure crystallised aconitine in such a manner as to serve, as far as practicable, as criteria of purity and identity, I append to this note a copy of the remarks I have put together for him,[*] thinking that the subject is one of some little importance now that the use of powerful drugs like aconitine is extending not only in reference to external application, but also for internal administration, *e.g.*, in accordance with the methods of treatment recently expounded by Dr. Burggrave, of Ghent, and those adopted by other practitioners. It requires little argument to show that granting that it is not very material whether the chief active ingredient in a lotion is present in a given proportion, or to half or double that extent, provided the limits of variation are not widely different (such as 10 to 1 or 100 to 1), this in no way holds good when this ingredient is to be administered internally, more especially when the character of the physiological action of the substances naturally admixed with this ingredient (in varying proportions with drugs of different sources and origin) is wholly unknown and cannot be allowed for. In such a case as this, it is evident that the use of a single definite substance, carefully isolated in a state of purity, permits of the dose being regulated and the action of the drug studied in a way wholly impracticable when a crude impure drug is employed containing an unknown percentage of active ingredient and unknown amounts of other bodies of possibly quite different properties.

Dr. Rice concludes his letter to me with the following words:—"The medical profession over here is disgusted with the worthless commercial article, and, if the pure alkaloid could be obtained, would use it in very considerable quantities." On making inquiries of Mr. John Williams (Messrs. Hopkin and Williams, 16, Cross Street, Hatton Garden, E.C.), I understand the chief impediments in the way of supplying pure crystallized aconitine (from *A. Napellus*) are twofold. Firstly, as a general rule, purchasers object to paying the high price at which the pure article must necessarily be sold on account of the great cost of production, so long as an impure article is in the market at a much lower price (even though that be comparatively high); and secondly, it is not every batch of roots that will yield the crystallized base, even though the mode of manufacture be uniformly the same; which I expect, judging from my own experience in the matter, means to say that whilst some batches of roots contain a larger proportion of crystallizable base and smaller quantities of non-crystallizable alkaloids, so that a considerable percentage of crystallized alkaloid can be isolated in the manufacturing way, other batches contain less crystallizable aconitine and so much of the non-crystalline bodies that what crystallizable aconitine is present cannot be induced to separate by crystallization from the other impurities.

It appears to me that the first difficulty is one which will in time cure itself. If prescribers insist that the pure alkaloid only shall be used, dispensers are bound to supply it, even should the pure substance cost twenty times as much as the impure article now usually sold. The question of cost really only affects the patient and not the dispenser, who will simply charge more for making up the prescription. Besides, the activity of the pure alkaloid is so great that the actual weight of substance used in any prescription would be excessively small, and its actual value, therefore, not great, even were the drug an enormously costly one. Moreover, from another point of view, it is just possible that it might be held that the sale under the name of "aconitine" of a substance which is not actually aconitine, but a mixture of that substance with other bodies naturally occurring with it, and not perfectly separated from it, is as much an offence under the Sale of Food and Drugs Act as would be the sale of morphine contaminated with a large amount of narcotine imperfectly separated in the manufacture, or of quinine containing much cinchonine, under the names of morphine and quinine respectively. In the latter two cases I take it that it would be difficult to contend that the impure article was not sold to the prejudice of the purchaser, and that it was of the nature and quality demanded; whilst it is not easy to see in what respect the sale of aconitine stands on a different legal footing.

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[*] See before p. 2.

As regards the second difficulty, a simple cure at once suggests itself. At the present moment the price of aconite roots is fixed by considerations which, however valuable they may be as indications, are certainly not calculated to give any adequate idea of the percentage of pure crystallizable alkaloid to be extracted from the roots. Let the manufacturer purchase roots, not by rule of thumb and in the dark, but on the strength of an analytical certificate showing that when the roots are treated by such-and-such a method (the exact details of which should be specified like the details of the anthracene tests), 100 parts of roots yield so many parts of aconitine in the crystallized state, or as a crystallized salt, *e.g.*, the nitrate. The manufacturer then would have it in his power to reject batches of roots which cannot be worked up into crystallizable alkaloid or which will not give a satisfactory yield thereof; and would thus avoid the irregular results justly considered by Mr. Williams to be a great bar to the production on a manufacturing scale of the pure base.

In connection with this it may be remarked that the effects of variation of soil and climate on *A. Napellus* roots (and other species), so far as regards the quantity of crystallizable and other bases obtainable from a given weight of root, are at present wholly unknown. The questions as to whether the best yield of crystallized base is obtained with young, mature, or old roots; as to how far the pseudaconitine of *A. ferox* and the alkaloid allied to aconitine obtainable from Japanese roots can be substituted for aconitine itself with advantage, and many other analogous questions require working out. On this latter point the comparative physiological experiments of Dr. Fraser, of Edinburgh, now in progress with specimens prepared by the writer, will, it is to be hoped, throw some light. In reference to the former point it may be noticed that a batch of fresh aconite stems and flowers worked up in much the same way as the roots by the writer, has yielded a product which, whilst evidently containing some amount of aconitine, is yet so charged with amorphous bases that the aconitine cannot be separated by crystallization either as alkaloid or salt. How far this is a characteristic difference between the stems and roots, however, can only be decided by further experiments.

Chemical Laboratory, C. R. ALDER-WRIGHT, D.Sc.
St. Mary's Hospital, W.

APOTHECARIES' WEIGHTS AND MEASURES.

Sir,—I have just received official intimation that the standards for apothecaries' weights and measures have been received in Liverpool and have thought it well to communicate the fact through the medium of the Journal to the chemists and druggists of this district.

The Act now being fully adopted here, it will be well that all concerned should at once comply with the requirements of the law.

Liverpool. CHARLES SYMES.

MR. CYRUS BUOTT.

> "I am not what I was. I feel these years
> Have done sad office for me; and that time,
> Which I had dreamed might fling around the path
> On which I ventured something of that light
> Which cheers life like a halo, hath but cast
> A sickly shadow o'er my pilgrimage."

. . . .

Sir,—With your permission I wish to make another appeal on behalf of old Mr. Cyrus Buott, the late Editor of the *Chemists and Druggists' Advocate*, and late proprietor of the *Medico-Pharmaceutical Abstract and Review*. Many of your readers will better remember Mr. Buott as the vigorous Secretary of the United Society of Chemists and Druggists, a society which, at one time, had considerable influence on pharmaceutical politics. The unhappy condition of this old gentleman, who has lived to the age of eighty years to find himself worsted in the struggle for existence, is truly pitiable. About four years since, I ventured to appeal to the benevolent hearts which abound in our trade in help of Mr. Buott, and the response was most generous and beneficent. The tide of adversity has, however, once more overtaken him, and I again plead for such assistance that will enable him to live the few remaining years of his life free from the assaults of poverty and corrosive cares.

I shall be glad to receive and acknowledge through the medium of the Journal, the donations resulting from this petition.

205, *St. John Street Road, E.C.* ROBT. HAMPSON.

VIVIPAROUS PLANTS.

Sir,—At page 37 of Rhind's 'Vegetable Kingdom,' your correspondents will find the following:—

"The name of bulbils is applied to a kind of small solid or scaly buds, that grow on different parts of a plant, and are susceptible of vegetating by themselves; or which, when detached from the parent plant, become developed and produce a vegetable perfectly similar to that whence they derive their origin. Plants bearing buds of this kind are named viviparous. They may occur in the axilla of the leaves. At other times they are produced in the place of the flowers. The nature of the bulbils is similar to that of the bulbs properly so called. Sometimes they are scaly, at others solid and compact."

Liverpool. J. B. O.

UPWARD PERCOLATION.

Sir,—I find that the idea itself of upward percolation has been anticipated nearly twenty-two years ago in a letter to the *Pharmaceutical Journal*, by Mr. A. W. P. Smith, who gave a figure of the apparatus he used. He did not, however, record any results of experiments with the percolator, such as form the bulk of my paper.

16, *Burton Crescent, W.C.* WILLIAM ELBOURNE.

Pharmaceutical Student.—Your questions should be addressed to the Registrar under the Dental Act, 315, Oxford Street, at the same time informing him upon what grounds you propose to claim registration, a point that you have ignored in your communication to us.

Rob.—See a paper on the preparation of "Permanent Essence of Rennett" in *Pharm. Journ.* for Oct. 19, 1878 (vol. ix., p. 307).

A. Deck.—We should think the crystals could be obtained by applying to Dr. Theodor Schurhardt, Goerlitz.

J. W. Garrett.—*Symphytum tuberosum*, *Stellaria glauca*, and *Lotus hispida* would be plants very unlikely to be met with in the locality mentioned. We should like therefore to see specimens before making use of your note.

Veritas.—Your letter appears to have more to do with the business of the office than with that of the Journal. It has therefore been handed to the Secretary.

J. B. Shilcock.—If the proprietary medicine for veterinary use be *capable* of being used as a beverage or as a medicine for internal administration it will come within the terms of the Act.

F. Gall.—(1) *Thalictrum flavum.* (2) *Anthyllis vulneraria.*

W. Stewart.—*Conium maculatum.*

R. E. Williams.—(1) The reaction was due to free alkali in the potassium cyanide. (2) A general knowledge of the whole would be necessary. (3) The occurrence is interesting if the whole of the flower is white. (4) We are not aware that powders are at present sent out from Bloomsbury Square for analysis.

Θ—(1) "Quina" was the orthography adopted in the London Pharmacopœia. (2) Cinkōna.

B.P.—The general practice is to follow the usual rule of giving a soft sound to the letter *c* when coming immediately before the vowel *e*. The exceptional practice is based upon an opinion that would not be affected by the use of a cedilla mark.

Camphor.—We cannot endorse your opinion that it should be made compulsory upon a chemist and druggist to keep every drug mentioned in the Pharmacopœia if he does not consider it to his interest to do so.

Re.—We have no knowledge of the details beyond what is conveyed in the report.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Claypole, Bradshaw, Garrett, Kermath, Coleman, Prentice Bros., J. B. O., Wide Awake, Temporary Assistant.

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(*Continued from page* 994, *Vol. X.*)

ACORUS CALAMUS, *Linn.*, ARACEÆ. *The rhizome. Vernacular*: BACHA, BACH (Hind., Beng.); VEKHAND (Bomb.).

History, Uses, etc.—This plant, originally a native of Central Asia, is now established in most parts of Europe; it is the 'acoron' of the Greek and the 'vacha' of Sanskrit writers. The Arabs call it 'waj' and 'ood-ul-waj,' evidently corrupted forms of the Sanskrit name. Some consider it to be identical with the 'calamus aromaticus' of Dioscorides, but against this we have the authority of the Arabic and Persian writers, who state that the 'kalum armátik' of the Greeks was a kind of chiretta; Royle would have it to be an andropogon. The Hindus consider the sweetflag to be emetic in large, and carminative, stimulant and tonic in small doses. As an emetic a drachm and a half to two drachms is given in a tumbler full of warm salt and water; as a tonic it is usually combined with other bitters and aromatics; as a stimulant it is added to other remedies in paralytic and nervous affections. The Mahometans describe it as deobstruent and depurative, useful for the expulsion of the phlegmatic humours which they suppose to be the cause of paralysis, dropsy and many other diseases; they recommend it to be given to children to bite when teething and prescribe it internally in calculous affections. It has also a reputation as a diuretic, emmenagogue and aphrodisiac, and is applied in the form of poultice to paralysed limbs and rheumatic swellings. A pessary composed of acorus, saffron and mares' milk is used to promote delivery; a hip bath of the decoction is also said to be efficient for this purpose.

Description.—The root stock occurs in somewhat tortuous, sub-cylindrical or flattened pieces, a few inches long and from ½—1 inch in greatest diameter. Each piece is obscurely marked on the upper surface with the scars, often hairy, of leaves, and on the under with a zigzag line of little, elevated, dot-like rings, the scars of roots. The root stock is usually rough and shrunken, varying in colour from dark brown to orange brown, breaking easily with a short corky fracture, and exhibiting a pale brown spongy interior. The odour is aromatic and agreeable, the taste bitterish and pungent.

Microscopic Structure.—A section of the rhizome is like an open net work, composed of rows of nearly round cells and open spaces (water passages). Most of the cells contain small starch granules, but some of them essential oil. At the junction of the cortical and central portions of the rhizome is a very distinct row of small empty cells. The vascular bundles are numerous, especially just within the line of small cells just noticed; each bundle consists of a ring of spiral vessels surrounding a number of jointed tubes.

Commerce.—Two kinds of vekhand are met with in this market: multani, value Rs. 3½ per maund of 41 pounds; ghati, value Rs. 2½.

ARUM MARGARITIFERUM, *Roxb.* (?), ARACEÆ.

A large *Amorphophallus*, growing at Asnora in the Goa territory, which I have only seen in fruit, will, I think, prove to be this species. The country people use the crushed seed to cure toothache. A small quantity is placed in the hollow tooth and covered with cotton; it rapidly benumbs the nerve. They also use it as an external application to bruises, on account of its benumbing effect. The fruit is yellow, about the shape and size of a pistachio nut, closely set round the upper part of the spike, which is several feet in height and as large as that of the plantain. The skin of the fruit is tough, the pulp scanty and yellow; it encloses two seeds having the shape of a coffee bean, and placed with their flat surfaces in apposition. The testa of the seed is soft, greenish-brown externally, green internally; the kernel is white, adhering closely to the testa, soft and juicy when fresh, but rapidly becoming hard and dry when cut. The taste is intensely acrid; after a few seconds it causes a most painful burning of the tongue and lips, which lasts for a long time, causing much salivation and subsequent numbness. A section of the fruit and seed shows the following structure from without inwards. (1). Several rows of thick-walled cells, having yellowish-brown granular contents (skin). (2). A parenchyma composed of thin-walled cells, having no solid contents except needle-shaped crystals (pulp). (3). Several rows of small cells, containing chlorophyll (testa of seed). (4). A delicate parenchyma, the cells of which are loaded with very small starch granules, mostly round, some truncated (kernel). The Goa name of the plant is 'uzomut' or 'azomut.'

CURCULIGO ORCHIOIDES, *Gaertn.*, HYPOXIDEÆ. *The root. Vernacular*: KALI-MUSLI, MUSLI-KAND (Hind., Beng., Bomb.); NILAP-PANAIK-KIZHANGU (Tam.).

History, Uses, etc.—Both Hindu and Mahometan writers speak of two kinds of musli, which from their description appear to be species of *Curculigo*, which they describe as white and black; the former probably the translucent dried root of *C. orchioides*, and the latter the root of *C. uncifolia*. The suffed-musli of the shops is quite a different article, being the tuber of an asparagus. The author of the 'Mahkzan' describes the root of the musli as tapering and like the Egyptian shakákul. He says that some prefer the white variety and some the black. In Bombay we meet only with the black kind. It is collected in the Concon and Guzerat, where *C. uncifolia* is very abundant. It must be borne in mind that the word 'musli' (in Sanskrit 'mushli') means any tapering root, and is often loosely applied. Native medical works give the following instructions for collecting musli:—Two year old plants are to be selected, and the roots having been washed and cleared of rootlets are to be sliced with a wooden knife, threaded upon a string, and dried in the shade; when dry they may be powdered. The dose is 180 grs., to be beaten up with 180 grs. of sugar in a small glass of water, until it forms a thick mucilage. Treatment to be continued for forty days, abstinence from mental and physical exercise being enjoined. Musli is prescribed in asthma, piles, jaundice, diarrhœa, colic and gonorrhœa. It is considered to be demulcent, diuretic, tonic and aphrodisiac, and is generally combined with aromatics and bitters for administration.

Description.—Musli occurs as short tranverse sections of the root, half an inch or less in diameter, covered externally by a dark brown bark. The substance of the root in the black variety is opaque and greyish-brown; in the white, amber coloured and translucent. Portions of the characteristic wrinkled vermicular rootlets may usually be found attached to some of the pieces. The taste is mucilaginous and slightly bitter.

Microscopic Structure.—The fresh root of *C. uncifolia* when cut across presents a firm milk-white opaque surface, marked with numerous minute punctures. Thin sections show that it consists of a cortical and central portion, both composed mainly of a delicate parenchymatous tissue, loaded with small starch granules; here and there a large cell contains a bundle of needle-shaped crystals. The large open passages, which can be seen with the naked eye, are almost entirely confined to the cortical portion; they are lined by the walls of the neighbouring cells. In the central column are numerous bundles of spiral vessels, which are mostly situated near its junction with the cortical portion. Many of the starch granules are muller-shaped.

Chemical Composition.—The drug has not been examined.

Commerce.—Most of the bazaar musli comes from Rutlam in Malwa. Value Rs. 4 per maund of 37½ lbs.

Crinum asiaticum, *Linn.*, Liliaceæ. *The blub and leaves. Vernacular*: Sukhdarsan, Barakavar (Hind., Beng.); Visha-mungil (Tam.); Nágdown (Bomb.).

History, Uses, etc.—I have not met with any account of this drug in native works on materia medica, nor does it appear to be used medicinally in Bombay, though the plant is very common. Ainslie informs us that the natives of Southern India bruise the leaves and mix them with a little castor oil, so forming an application which they think useful for repelling whitlows and other inflammations that come at the ends of the toes and fingers; also, that the juice of the leaves is employed for ear-ache in Upper India. Rumphius, who calls it 'radix toxicaria,' (Amb., ii., p. 155 to 169), speaks highly of its virtues in curing the disease occasioned by the poisoned arrows of the Macassers in their wars; it is the root chewed that is the emetic, provided a little of the juice is swallowed. The *Crinum asiaticum* is the man-sylan of the Cochin Chinese and its virtues may be found lauded by Loureiro (Ainslie, 'Mat. Ind.,' vol. ii., p. 464.) Sir W. O'Shaughnessy remarks ('Beng. Disp.,' p. 656), that this is the only indigenous and abundant emetic plant, of which he has experience, which acts without producing griping, purging or other unpleasant symptoms. In the Phar. of India the root has been made official as an emetic, nauseant and diaphoretic. Directions for making a juice and syrup are given; the former to be given in doses of 2—4 fluid drachms every 20 minutes until emesis is produced, the latter in doses of 2 fluid drachms as a nauseant and emetic for children.

Description.—Caulescent or stemless; leaves linear-lanceolate, very smooth; margins entire, striated beneath, 3—4 feet long and 5—7 inches broad; scapes axillary, shorter than the leaves, a little compressed; flowers numerous, 12—50 in an umbel, white, almost inodorous; berries roundish, the size of a pigeon's egg ('Bombay Flora,' pt. I., p. 275). The root is bulbous, white, with a terminal stoloniferous fusiform portion issuing from the crown of the bulb. It varies greatly in size; odour narcotic and disagreeable.

Microscopic Structure.—The central portion of the bulb (stoloniferous fusiform portion) consists of a parenchyma made up of polyhedral cells containing a little granular matter and some needle-shaped crystals; it is traversed by numerous bundles of jointed and spiral vessels. Surrounding the central portion is a solid cortical layer, less vascular than the central column. From both of these spring the subterraneous white bases of the leaves, which form the upper part of the bulb.

Chemical Composition.—Nothing is known.

Commerce.—Not an article of commerce.

(*To be continued.*)

OPIUM SMOKING APPARATUS.

The following note upon this subject has been placed at our disposal by Professor W. T. Thiselton Dyer, Assistant Director of the Royal Gardens, Kew:—

The number of articles employed by an opium-smoker in China in the process of fumigation is very considerable, but I am not aware that they have ever been described. We are indebted to Dr. Hance, the well-known botanist, who has turned his official position as Vice-Consul at Whampoa to the greatest advantage in the interests of science, for the very complete specimen of an opium smoker's outfit which is now exhibited in the Kew Museum.* He has also furnished us with the accompanying memorandum describing the several articles and their mode of use, which has been drawn up by Mr. Sampson.

Description of Opium Smoking Apparatus.—The tray is usually of larger size than that sent herewith (which is of Japanese make) and is made of black wood inlaid with mother-of-pearl. All the apparatus is neatly arranged on the tray, which is placed in the centre of a large square couch, so that a man can lie on either side of it.

The essential contents of the tray consist of a lamp, a stand for spare bowls, a pot for the opium, and a dipper. The bowl-stand herewith sent is made to hold three spare bowls; a Chinese opium smoker has as many fancies about his pipes as a tobacco smoker has of his meerschaums. The lamp is sometimes made of glass, and sometimes of metal; it is essential that the cover be so arranged as to prevent smoke coming from the flame. The opium pots are sometimes made of silver; those sent herewith are of horn. A small quantity of prepared opium is also sent as a specimen, in a glass bottle. The two iron things with wooden handles are to scrape out the bowl when it becomes foul; the scrapings form the "opium dross," which is sold to those who want a strong but cheap and ill-flavoured smoke. The two iron things without wooden handles are the "dippers" above mentioned, one end being pointed and the other flattened. There is also a tin box in which the scrapings and opium ashes may be put. An opium smoker takes great pride in the neatness of his tray, and adorns it with other little contrivances both useful and ornamental.

Lying on his side, with his face towards the tray and his head resting on a high hard pillow (sometimes made of earthenware, but more frequently of bamboo covered with leather), the smoker takes the pipe in his hand; with the other hand he takes a

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*** The authorities of the Kew Museum having since come into the possession of a second set of the apparatus, one set has been presented to the Museum of the Pharmaceutical Society through Professor Dyer.—Ed. Pharm. Journ.**

dipper and puts the *sharp* end of it into the opium, which is of a treacly consistency. Twisting it round and round he gets a large drop of the fluid to adhere to the dipper; still twisting it round to prevent it falling, he brings the drop over the flame of the lamp and twirling it round and round he roasts it; all this is done with acquired dexterity. The opium must not be burnt or made too dry, but roasted gently till it looks like burnt worsted; every now and then he takes it away from the flame and rolls it (still on the end of the dipper) on the flat surface of the bowl. When it is roasted and rolled to his satisfaction, he gently heats the centre of the bowl, where there is a small orifice; then he quickly thrusts the end of the dipper into the orifice, twirls it round smartly, and withdraws it; if this is properly done the opium (now about the size of a grain of hempseed or a little larger) is left adhering to the bowl immediately over the orifice. It is now ready for smoking.

The smoker assumes a comfortable attitude (lying down of course) at a proper distance from the lamp. He now puts the stem to his lips and holds the bowl over the lamp. The heat causes the opium to frizzle, and the smoker takes three or four long inhalations, all the time using the dipper to bring every particle of the opium to the orifice as it burns away, but not taking his lips from the end of the stem or the opium pellet from the lamp till it is all finished. Then he uses the flattened end of the dipper to scrape away any little residue there may be left around the orifice, and proceeds to prepare another pipe. The preparations occupy about five or ten minutes, and the actual smoking about thirty seconds. The smoke is swallowed and is exhaled through both the mouth and the nose.—THEO. SAMPSON, *Canton, September* 24, 1879.

We have a model of an opium smoker's couch with two smokers carved in Pai-c'ha wood procured for us by Mr. W. M. Cooper, H.M. Consul at Ningpo. This is exhibited in the same case with the smoker's tray in the Kew Museum. The mode of smoking is also illustrated by some wood cuts (from Chinese blocks) given in 'China's Millions,' 1878, pp. 22, 45.

ERGOT AND THE ERGOTINES.*

BY E. SCHMITT.

Although the botanical nature and microscopic structure of ergot are now well known, the same cannot be said respecting its chemical constitution.

The earliest labours upon the composition of ergot are due to Vauquelin and Legrip in France, and Maas and Wiggers in Germany. The first complete chemical analysis was published in 1831 by Wiggers, and it was then that the first mention was made of ergotine as the active principle of ergot. With ergotine there were also mentioned a red colouring matter, a non-saponifiable fatty oil, a sugar that was specially studied by Mitscherlich, fungine, ash very rich in phosphoric acid, etc. As to the more recent investigations a *résumé* of them is to be found in the *Traité de Pharmacognosie* of Dr. Albert Wigand (Berlin, 1879) and another in a memoir by Dr. Daubraiva in the *Zeitschrift d. allgemeinen œsterreich. Apotheker-Vereines*, 1880, p. 73. According to these later researches the activity of ergot would be due (1) to two acids, sclerotic acid combined with lime and fuscosclerotic acid derived from the red colouring matter; (2) to a very bitter alkaloid, picrosclerotine, probably occurring with fuscosclerotic acid in the colouring matter; and (3) to a nitrogenous matter of a gummy nature, scleromucin. Ergot contains 1·5 to 4·5 per cent. of sclerotic acid, and 2 to 3 per cent. of scleromucin, whilst it contains scarcely one part in a thousand of fuscosclerotic acid and picrosclerotine.

In the second rank come alkaloids of doubtful action, ergotine, ecboline, and ergotinine, combined with a volatile acid, ergotic acid, and colouring matters, sclererythin, scleroiodin, scleroxanthin and sclerocrystallin.

In the third rank occur the inert matters: 30 to 35 per cent. of fixed oil, 2 per cent. of resinous matter, 46 per cent. of cellulose, mycose, leucine, secaline, and ash very rich in phosphates.

These analyses do not mention cholesterine, which Schoonbrodt, in 1866, and Ludwig, in 1869, found in ergot. They are especially the expression of the later work of Dragendorff and Podwissotzky and take very little account of other researches made since 1831. Let us pass in review the memoirs thus forgotten, commencing with those which relate to the ergotines.

The ergotine of Wiggers, which is the oldest in a chronological point of view, is not an alkaloid. It is a complex extractive matter; nevertheless its elementary composition has been established by Liebig and Pelouze. It is obtained by first freeing ergot from its fixed oil by means of ether or carbon bisulphide, and then treating it with boiling alcohol. This alcoholic tincture is evaporated to dryness upon a water-bath, and the dry extract is exhausted with cold distilled water. The residue insoluble in water is the ergotine of Wiggers, of which the yield is from 1 to 1·25 per cent. This ergotine is very toxic; its action is therefore not uncertain, as is alleged by Dragendorff and Podwissotzky. It occurs under the form of a reddish-brown pulverulent extract, having an acrid and bitter taste. It is insoluble in water and ether; it, therefore, contains neither sclerotic acid nor scleromucin, which are soluble in water, nor ergotine, which is soluble in ether. It is soluble in alcohol, to which it communicates a red colour, and contains consequently the colouring matters mentioned above of fuscosclerotic acid and picrosclerotine. It is also soluble in concentrated acetic acid and in alkalies. In consequence of its method of preparation, its complex nature, and its badly defined therapeutic effects the ergotine of Wiggers has not been employed in medicine.

This is not the case with another extractive product obtained from ergot, and to which M. Bonjean, of Chambery, has also given the name of ergotine. Bonjean's ergotine is a true mixed extract. It is prepared by exhausting ergot with cold water, bringing the aqueous solution to the consistency of a clear syrup, and freeing this syrup by strong alcohol from insoluble salts, gummy matters and albuminoids. After filtration the filtered liquor is brought to the consistence of an extract. The preparation and the characters of this ergotine will be referred to subsequently; but from a chemical point of view it may be stated that this extract contains probably the sclerotic acid and a little of the scleromucin of Dragendorff, the secaline of Winckler, and the ergotine and ecboline of Wenzell.

This brings us to a third ergotine, the ergotine of Wenzell. This German chemist, studying in 1864 the aqueous extract of ergot, believed that he had discovered in it two alkaloids, ergotine and ecboline, the first slightly active, the second possessing the obstetrical properties of ergot and combined with a special acid, ergotic acid.

Wenzell prepared these two alkaloids by heating the aqueous extract of ergot with acetate of lead, filtering, freeing the liquor from excess of lead salt, and afterwards adding corrosive sublimate, which precipitates the ecboline only. After separation of this alkaloid the ergotine is precipitated by phosphomolybdic acid, the phosphomolybdate is then decomposed by carbonate of barium in the presence of water, and after filtration the liquid, containing the ergotine, is evaporated to dryness in a water-bath. Wenzell's ergotine has the appearance of brownish-black shining varnish. It is soluble in water and in alcohol, but insoluble in ether. It is very slightly active, as has been mentioned; ecboline, on the contrary, would represent four times its weight of ergot.

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* *Bulletin de la Société de Pharmacie de Bordeaux*, vol. xx., p. 40.

The study of these three products, so different in their mode of preparation and their physiological effects, shows that these ergotines are far from being clearly defined compounds. The ergotinine of M. Tanret appears to be a true alkaloid. This chemist first prepares an extract of ergot with boiling 80° alcohol, and from it he obtains by the successive actions of ether, chloroform, sulphuric acid, and alkalies, a body having a very feeble alkaline reaction, but possessing all the other properties of alkaloids. His process of preparation has been published in the *Pharmaceutical Journal*, [3], vol. vi., p. 522; vol. ix., p. 707.

Ergotinine is a crystallizable alkaloid. It is insoluble in water, and soluble in alcohol, ether, and chloroform. The alcoholic solution is very fluorescent. By the action of concentrated acids in the presence of traces of ether it gives rise to phenomena of coloration. Thus sulphuric acid added to one-seventh part of water causes it to become red, yellow, and then an intense violet blue. It forms with acids, especially sulphuric and lactic acids, well crystallized salts. Unfortunately it is very unstable, and is found in ergot in very small quantity, the maximum yield per kilogram being 1·20 gram of ergotine, of which only one-third crystallizes. Hence it would not be susceptible of every day use, although it might be a very powerful hemostatic in cases of uterine hemorrhage.

I come now to the investigations of Dragendorff and Podwissotzky, who relegate the ergotines and ergotinine to the second rank, and attribute all the properties of ergot to two acids, a gummy matter, and an alkaloid very different according to them from ergotine and ergotinine. Sclerotic acid, obtained, like scleromucin, from the aqueous extract, is soluble in water, 45° alcohol and boiling 75° alcohol. It is a body with a very energetic action, a subcutaneous injection of it rapidly causing paralysis in frogs, with swelling of the abdomen. Fuscosclerotic acid is insoluble in water and in ether. It dissolves in acid menstrua, and is prepared by treating the colouring matter of ergot with alcohol acidulated with tartaric acid. It appears to act specially upon the sensibility, which it diminishes promptly. Scleromucin is a viscous colloidal matter, soluble in water and insoluble in alcohol. It is nitrogenous and very rich in mineral substances (26·8 per cent.). Although very impure and badly defined it appears to be the therapeutic agent of ergot. Picrosclerotine is a very bitter alkaloid, which is removed from the colouring matter at the same time as fuscosclerotic acid. It is not soluble in acidulated water. This alkaloid is the most toxic agent in ergot. Injected in the dose of one milligram under the skin of a frog it produces at first insensibility, followed by paralysis of the extremities, and causes death in less than ten minutes.

This rapid review of the different bodies that have been derived from ergot proves that we are not well acquainted with the active principle or principles of ergot. Not one of the bodies isolated, alkaloid or acid, gummy or colouring matter, can replace in therapeutics the drug itself, and it would appear that it only remains to admit with Bonjean and Buchheim, that ergot owes its medical properties to the whole of its chemical constitution. Consequently the medical man should always employ ergot in its natural state, powdered, and the powder should always be recently prepared. Under this form it could be rendered more active and probably less alterable by removing the 35 per cent. of fixed oil, by exhausting it, for example, with carbon bisulphide.

For hypodermic injections choice should be made among the preparations soluble in water of that which would be at the same time the most active and the most stable, the easiest to prepare and the most apt to lend itself to dispensing. This choice is rendered easy by the small number of preparations in which these conditions are to be found. I can only mention three, the fluid ergotine of Portans, the liquid extract of Yvon, and the ergotine of Bonjean.

I am not acquainted with experiments made with Portans' ergotine, but can quote its mode of preparation, which whilst being convenient to any pharmacist, appears to be logical. The powdered ergot is macerated during eight days in a mixture of water, alcohol and glycerine. At the end of this time it is passed through a filter, and the filtered liquor freed from alcohol by distillation. The ergot remaining on the filter is then exhausted by displacement with water, and this aqueous solution is concentrated in a water-bath to the consistence of an extract. The extract is then redissolved in the liquid from the first maceration, and this solution is concentrated in a water-bath in a tared capsule until the weight of the liquid equals the weight of the ergot employed, and then filtered. A fluid extract is thus obtained which represents its own weight of ergot.

Yvon's liquid extract is prepared also to represent its own weight of ergot, but the method is based upon the investigations of Wiggers, Wenzell, and Tanret in treating the ergot with an acid menstruum. The ergot is pulverized, freed from fatty matters by carbon bisulphide, and then dried in the open air in the shade until all the odour has disappeared. It is next treated by displacement with water acidulated with four parts per thousand of tartaric acid, the acid liquid is heated to coagulate albuminoid matters, reduced in a water-bath to one third, allowed to cool and filtered. The filtered liquor is digested with freshly precipitated carbonate of lime, again filtered and brought to the consistence of a syrup, to which is added some 92° alcohol. The alcoholic liquid is filtered, decolorized by animal charcoal, again filtered, then submitted to distillation or evaporation to drive off the alcohol. Finally the residue is taken up with distilled water, 15 centigrams of salicylic acid added for each 100 grams of ergot, and sufficient distilled water or cherry-laurel water to have 100 grams of liquid for each 100 grams of ergot. It is then allowed to deposit afresh, filtered and preserved in small well closed flasks.

Yvon's extract is a liquid having an amber colour and a peculiar odour; it gives all the reactions of alkaloids. It lends itself well to the preparation of hypodermic injections and, according to the inventor, keeps well. The product is open, however, to the objection of want of homogeneity, its activity varying exactly with that of the ergot, and so especially is the long and unpractical mode of preparation. Yvon's process is a laboratory process, which could never be followed in the ordinary course in pharmacies, especially in country places.

Bonjean's ergotine is therefore the preparation to which recourse should be had in the majority of cases, it being, when well prepared, a valuable and reliable remedy. The preparation of this extract not being mentioned in the Codex has been dealt with rather arbitrarily. Few extracts have been so much studied during recent years, but it will suffice to mention the memoirs of Deschamps, Dorvault, Carles, Lepage, Patrouillard and Catillon. I prefer to all the processes indicated that of Bonjean, modified in the direction indicated by Lepage and the Bordeaux Society of Pharmacy.

Taking a kilogram of ergot, for example (fresh and undried, if this be possible), it is reduced to a coarse powder and placed in a bottle of five litres capacity; the bottle is filled with distilled water, closed and shaken frequently. At the end of twenty-four hours, after allowing it to deposit during the night, the liquid is decanted or siphoned, and its evaporation commenced in a tared vessel in a water-bath. The bottle is refilled with distilled water and again shaken; then, after a maceration of six hours, the liquor is decanted and added to the previous product. Another litre of water is added to the ergot and left in contact during two hours, then the whole is thrown on a strainer and pressed. The third liquor is added to the other two and the whole is evaporated rapidly until reduced to about 500 grams. It is now allowed to cool to 50° C. and poured into a litre flask; the dish is rinsed with a little 92° alcohol, which is added to the other liquid and the flask is completely filled with strong alcohol, after which it is closed, shaken and placed in a cool place. After twenty-four hours the liquid is filtered through paper and the filtrate is evaporated in a water-bath to the consistence of a firm extract. A yield of about 8 per cent. of ergotine is thus obtained.

This ergotine is of a red-brown colour and has a smell like that of roast meat; its taste is bitter and piquant. It contains 10 per cent. of water and leaves 6 per cent. of salts upon incineration. It dissolves nearly completely in water, and this solution is facilitated by first suspending the extract in a little glycerine. It is soluble in 60° alcohol.

It will have been noticed that I employ the method of Cadet, which I prefer, with M. Patrouillard, to the method of displacement. I have not obtained a larger yield; never 12 to 15 per cent., and upon this point I am in complete accord with M. Carles. I have also operated as recommended by M. Catillon, by first making an alcoholic extract and then taking up the extract with water. The displacement with alcohol is much more methodical and regular, but I have not obtained a larger yield than by the process mentioned before when operating with the same kind of ergot. I would mention, however, that these parallel experiments were made with small quantities. But nevertheless, in presence of this result it seems preferable to retain the process of Bonjean; the product is more homogeneous and more comparable to the ergotines found in all pharmacies, which is a great advantage to the physician and the patient.

Ergotine should be preserved in well closed flasks. It should never be used too old; there would therefore be an advantage in preparing it every year or every two years at least. After a time it forms crystalline deposits of a salt which, according to Flückiger, is an acid phosphate of sodium and magnesium, with a little sulphate.

For hypodermic injections ergotine is used in doses of 1 to 2 grams, dissolved in distilled water, cherry-laurel water, or a mixture of distilled water and glycerine, the precaution being taken to first suspend the ergotine in the glycerine, adding the water and filtering through moistened paper to obtain very clear solutions. These solutions are made sometimes 1 in 5 (Dr. Vidal), sometimes 1 in 10 or 1 in 15 (Dr. Bucquoy and Dr. Moutard-Martin).

Subcutaneous injections of ergotine are occasionally painful, either when a badly prepared alcoholic extract or a solution slightly alcoholic has been used, or an ergotine containing lactic acid, due, according to Buchheim, to the lactic fermentation of the mycose.

The conclusions from a chemical and pharmaceutical point of view are easily deduced. When the medical man can, he should administer the pulverized ergot, were it even in suspension in a julep, and that in preference to all the ergotines. For hypodermic injections he should use for the present the ergotine of Bonjean.

THE SAPPHIRE MINES OF SIAM.

The Commercial Report by the Acting British Consul-General in Siam for the year 1879 contains the following interesting information upon this subject:—

The year 1879 will long be memorable in the provinces of Battambong and Chantaboon for the discovery of valuable sapphire mines and for the great influx of foreigners, chiefly from British and Independent Burmah, to work the same. There have long been mines of inferior value in this neighbourhood, and about five years ago new mines were discovered by a native hunter. Being, however, in a very remote and secluded position, it was some time before the fame of the new mines spread o the Burman and Indian gem traders and miners.

Some individual diggers, however, having found their way to the mines, and having returned to Rangoon and Calcutta with the proceeds of their work, realized very large sums, and a rush for the new mines commenced and continued throughout the last year, during which many thousands of British subjects passed through Bangkok from British Burmah on their way to the mines.

The arrival of these large bands of armed strangers caused considerable alarm among the natives of Chantaboon and Battambong, who could scarcely be persuaded that the country was not invaded once more by the old hereditary enemies of Siam, the Burmans and Peguans. The miners, however, by their peaceable behaviour restored confidence, and the country people soon were glad to sell them all kinds of provisions at enhanced rates.

The miners, in their haste to become rich, disregarded all considerations of health, and immense numbers died from jungle fever. The Toung-thoos from Pegu proved the most capable of standing the climate, and, many having made money and returned successful to their homes, the rush continued unabated for a long time; but now the great mortality is beginning to tell, and the broken health and emaciated appearance of most of those who return will check the eagerness of others to try their fortunes in this fever-stricken district.

The governor of the province has hitherto levied 2¼ ticals (5*s*. 7½*d*.) from every man working at the mines, and this is cheerfully paid.

Good order has hitherto, I am happy to say, been maintained, and the governor has appointed a British subject named Kam Sai to act as headman and to collect the licence duty.

The Siamese authorities do not regard with entire complacency this conveyance from their soil of these valuable gems without the payment of any royalty. No definite proposition has, however, yet been made to impose any other than the licence tax above mentioned.

There would probably be found considerable difficulty in collecting any sort of *ad valorem* duty.

As it is, the discovery of the most valuable stones is kept as secret as possible by the fortunate finders, and should any *ad valorem* duty be attempted to be imposed, the tax-gatherer would probably be defeated by craft or force.

When Admiral Coote was here, I was anxious to show him some good specimens of these sapphires, and called for some of the miners who were in Bangkok on their return from the diggings. One of them, a poorly clad and miserable looking individual, produced a few small stones, and, after a great deal of coaxing, was induced with many precautions to give us a private view of his great prize, which was a very large sapphire in the rough, which he valued at 20,000 rupees. He would probably not have shown this stone at all had he not been on the point of leaving in a steamer.

Owing to the secrecy thus observed by the possessors of valuable gems, it is impossible to give any estimate of the total value of stones found, but that individuals have made very large profits is certain. There is a man now in Bangkok who dug out a stone which he offered for sale in Chantaboon at 1000 rupees, but did not find a purchaser. He went with it to Rangoon, where he was offered 15,000 rupees; but, having then awoke to the value of the stone, he declined to sell and took it to Calcutta, where he eventually obtained 30,000 rupees for it.

Now, however, there are many experienced gem merchants established in the neighbourhood of the mines, and something like the real value of the stones can be obtained by the miners on the spot.

Many of the miners finding themselves in cash have invested in the luxury of wives taken from the Siamese population, and the value of marriageable young women, who are at all good looking, has in consequence gone up to a very high figure.

The largest sapphire hitherto found, which I know of, weighed 370 carats in the rough, and when cut turned out 111 carats of the finest water.

The ruby, onyx, and jade are also found in the district, but the quality of none of these is such as to make them very valuable.

CHESTNUT LEAVES.*

BY LEWIS JOSEPH STELTZER, PH.G.

Chestnut leaves should be gathered for medicinal use in the months of September and October, while still green; they possess a faint characteristic odour. When gathered in the early part of October they lose in drying 49 per cent. of their weight, retaining most of their green colour, except the midrib, which changes to brown. They do not become brittle, and are, therefore, with difficulty reduced to powder.

The leaves contain a considerable amount of tannin and extractive matter. The powder cannot be percolated alone on account of swelling when water or alcohol is added. A fluid extract is made by repeatedly digesting the leaves in water and expressing the juice, adding glycerin and sugar and evaporating, as recommended by Professor J. M. Maisch (*American Journal of Pharmacy*, December, 1871). A tincture made in the proportion of two ounces of the leaves to a pint of diluted alcohol is also frequently used.

Chestnut leaves were first brought to the notice of the medical profession by Mr. George C. Close, in the year 1862, but were used by some physicians and in domestic practice previous to that time. They have been used with good success as a remedy for whooping cough; appear to control the spasms and often cause their suspension in a few days. The fluid extract is probably the best preparation to use, as it contains the drug in a concentrated form and is not unpleasant to take. The tincture may also be used, but the objection to it is the large dose required and the amount of alcohol contained therein.

For the purpose of ascertaining some of the constituents of the leaves they were subject to the following experiments:—

The infusion possessed an astringent taste, producing with ferric chloride a greenish-black precipitate, and a copious precipitate with solution of gelatin, showing the presence of tannin. The infusion was deprived of colouring matter, tannin, etc., with solution of subacetate of lead, filtering and separating lead with sulphydric acid. The liquid appears to be free from sugar. The cold infusion showed the presence of albumen when heated, and by the precipitate produced with solution of mercuric chloride. Alcohol precipitated gum, soluble in excess of water, and this solution was not precipitated with ferric chloride or sodium borate.

Ten grams of the ground leaves were boiled with successive portions of water until the soluble parts were all dissolved, the different solutions mixed, filtered and treated with solution of gelatin until it ceased to afford a precipitate. This was separated by filtration, washed, dried and weighed; the result was 1·70 gram, equal to about 0·9 gram of tannin. A repetition of this experiment gave nearly the same result. This experiment shows 9 per cent. of tannin present in chestnut leaves. After removing the tannin from the infusion by means of fresh hide the filtrate was not affected by ferric chloride, and was, therefore, free from gallic acid.

The alcoholic tincture possessed a dark green colour by reflected light and brown colour by transmitted light. Upon evaporation a dark green extract was obtained. Its solution in water, in which it is slightly soluble, gives a black precipitate with ferric chloride. A portion of the tincture was evaporated to a small bulk, thrown upon water and the insoluble portion filtered out, again dissolved in alcohol and treated with animal charcoal; when filtered the solution was colourless, and left no residue when evaporated. The solution of the extract in chloroform, when treated with purified animal charcoal, filtered and evaporated, left a small quantity of a soft, yellowish substance, probably resin. By the treatment of the leaves with petroleum benzin and evaporating a quantity of fatty matter is obtained, freely soluble in ether. Negative results were obtained when examining for an alkaloid or volatile oil.

One hektogram of the dried leaves was incinerated; 5·40 grams of ash of a light grey colour was obtained, having an alkaline reaction.

Appropriate tests indicated the presence of carbonates, chlorides and phosphates of potassium, calcium, magnesium and iron, while the organic constituents of the leaves are tannin (9 per cent.), gum, albumen, resin (a trace), fat, extractive and lignin.

RESIN AND TURPENTINE.*

The following account of the mode of production of resin and turpentine on the south-eastern coast of the United States is taken from an American paper:—

"From Wilmington, N.C., southward, and nearly all the way to Florida, the pitch pine trees, with their blazed sides, attract the attention of the traveller. The lands for long stretches are almost worthless, and the only industry, beyond small patches for corn or cotton, is the 'boxing' of the pitch pine trees for the gum, as it is called, and the manufacture of turpentine and resin. There are several kinds of pine trees, including the white, spruce, yellow, Roumany and pitch pine. The latter is the only valuable one for boxing, and differs a little from the yellow pine, with which it is sometimes confounded in the north. The owners of these pine lands generally lease the 'privilege' for the business, and receive about 125 dollars for a 'crop,' which consists of 10,000 'boxes.' The boxes are cavities cut into the tree near the ground in such a way as to hold about a quart, and from one to four boxes are cut in each tree, the number depending upon its size. One man can attend to and gather the crop of 10,000 boxes during the season, which lasts from March to September. About three quarts of pitch or gum is the average production of each box, but to secure this amount the bark of the tree above the box must be hacked away a little every fortnight. Doing this so often, and for successive seasons, removes the bark as high as can be easily reached, while the quality of the gum constantly decreases, in that it yields less spirit, as the turpentine is called, and then the trees are abandoned. The gum is scraped out of the boxes with a sort of wooden spoon, and at the close of the season, after the pitch on the exposed surface of the tree has become hard, it is removed by scraping, and is only good for resin, as it produces no spirit. The gum sells for 1·50 dollar a barrel to the distillers. From 16 barrels of the crude gum, which is about the average capacity of the stills, 80 gallons of turpentine and 10 barrels of resin are made. The resin sells for from 1·40 dollar to 5 dollars per barrel, according to quality, and about pays for cost of gum and distilling, leaving the spirit, which sells for 40 cents a gallon, as the profit of the business. Immense quantities of resin await shipment at the stations along the line, and the pleasant odour enters the car windows as we are whirled along. After the trees are unfit for further boxing, and are not suitable for lumber, they are sometimes used to manufacture tar; but the business is not very profitable, and is only done by large companies, who can thus use their surplus labour. The trees are cut up into wood, which is piled in a hole in the ground and covered with earth and then burned the same as charcoal is burned elsewhere. The heat sweats out the gum, which, uniting with the smoke, runs off through a spout provided for the purpose. A cord of wood will make two barrels of tar, which sells for 1·50 dollars per barrel and costs 37½ cents to make. The charcoal is then sold for cooking purposes."

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* From the *American Journal of Pharmacy*, June, 1880.

* From the *Journal of the Society of Arts*, June 4, 1880.

The Pharmaceutical Journal.

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SATURDAY, JULY 10, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE TESTING OF COMMERCIAL QUININE SULPHATE.

The vast importance of quinine as a remedial agent, surpassing as it does that of almost all other medicines, is now so generally acknowledged that it is not surprising to find considerable attention directed to the means by which the purity of the salt most frequently met is to be ascertained. Some years ago there was published in this Journal a description of a method for testing sulphate of quinine devised by Dr. G. Kerner, and based upon the differences existing between the solubilities of the sulphates of cinchona alkaloids in water and between the solubilities of the several alkaloids in dilute solution of ammonia.

That method of testing was a great improvement upon the test recommended by Zimmer and Liebig, based upon the differences in the solubility of quinine and other cinchona alkaloids in ether; it was on that account adopted in the German Pharmacopœia, but has not yet received further official recognition. The consequence has been that the results obtained in testing sulphate of quinine as to purity have not always been of such a nature as to decide the question satisfactorily or at all, and it is somewhat notorious that sulphate of quinine has very frequently contained such an amount of cinchonidine sulphate as to be very far from entitled to rank as a pure preparation. That this should be the case is to a great extent intelligible from the circumstance that of late years it is said there has been in the manufacture of quinine a much larger use of those varieties of cinchona bark that contain considerable amounts of cinchonidine.

Three years ago attention was directed to this subject at an Evening Meeting of the Pharmaceutical Society, and it was shown that several commercial samples of quinine sulphate contained from 5 to 10 per cent. of cinchonidine sulphate. It was also shown that the indications furnished by the test directed in the British Pharmacopœia were not such as to give evidence of this impurity, and that there was really no difference between the result obtained in testing such samples and that obtained in testing really pure quinine sulphate. At that time it was suggested that a test based partly upon the different solubilities of the sulphates of quinine and cinchonidine in water and partly upon the different solubilities of the corresponding alkaloids in ether, would be more useful for ascertaining the purity of quinine sulphate than either the test of the British Pharmacopœia or even that introduced years before by Dr. Kerner. Somewhat later almost exactly the same mode of testing quinine sulphate was recommended by Dr. Hesse, who described a form of apparatus in which the operation was to be conducted and laid down rules by which some approximative estimate might be formed as to the amount of impurity present in the quinine sulphate operated upon.

It is in regard to this point that there is the greatest difficulty in obtaining trustworthy results by any of the known methods of testing quinine sulphate. Even with Kerner's test applied volumetrically the results obtained are liable to vary under the influence of slight differences of the conditions of experiment, and at the time when that test was introduced the knowledge of the alkaloids associated with quinine was sufficiently imperfect to give rise to additional uncertainty; now, however, it may be taken as certain that in almost every case the impurity met with in commercial quinine sulphate is nothing more nor less than cinchonidine sulphate. The great solubility of cinchonine sulphate as compared with quinine sulphate is alone almost a guarantee that it cannot be present in a well prepared sample of quinine sulphate. As regards quinidine, again, the probability of its occurrence is very slight, for it must be remembered that there are but few kinds of cinchona bark which contain so much quinidine that its sulphate is likely to remain mixed with recrystallized quinine sulphate.

Quite recently, another paper on the subject has been published by Dr. Kerner, in which he specially refers to the misconceptions and errors which he thinks have arisen from Dr. Hesse's recommendation of method for judging as to the quality of commercial quinine sulphate, and in justification of this view he instances the statement in a paper by Dr. Schacht, of Berlin, that a certain sample of quinine sulphate, tested as Dr. Hesse directs, gave a result showing that it contained "at least 3 per cent. of cinchonidine sulphate." He there mentions having long ago made use of the method recommended by Dr. Hesse, and based essentially upon the fact that cinchonine, quinidine and cinchonidine dissolve less readily in ether and separate from the ethereal solution more quickly when they are associated with very little or no quinine; but he adds that his experience at that time led him to regard this mode of testing as not being practical and trustworthy enough for its adoption as an official quinine test. He gives several reasons which lead him to infer that quantitative estimations according to the time the appearance of crystals in the ether solution takes place are altogether precarious and untrustworthy, and then goes on to state that the ammonia test carefully applied is so much more safe and delicate that it will admit of approximate determination of the impurities in commercial quinine sulphate, besides giving positive evidence of purity in the case of samples that are free from associated alkaloids.

We propose publishing in an early number of this Journal a *résumé* of the directions given by Dr. KERNER for applying the ammonia test in order to ascertain the character of commercial quinine sulphate, and also for the purpose of determining more precisely the actual quantities of impurity present, and will now only mention one other point which he deals with, viz., the amount of water in the quinine sulphate of trade. It is well known that this salt normally contains a considerable amount of water of crystallization, and that this water is readily lost by efflorescence. Besides this, the voluminous character of the salt enables it to hold mechanically a variable excess of water to such an extent, as Dr. KERNER states, that apparently dry samples may be met with containing as much as 18 per cent. of water. It is also stated that such a result is not unfrequently brought about by devices of the manufacturer and by intentional moistening of the salt after it has passed from his hands into commerce. Dr. KERNER suggests that the best remedy for this state of things would be to substitute the hydrochlorate in place of the sulphate, inasmuch as it is a more constant salt, and it has been found to possess advantages from a therapeutical point of view.

Still, since quinine sulphate is the official preparation and the one in general use, the question as to the amount of water in a sample is, as Dr. KERNER insists, one of importance as regards the determination of relative value of that sample; but at the same time he points out that it is not easy to decide what may reasonably be required in this respect, and that it is still less easy to determine quickly the amount of water in a sample of quinine sulphate than it is to detect minute traces of cinchonidine not indicated by the ammonia test. In most manuals of chemistry the neutral quinine sulphate is represented by the formula $2(C_{20}H_{24}N_2O_2)H_2SO_4+7H_2O$, according to which the percentage amount of water would be 14·45. Dr. HESSE adopts formulæ with 7½ and even 8 molecules of water, but Dr. KERNER has invariably found the loss of weight by drying at 115° C. to vary between 14·38 and 14·80 per cent. when the fresh salt pressed between blotting paper and protected from efflorescence was operated upon. Consequently, he adopts the corresponding formula as correct, and as he considers it is impracticable in factory operations to prevent efflorescence altogether, while thoroughly removing all mechanically adherent water, he concludes that it must be regarded as a well founded requirement that official quinine sulphate should not at the utmost lose more than 14·6 per cent. of its weight when dried at 115° C. As a general rule he considers the loss of weight in good samples would be only 13·8 to 14·4 per cent.

By exposure to dry air at a moderate temperature the crystallized quinine sulphate gradually loses five molecules of water, or 10·32 per cent., forming the compound $2(C_{20}H_{24}N_2O_2)H_2SO_4+2H_2O$, containing 4·6 per cent. water and 82·86 per cent. dry alkaloid. This salt is heavier than the above mentioned salt with seven molecules of water, and it has not so good an appearance, but it is constant, and though it can be thoroughly deprived of water of crystallization* even by drying at 100° C., the anhydrous salt, $2(C_{20}H_{24}N_2O_2)H_2SO_4$, containing 86·86 per cent. of alkaloid, is so hygroscopic that it again attracts from the atmosphere two molecules of water more or less rapidly according to the humidity of the air.

Consideration of these facts leads Dr. KERNER to suggest that the constant salt with two molecules of water should be made official, with the view of preventing improper introduction of water or loss to druggists by efflorescence, and of ensuring the administration of quinine in precisely the doses desired. Meanwhile, however, he recommends the practice of making a determination of the amount of water an element in the valuation of commercial quinine sulphate, as being more important than the testing for such traces of cinchonidine as fail to be indicated by the ammonia test.

We share this view of the desirability of taking the percentage of water into account in testing quinine sulphate more thoroughly than we do that which gives a preference to the ammonia test, and are disposed to think that the modification of that test in which ether is used to ascertain the solubility of the alkaloid remaining in solution as sulphate after recrystallizing the sample in question from water will furnish a more intelligible result than any other we know of. The quantitative determination of the amount of impurity is, however, a matter requiring some considerable skill in analytical operations, and as regards anything less than 1 per cent. it may in general be dispensed with altogether for all practical purposes.

MR. CYRUS BUOTT.

MANY of our readers will have noticed in the last number, on page 20, a fresh appeal on behalf of Mr. CYRUS BUOTT. The fact that this gentleman "has lived to the age of eighty years to find himself worsted in the struggle for existence" will be in itself a strong plea with the generous, and especially there must be many gentlemen who were associated with Mr. BUOTT in the work of the United Society who will be glad of the opportunity of sending a contribution towards his aid now that he is in distress to Mr. HAMPSON, 205, St. John Street Road, E.C.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

THE annual meeting of the above Association will be held on Thursday, the 15th inst., at 8·30 p.m., when the chair will be occupied by the President, Professor ATTFIELD, F.R.S., and the Annual Report of the Executive Committee will be read.

THE Lord Chancellor has been pleased to place the name of Mr. S. R. ATKINS, pharmaceutical chemist and member of the Council of the Pharmaceutical Society, on the Commission of the Peace for city of Salisbury.

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* See Cownley "On the Water of Crystallization in Quinine Sulphate," *Pharm. Journ.*, [3], vii., p. 189.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, July 7, 1880.

MR. THOMAS GREENISH, PRESIDENT.

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present—Messrs. Andrews, Atkins, Bottle, Churchill, Frazer, Gostling, Hampson, Hills, Mackay, Radley, Richardson, Robbins, Sandford, Savage, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

Mr. **Mackay** presented, in the name of Professor Archer, a small box containing rare specimens of Indian attars.

The **President** moved a vote of thanks to Professor Archer, which was carried unanimously.

The Sessional Address.

The **Secretary** read a letter he had received from Dr. Langdon Down, expressing his willingness to undertake the duty of delivering the Sessional Address in October next, in accordance with the request of the Council.

Resignation of Mr. Shaw.

The **President** reported that he had received a letter from Mr. Shaw, stating that he found he should not be able to attend the Council regularly during the present year, and he therefore begged to place his resignation in the hands of the President. In taking leave of his colleagues, he desired to express his high sense of the kindness which he had received at their hands during the nine years he had held office. The President said he had written to Mr. Shaw, asking him to reconsider the matter, but Mr. Shaw could not see his way to do so. He was sure they would all agree with him that it was a source of regret that they should lose so able and zealous a member as Mr. Shaw.

Mr. **Sandford** having had much intercourse with Mr. Shaw all the time he had been a member of the Council, felt sure the Council would agree with him that a vote of thanks was due to Mr. Shaw for his services on the Council, together with an expression of regret that he should have found it necessary to resign.

Mr. **Mackay** begged to second the motion, which he did with the greater heartiness because Mr. Shaw was known to the members of the North British Branch before he became a member of the Council. In the early days of the Society's existence in Edinburgh Mr. Shaw was in business there, and devoted a great deal of time and attention to the interests of the Society. He therefore shared very deeply the regret which had been expressed at Mr. Shaw's resignation.

Mr. **Hampson** also felt that the retirement of Mr. Shaw was a loss to the Council and to the trade. He well reflected general broad views on trade matters and was a very conscientious and zealous member of the Council.

Mr. **Symes** having also supported the motion, it was carried unanimously.

The **President** stated that, in accordance with the bye-laws, the Council would have next month to fill up the vacancy caused by Mr. Shaw's retirement.

The following, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Chapman, Joseph George.
Evans, John.
Holmes, William Albert.
Jones, William.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Chapman, Joseph George	Binfield.
Holmes, William Albert	Kendal.

Chemists and Druggists.

The following registered chemists and druggists, who were in business on their own account before August 1st, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Davies, Elias Kossuth	Bethesda.
Patchitt, Edwin Cheshire	Nottingham.
Pattison, Henry	Shrewsbury.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Boyd, Samuel	Annan.
Coleman, Edward	Tamworth.
Currie, William Little	Glasgow.
Fox, Alfred	Hull.
Griffith, Philip	Burnham, Somerset.
James, Thomas Cragg	Birkenhead.
Porter, John Thomas	Coalville.
Welford, Richard	Blackburn.
Wright, Eli	Birmingham.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid, as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Barnett, John Arthur	Salisbury.
Dickinson, David	Boston.
Dodd, William Ralph	Market Drayton.
Francis, Matthew Robert	London.
Jackson, Henry Lawson	Crediton.
Jackson, William Hodgkinson	Crediton.
Mason, Joseph Robert	Workington.
Moore, Jonathan Reuben	Kettering.
Slicer, Walter	Bingley.
Trible, Edward	Launceston.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Austen, Charles Wilson	Surbiton.
Blamey, Edward Parr	Hayle.
Crowther, Horace Woodward	West Bromwich.
Garnett, James	Kendal.
Hopkins, John Henry	Leicester.
McKenzie, James	Macduff.
Morrison, John Wm. Thomas	London.
Parsons, Thomas	Bourton-on-the-Water.
Richmond, Paul Henry	Wigton.
Stevens, Walter Rowland	Wye.
Thomas, Joseph Arden	Cambridge.
Ward, Robert Edward	Kettering.
Wheeler, William Robert	Fant Holme.
Woods, William Herbert	Plymouth.
Woolley, Evan Edward	Llanidloes.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

RESTORATION TO THE REGISTER.

The name of the following person, who had made the required declaration and paid a fine of one guinea, was restored to the Register of Chemists and Druggists:—

Henry Matthew Roberton, 11, East Street, Walworth, Surrey.

ADDITIONS TO THE REGISTER.

The Registrar reported that—

Wallett James Burgess, Great Northern Hospital, Caledonian Road, London, N.,
Joseph Cook, Chapel-en-le-Frith, Derby,
Joseph Robinson Lund, 81, Barkerend Road, Bradford, Yorks, and
George Murrell, 36, High Street, Winchester,

having made statutory declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been supported by duly qualified medical practitioners, their names had been placed on the Register.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was received and adopted, and sundry accounts were ordered to be paid. The accounts included a large item for law costs, and in connection with this matter the President stated that he had received a communication from the Solicitor, saying that he had retained Mr. Benjamin, Q.C., in addition to the counsel previously engaged in the case, for the appeal in the House of Lords.

BENEVOLENT FUND.

Mr. **SYMES** suggested that time might be saved if the details of cases were not read to the Council.

The **PRESIDENT** thought it very desirable that the details should be read, in order that those who did not attend the Committee might know what was being done.

Mr. **RICHARDSON** supported the view of Mr. Symes. He thought the Council had full confidence in the Committee.

Mr. **WILLIAMS** suggested that if this question were to be raised, a notice of motion should be given, to which Mr. Symes assented, and the reading of the minutes was then proceeded with.

The report included a recommendation of the following grants:—

£15 to a registered chemist and druggist and former member, age 73.

£5 to a registered chemist and druggist, aged 71, who has had two previous grants of £10 each.

£10 to a registered chemist and druggist and associate, suffering from illness.

£10 to the widow of a registered chemist and druggist.

£20 to the widow of a member, to assist her in furnishing her house for the purpose of letting lodgings.

£10 to the widow of a registered chemist and druggist.

£10 to the widow of a chemist and druggist.

£5 to the widow of a registered chemist and druggist, who had a grant of £10 in September last.

£10 to the widow of a life member, who has had two previous grants of £20.

£10 to a registered chemist and druggist, who has had several previous grants.

£10 to a female registered chemist and druggist.

£10 to one of the unsuccessful candidates for an annuity at the last election.

With regard to a provisional grant of thirty guineas made in November last, to assist in the election of an orphan to an asylum, the Secretary reported that he had attended the election, but had not found it necessary to expend any of the money, the child being elected without such expenditure.

One or two cases had been deferred for further inquiries, and in two cases the Committee had not entertained the applications.

The report and recommendations were unanimously received and adopted.

THE SALE OF PATENT MEDICINES CONTAINING POISONS.

The Council then went into Committee to consider a communication from the Privy Council, relative to the sale of patent medicines containing poisons. After some discussion, a draft letter to be sent in reply was agreed to by the Council, and ordered to be sent to the Privy Council.

REPORTS OF COMMITTEES (*continued*).

LIBRARY, MUSEUM AND LABORATORY.

The Professors had attended and reported on their respective classes.

Professor Redwood had submitted specimen copies of the 'Historical Sketch of Pharmacy.'

The Librarian's report had been received, and included the following particulars:—

	Attendance.	Total.	Highest.	Lowest.	Average.
May . .	Day . .	288	18	3	12 nearly.
	Evening	130	12	3	7

Circulation of books.	Town.	Country.	Total.
No. of entries . . .	164	87	251
Carriage paid		£1 12*s.* 2*d.*	

The following donations to the Library had been reported, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Blanchet, C., Du Thapsia garganica, 1880.
Truphème, V., Premières études sur l'Erythroxlyon coca, 1879.
From Professor J. Léon Soubeiran ?

Philadelphia College of Pharmacy, Annual Report of the Alumni Association, 1879–80.
From the President of the Association.

Ambition's Dream, in two fyttes, new ed., 1879. [*Anonymous.*] From the Author.

Hielbig, C., Kritische Beurtheilung der Methoden welche zur Trennung und quantitativen Bestimmung der verschiedenen Chinaalkaloide benutzt werden, 1880.
Lehmann, A., Vergleichende Untersuchungen einiger Catechu- und Gambir-Proben nebst kritischer Beleuchtung der Methoden zur Bestimmung ihres Handelswerthes, 1880.
From Professor Dragendorff.

Hoadly, B., Three Lectures on the Organs of Respiration, 1740.
Leake, J., Lecture introductory to the Theory and Practice of Midwifery, 3rd ed. [1776].
— Syllabus of Lectures on Midwifery, 1776.
— Description and Use of a New Forceps, [1775].
— Vindication of Forceps, 1774.
Keill, J., Essays on several parts of the Animal Œconomy, 2nd ed., 1717.
Morley, J., Essay on the Nature and Cure of Scrophulous Disorders, [with description and] coloured plate of vervain, [25th ed.,] 1787.
Quincy, J., Lexicon Physico-Medicum, or, New Physical Dictionary, 2nd ed., 1722.
— Prælectiones Pharmaceuticæ, or, Course of Lectures in Pharmacy, 1723.
Read, [A.,] Chirurgorum Comes, or, Whole Practice of Chyrurgery, 1687.
Salmon, W., Synopsis Medicinæ, or, Compendium of Physick, 3rd ed., 1695.
Sydenham, T., Whole Works, translated by J. Pechy, 1696.
Withering, W., Account of the Foxglove and some of its Medical Uses, 1785.
From Mr. Benjamin Heald.

Flora of British India, by Sir J. D. Hooker, *etc.*, [pt. 7, 1880].
From H.M. Secretary of State for India.

Annuaire des Spécialités Médicales et Pharmaceutiques, 1880. From the Editors ?

The Committee recommended the purchase of the undermentioned works for the Library:—

Chemist's Journal, The.
Corfield, W. H., Health, 1880.
Dickson, J., Fasciculi Plantarum Cryptogamicarum Britanniæ, 1785–1801.
Ekin, C., Potable Water, 1880.
Ferrand, E., Aide-Mémoire de Pharmacie, 2me éd., 1880.
Freind, J., Chymical Lectures, 2nd ed., 1729.
Gordon, J. E. H., Physical Treatise on Electricity and Magnetism, 1880. 2 vols.
Kingzett, C. T., Nature's Hygiene, 1880.
Latham, H., On the Action of Examinations, 1877.
Luff, A. P., Introduction to the Study of Chemistry, 1880.
Pavy, F. W., Treatise on Food and Dietetics, 2nd ed., 1875.
Prantl, K., Elementary Text-Book of Botany, translated by S. H. Vines, 1880.
Ringer, S., Handbook of Therapeutics, 8th ed., 1880.
Tyndall, J., Heat a Mode of Motion, 6th ed., 1880.
Valentin, W. G., Course of Qualitative Chemical Analysis, 5th ed., 1880.

The Librarian had laid before the Committee copies of the new edition of the Catalogue of the Library. He had also expressed his appreciation of the aid he had derived in its compilation from the rules for cataloguing adopted or proposed by the Library Associations, and from those prepared by Mr. Cutter.

The Committee recommended that a copy of the Library Catalogue be forwarded to each of the provincial associations and to various public institutions and libraries.

The Committee recommended that the Library and Museum be closed in the evening during August and September.

The Curator's report had been received, and included the following particulars:—

		Total.	Highest.	Lowest.	Average.
Attendance during April.	Day . .	314	20	4	10
	Evening	64	8	1	2

		Total.	Highest.	Lowest.	Average.
During May.	Day . .	170	14	2	8
	Evening	29	4	1	2

The following donations to the Museum had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimen of Bloodwood Gum (*Eucalyptus corymbosa*). From Mr. T. B. Groves, Weymouth.
Specimens of *Cyperus bulbosus*, Anchanchah seed, True Zedoary Root (*Kachoora*), Yellow Zedoary Root (*Amba Hulda*), and the root of *Zingiber Cassumunar*. From Dr. Dymock, Bombay.
Specimens of *Valeriana Hardwickii*.
From Mr. A. W. Gerrard.
Specimen of the Fruit of *Liquidambar Formosana*.
From the Director of the Royal Gardens, Kew.
Specimen of the Seeds of *Brucea Sumatrana*.
From Dr. De Vrij.
Specimens of Boiari Root.
From Professor Davidson, Aberdeen.
Specimens of the barks of *Cinchona Calisaya*, *C. succirubra*, and *C. officinalis*, from Jamaica, and fine quills of the bark of *C. Ledgeriana*, from Java.
From Mr. Thos. Whiffen.
Specimens of the following chemicals, etc., from the recent Pharmaceutical Exhibition:—
Anetholate, Carbolate, and Eugenate of Quinine, Sulphate of Conchinine, Santonate of Sodium, Laudanine and Pseudomorphine, and a specimen of German Opium. From Mr. T. Farries.
Specimens of Apocynin, Chelonin, Eupurpurin, Hamamelin, Stillingin, Xanthoxylin and False Quebracho Bark.
From Messrs. Burgoyne, Burbidges, Cyriax and Farries.
Two crystalline acids, separated from commercial artificial Salicylic Acid.
From Messrs. Hopkin and Williams.
Specimen of genuine Chian Turpentine.
From Dr. John Clay, Birmingham.
Specimens illustrating the composition of Cod Liver Oil, as exhibited at the last Paris Exhibition, including oleic acid, solid fatty acids, volatile acids, biliary matter and gaduine.
From Messrs. Southall, Brothers and Barclay.
Specimen of Lisbon Copal, apparently not of fossil origin. From Mons. C. Chantre.
Specimens of South American Drugs.
From Messrs. Wyleys and Co., Coventry.
Specimens of Chinese Opium Smoking Apparatus and three cases of Indian Drugs.
From the Director of the Royal Gardens, Kew.
Herbarium specimens of the plant yielding Chinese Oil of Peppermint.
From Mr. C. Ford, Director of the Botanical Gardens at Hong Kong.
Herbarium specimens of *Aristolochia Clematitis* (the uncultivated plant). From Mr. R. Modlen, Oxford.
Herbarium specimens of *Daphne Laureola*.
From Mr. T. Romans.

The Curator had also reported that M. Pfleiderer had offered to present the Society with one of his mixing machines, and it was recommended that the offer be accepted.

It was also recommended that a small quantity of zircon and phenakite be purchased for the Museum, specimens having been submitted. Also that the Curator pay a visit to Glasgow, in order to select and superintend the removal of some valuable specimens of crystals which had been offered the Society by Mr. E. C. C. Stanford.

The Curator had made an application for an assistant, and the Committee recommended that one be engaged at a salary of not more than 30*s.* per week.

Mr. Frazer and Mr. Mackay having expressed their approval of the Curator visiting Glasgow and Edinburgh,

The President remarked, in reference to the engagement of an assistant in the Museum, that the Curator had a great deal of his time occupied in classifying and arranging specimens sent from Kew, and other sources; in answering queries and giving information to visitors, and in identifying specimens of drugs sent to him from all parts. It was absolutely necessary that an assistant should be engaged to perform the more mechanical part of the work.

The report and recommendations of the Committee were received and adopted.

The Historical Sketch of Pharmacy.

Specimen copies of this book were laid on the table, and it was referred to the Library, Museum and Laboratory Committee to decide on the style of binding which should be adopted.

HOUSE.

The report of this Committee was received and adopted, but it contained nothing calling for special notice. The main portion of it referred to cleaning and decorating the premises of the Society in Edinburgh.

Mr. Mackay suggested that a fire-proof safe should be procured, for the purpose of keeping the register books belonging to the North British Branch.

This proposition was acceded to, and included in the report.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor stating the progress of various matters which had been placed in his hands. In the case of Mr. Jackson, of Chesterfield, the defendant had paid the penalty and costs into Court; in the case of Mr. Hartley, Sheffield, judgment had been obtained against the defendant. The same result had been obtained in the case of Mr. Wright, Liverpool. Mr. Jenkins, Llangadock, had paid the penalty and costs into Court. A verdict had also been obtained against Mr. Copping, Manchester.

The Solicitor had also reported that the appeal case stood the eighth on the list of cases for hearing.

Several other cases of alleged infringement, particulars of which had been sent to the Registrar, had been considered, and in some instances prosecutions had been ordered. The report was as usual considered in Committee. On resuming, the report and recommendations of the Committee were received and adopted.

THE BILL FOR REGULATING THE MANUFACTURE AND SALE OF SPIRIT.

Mr. **Hampson** asked if the Spirits Bill now going through the House of Commons was receiving attention.

The **President** said it was.

Mr. **Williams** said there were clauses which would be very injurious to chemists and druggists, inasmuch as there was a provision that no article should be made or kept in stock in which methylated spirit had been used, under a heavy penalty.

Mr. **Hampson** thought that hitherto the law had been in one direction, and the regulations issued by the Board of Inland Revenue in another. Instead of all persons being amenable to the law, they were amenable to official regulations which were uncertain and unsatisfactory. It ought to be known exactly what the law was which people had to obey, and not have to obtain permission to do certain things, the interpretation of which was extremely doubtful.

Mr. **Sandford** said his attention having been called to this Bill by the Secretary, he saw certain things which appeared to him to require alteration, and he, therefore, waited on the solicitors to the Board of Inland Revenue, and put the case before them. They assured him that the Bill was simply to consolidate, not in any way to alter the existing law. The Bill allowed the use of methylated spirit in the preparation of sulphuric ether and chloroform as before, and he suggested that it might also be extended so as to allow of its use in such operations as extracting the resin of scammony, an article to which his attention had been called by the President, where the methylated spirit all passed off before the substance was ready for use. He, therefore, asked the solicitors to insert words rendering it necessary for the spirit to remain as a component part to constitute an offence. They told him that it would be very difficult to introduce any regulation of that kind, but that it was quite unnecessary, because if resin of scammony or any dry article which had no methylated spirit in it were examined it could not be proved any had been used. Two or three days after, however, his notice was drawn to the omission of one word which was very important; he again called and drew attention to it, and he believed the matter would receive full consideration. The old Act of 1866, said that "no person shall use methylated spirit or any derivative thereof in the preparation of any article capable of being used either wholly or partially as a beverage, or internally as a medicine; and if any person shall use, or shall sell or have in his possession any *such* article in the manufacture and composition of which methylated spirit should have been used, he should be liable to a penalty. Now, in the new Act the word "such" had been omitted, accidentally he thought, and it therefore made a person liable for the possession of *any* article. He, therefore, asked that the word "such" should be re-inserted, and he hoped it would be, but he was told that the Bill had to await the result of the Budget. It was a curious fact that under the old Act, permission had been obtained from the Board of Inland Revenue to make soap and compound camphor liniment with methylated spirit, and afterwards on a special application by this Council that permission was extended to aconite and belladonna liniments, but it now appeared that there really had been no occasion to obtain permission for either of these things, they being already exempted by the word "such," which limited restrictions to articles which might be used as a beverage or a medicine to be taken internally. He was also informed that whatever regulations had been made under the old Act would remain in force under the new.

Mr. **Williams** remarked that the Council had been told the same thing in the case of other Acts, but when the Acts came to be applied there were found to be most material alterations required. Besides, the reading of police magistrates and judges was not always the same as that of the Privy Council, or those who drew the Act; and he wanted everything to be made plain in the Act itself. Methylated spirit was largely used in the preparation of some of the vegetable alkaloids, and if the Act passed as it now stood, all this manufacture in Great Britain would be entirely stopped. Methylated spirit had been used in the preparation of strychnine, atropine, and such like bodies, and if it were stopped all the trade would go abroad, because it would be impossible to compete with foreign makers.

Mr **Sandford** said if no one could be prosecuted for selling an article which had not the spirit remaining in it and if the word "such" were inserted, the difficulty would be removed.

Mr **Hampson** thought notwithstanding the great obligations they were under to Mr. Sandford for having taken action in the matter, it ought not, being so important, to rest in the hands of any individual, and he would therefore move that a committee, consisting of the President, Vice-President, Treasurer, and Messrs. Sandford and Williams, be requested to watch and report on this Bill.

Mr **Andrews** seconded the motion.

Mr **Richardson** supported the motion. In addition to the articles mentioned by Mr Williams, methylated spirit was used considerably in the manufacture of compound extract of colocynth. But he understood from Mr. Sandford that the introduction of the word "such" would make an immense difference. He was lately asked by a surgeon to make him four winchesters of tincture of opium with methylated spirit for outward application; he told him he was not permitted by law to do so, but as he understood Mr. Sandford it might be done if the product was not intended to be taken internally.

Mr. **Sandford** said that was not so. It was only permissible in cases where the article could not be used internally.

Mr. **Symes** having spoken in support of the motion, it was put and carried unanimously.

Mr. **Churchill** said it would be desirable to obtain the same exemptions under the new Bill as were enjoyed under the old.

THE SCHOOL OF PHARMACY.

The Council then went into committee to consider the report of the Special Committee appointed to consider the condition of the Society's School.

It was resolved that the result of the Committee's deliberations be communicated to the Professors.

APPOINTMENT OF PROFESSORS AND CURATOR.

Professor Redwood was reappointed Professor of Chemistry and Pharmacy for the ensuing year.

Professor Bentley was reappointed Professor of Botany and Materia Medica for the ensuing year.

Professor Attfield was reappointed Professor of Practical Chemistry for the ensuing year.

Mr. Holmes was reappointed Curator for the ensuing year.

THE COUNCIL EXAMINATIONS.

Messrs. M. Carteighe and Corder were appointed to conduct the examinations in July for the prizes offered by the Council.

List of Local Secretaries, 1880-81.[*]

The following gentlemen were appointed Local Secretaries for the ensuing year:—

Towns eligible.	Names of persons appointed.
Aberdare	
Aberdeen	Davidson, Charles.
Abergele	Hannah, John.
Aberystwith	Davies, John Hugh.
Abingdon	Smith, William.
Accrington	Sprake, David Lewis.
Altrincham	Hughes, Edward.
Andover	Gould, Robert George.
Arbroath	Shield, George.
Ashbourne	Bradley, Edwin Silvester.
Ashby-de-la-Zouch	Johnson, Edwin Eli.
Ashton-under-Lyne	Bostock, William.
Aylesbury	Turner, John.
Ayr	
Banbury	Ball, George Vincent.
Banff	Ellis, Bartlett.
Bangor	Baker, Henry Villars.
Barnsley	Badger, Alfred.
Barnstaple	Goss, Samuel.
Barrow-in-Furness	Steel, Thomas.
Bath	Commans, Robert Dyer.
Beaumaris	
Bedford	Cuthbert, John M.
Belper	Ashton, John.
Berwick	Carr, Walter Paterson.
Bewdley	
Birkenhead	Nicholson, Henry.
Birmingham	Southall, William.
Bishop Auckland	Dobinson, Thomas.
Blackburn	Farnworth, William.
Bodmin	Williams, Joel Drew.
Bolton	Dutton, George.
Boston	
Bournemouth	Duncan, Alexander.
Bradford (Yorkshire)	Rimmington, Felix W. E.
Brecon	Meredith, John.
Bridgnorth	Deighton, Thomas Milner
Bridlington	Forge, Christopher.
Bridport	Tucker, Charles.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Buckingham	Sirett, George Benyon.
Burnley	Thomas, Richard.
Burslem	Blackshaw, Thomas.
Bury	
Bury St. Edmunds	Youngman, Edward.
Calne	
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.
Cardiff	Hollway, Alfred Brown.
Cardigan	Jones, John Edward.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard M.
Carnarvon	Lloyd, William.
Chatham	Crofts, Holmes Cheney.
Chelmsford	Baker, Charles Patrick.
Cheltenham	Smith, Nathaniel.
Chester	Baxter, George.
Chesterfield	Windle, John T.
Chichester	Long, William Elliott.
Chippenham	Coles, John Coles.
Christchurch	Green, John.
Cirencester	Mason, Joseph Wright.
Clitheroe	
Cockermouth	Bowerbank, Joseph.
Colchester	Cordley, William Bains.
Congleton	Goode, Charles.
Coventry	Wyley, John.
Crewe	McNeil, James Norton.
Cricklade	
Croydon	Barritt, George.
Darlington	Robinson, James.
Deal	Green, John.
Denbigh	Edwards, William.
Derby	Stevenson, Richard.
Devizes	
Devonport	Codd, Francis.
Dewsbury	Matterson, Edward H.
Diss	Gostling, Thomas Preston.
Doncaster	Howorth, James.
Dorchester	Evans, Alfred John.
Dorking	Clift, Joseph.
Dover	Bottle, Alexander.
Droitwich	Taylor, Edmund.
Dudley	Gare, Charles Hazard.
Dumfries	Allan, William.
Dundee	Hardie, James.
Dunfermline	Seath, Alexander.
Durham	Sarsfield, William.
Edinburgh	Mackay, John.
Elgin	Robertson, William.
Ely	Pate, Henry Thomas.
Evesham	Dingley, Richard Loxley.
Exeter	Delves, George.
Eye	Bishop, Robert.
Falkirk	Murdoch, David.
Falmouth	Newman, Walter Francis.
Fareham	Batchelor, Charles.
Faversham	Underdown, Fredk. W.
Flint	Jones, Michael.
Folkestone	Goodliffe, George.
Forfar	Ranken, James A.
Frome	
Gainsborough	Spouncer, Henry Thomas.
Gateshead	Elliott, Robert.
Glasgow	Kinninmont, Alexander.
Gloucester	Meadows, Henry.
Gosport	Hunter, John.
Grantham	Cox, John.
Gravesend	Bulgin, William.
Greenock	
Grimsby, Great	Botterill, George Thomas.
Guernsey	Arnold, Adolphus.
Guildford	Martin, Edward W.
Haddington	Watt, James.
Halifax	Dyer, William.
Harrogate	Davis, R. Hayton.
Hartlepool	Jackson, William G.
Harwich	Bevan, Charles F.
Hastings and St. Leonards	Bell, James Alfred.
Haverfordwest	Williams, William.
Hawick	Craig, John.
Helensburgh	Harvie, George.
Helston	Troake, Marler H.
Hereford	Williams, Walter.
Hertford	Lines, George.
Hexham	Gibson, John Pattison.
Heywood	Beckett, William.
Horsham	Williams, Philip.
Huddersfield	King, William.
Hull	Bell, Charles Bains.
Huntingdon	Provost, John Pullen.
Huntly	Chalmers, George.
Hyde	Wild, Joseph.
Hythe	Lemmon, Robert Alce.
Inverness	Galloway, George Ross.
Ipswich	Anness, Samuel Richard.
Jersey	Ereaut, John, jun.
Kendal	Severs, Joseph.
Kidderminster	Hewitt, George.
Kilmarnock	Borland, John.
King's Lynn	Palmer, Wm. Jos.
Kingston-on-Thames	Walmsley, Samuel.

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[*] Local Secretaries are appointed in all towns in Great Britain which return a Member or Members to Parliament, and in such other towns as contain not less than three Members of the Society or Associates in Business.

Towns eligible.	Names of persons appointed.
Kirkcaldy	Storrar, David.
Knaresborough	Potter, Charles.
Knutsford	Silvester, Henry Thomas.
Lancaster	Bagnall, Wm. Henry.
Launceston	Eyre, Jonathan Symes.
Leamington	Davis, Henry.
Leeds	Reynolds, Richard.
Leek	Johnson, William.
Leicester	Clark, Walter Beales.
Leighton Buzzard	Readman, William.
Leith	Finlayson, Thomas.
Leominster	Davis, David Frederick.
Lewes	Martin, Thomas.
Lichfield	Perkins, John Jaquest.
Lincoln	Maltby, Joseph.
Liskeard	Young, Richard.
Liverpool	Symes, Charles.
Llandudno	Penney, William Sealy.
Longton	Prince, Arthur G.
Loughborough	Paget, John.
Louth	Hurst, John B.
Lowestoft	Sale, Thomas J.
Ludlow	Woodhouse, George.
Lyme Regis	Thornton, Edward.
Lymington	Allen, Adam U.
Macclesfield	Bates, William Isaac.
Maidstone	
Maldon	Wallworth, David.
Malmesbury	Brown, Francis James.
Malton	Buckle, James.
Malvern	Metcalfe, Edmund Henry.
Manchester, etc.	Wilkinson, William.
March	Davies, Peter Hughes.
Margate	Candler, Joseph Thomas.
Marlborough	
Marlow	
Merthyr Tydvil	Smyth, Walter.
Middlesborough	Buck, Thomas.
Midhurst	Cowap, Samuel Evan.
Monmouth	Key, Hobson.
Montgomery	
Montrose	Burrell, George.
Morpeth	Marshall, George T.
Neath	Hibbert, Walter.
Newark	March, William.
Newbury	Hickman, Frederick.
Newcastle-under-Lyme	Cartwright, William.
Newcastle-on-Tyne	Martin, Nicholas H.
Newport (I. of Wight)	Orchard, Herbert Joseph.
Newport (Mon.)	Seys, James Ancas.
New Radnor	
Newton Abbot	Poulton, John.
Newtown	Owen, Edward.
Northallerton	Warrior, William.
Northampton	Bingley, John.
Norwich	Sutton, Francis.
Nottingham	Fitzhugh, Richard.
Nuneaton	Iliffe, George.
Oldham	Hargraves, H. Lister.
Oswestry	Saunders, George James.
Over Darwen	Shorrock, Ralph.
Oxford	Prior, George Thomas.
Paisley	Hatrick, William.
Pembroke	Treweeks, Rich. Harwood.
Penrith	Kirkbride, William.
Penzance	Cornish, Henry Robert.
Perth	
Peterborough	Heanley, Marshall.
Petersfield	Edgeler, William B.
Plymouth	Balkwill, Alfred P.
Pontefract	Bratley, William.
Poole	Penney, William.
Portsmouth, etc.	Childs, James L.
Preston	Barnes, Lawrence R.
Ramsgate	Morton, Henry.
Reading	Hayward, Wm. Griffith.
Redditch	Mousley, William.
Retford	Clater, Francis.
Richmond (Yorks)	Thompson, John Thomas.
Ripon	Judson, Thomas.
Rochdale	Taylor, Edward.
Rochester	Harris, Henry William.
Rothesay	Duncan, William.
Rugby	Chamberlain, Arthur G.
Ryde (Isle of Wight)	Pollard, Henry Hindes.
Rye	Waters, William Allen.
St. Albans	Ekins, Arthur Edward.
St. Andrews	Govan, Alexander.
St. Austell	Hern, William Henry.
St. Ives (Cornwall)	Young, Tonkin.
Salisbury	Atkins, Samuel Ralph.
Sandwich	Baker, Frank.
Scarborough	Whitfield, John.
Seacombe	Walker, John Henry.
Selby	Cutting, Thomas John.
Shaftesbury	Powell, John.
Sheerness	Bray, John.
Sheffield	Ward, William.
Shields, South	Mays, Robert J. J.
Shipley	Dunn, Henry.
Shoreham	Fenner, Edwin.
Shrewsbury	Cross, William Gowen.
Slough	Griffith, Richard.
Southampton	Dawson, Oliver R.
Southport	Ashton, William.
Spalding	Shadford, Major.
Stafford	Averill, John.
Stalybridge	Brierley, Richard.
Stamford	
Stirling	Duncanson, William.
Stockport	Kay, Samuel.
Stockton-on-Tees	Brayshay, Thomas.
Stoke-on-Trent	Adams, Frank.
Stourbridge	Bland, Thomas Frederick.
Stratford-on-Avon	Hawkes, Richard.
Stroud	Blake, William F.
Sudbury	Harding, James John.
Sunderland	Sharp, David Blakey.
Swansea	Griffiths, William.
Tamworth	Allkins, Thomas Boulton.
Taunton	Prince, Henry.
Tavistock	Gill, William.
Teignmouth	Cornelius, Joseph.
Tenby	Davies, Moses Prosser.
Tewkesbury	Allis, Francis.
Thirsk	
Tiverton	Havill, Paul.
Torquay	Smith, Edward.
Totnes	Keen, Benjamin.
Truro	Percy, Thomas Bickle.
Tunbridge Wells	Howard, Richard.
Tynemouth	
Uttoxeter	Johnson, John Borwell.
Wakefield	Wice, Jonathan H.
Wallingford	Payne, Sidney.
Walsall	Bate, Joseph William.
Wareham	Randall, Thomas.
Warrington	Woods, Joseph Henry.
Warwick	Pratt, Henry.
Watford	Chater, Edward Mitchell.
Wednesbury	Gittoes, Samuel James.
Wellington (Somerset)	Langford, John Brown.
Wenlock	
Westbury	Taylor, Stephen.
West Bromwich	
Weston-super-Mare	Gibbons, George.
Weymouth	Groves, Thomas Bennett.
Whitby	Stevenson, John.
Whitehaven	Kitchin, Archibald.
Wick	Miller, Kenneth.

Towns eligible.	Names of persons appointed.
Wigan	Phillips, Jonathan.
Wigton	
Wilton	
Winchester	Hunt, Richard.
Windsor	Russell, Charles J. L.
Wolverhampton	Brevitt, William Yates.
Woodbridge	Betts, John.
Woodstock	Griffits, John Alonza.
Worcester	Virgo, Charles.
Worthing	Cortis, Arthur Brownhill.
Wycombe	Furmston, Samuel C.
Yarmouth, Great	Poll, Wm. Sheppard.
Yeovil	Maggs, Thomas Charles.
York	Davison, Ralph.

Local Examinations.

The Secretary presented the following table, showing the attendance of candidates at the various centres for the last eight Preliminary examinations.

PRELIMINARY EXAMINATION.

List of Centres and Table of Attendances of Candidates at each Centre.

	1878. Oct.	1879. Jan., Apr., July, Oct.	1880. Jan.	1880. Apr.	1880. July.	Total number of attendances at each centre at 8 examinations.
ENGLAND AND WALES.						
Birmingham	12	87	20	20	17	156
Brighton	3	14	3	—	5	25
Bristol	6	44	13	6	15	84
Cambridge	5	22	2	10	1	40
Canterbury	—	10	2	4	11	27
Cardiff	3	25	8	5	3	44
Carlisle	6	30	4	9	8	57
Carmarthen	7	42	3	9	4	65
Carnarvon	2	23	5	7	10	47
Cheltenham	2	8	3	2	1	16
Darlington	3	25	4	7	7	46
Exeter	2	34	13	9	4	62
Hull	—	40	6	13	3	62
Lancaster	1	21	5	9	13	49
Leeds	7	70	11	17	15	120
Lincoln	3	40	13	9	7	72
Liverpool	7	60	10	14	18	109
London	33	211	45	45	46	380
Manchester	18	104	23	26	23	194
Newcastle	5	32	9	13	10	69
Northampton	—	28	4	5	7	44
Norwich	2	46	8	13	11	80
Nottingham	8	53	13	15	12	101
Oxford	1	7	1	2	3	14
Peterborough	2	28	4	3	3	40
Sheffield	8	32	3	5	13	61
Shrewsbury	2	21	4	5	4	36
Southampton	5	44	8	6	5	68
Truro	1	19	2	3	1	26
Worcester	2	12	2	2	1	19
York	2	39	5	11		63
SCOTLAND.						
Aberdeen	13	61	9	17	8	108
Dundee	7	21	5	7	7	47
Edinburgh	11	63	20	13	27	134
Glasgow	3	46	8	9	11	77
Inverness	2	9	2	5	1	19
Douglas, I. of Man	—	2	—	—	—	2
Guernsey	1	1	2	—	—	4
Jersey	—	1	1	1	—	3

It was resolved that Superintendents be appointed at the same centres as last year, and that the appointments be offered in the first instance to the Local Secretaries in the respective places with the exception of London.

Report of Examinations.

June, 1880.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major, (16th)	9	4	5
Minor, (16th)	18	12	6
„ (17th)	25	15	10
	—43	—27	—16
Modified, (16th)	1	0	1
	53	31	22

Preliminary Examination.

9 certificates were received in lieu of the Society's examination :—

2 University of Oxford.
2 University of Edinburgh.
1 University of Glasgow.
4 College of Preceptors.

Opinion of the Board of Examiners on the Desirability of the Establishment of a Curriculum.

The report also included a statement that the London Board had discussed the desirability of requiring from candidates for the Minor and Major examinations a certificate of having completed a curriculum at some recognized school of pharmacy, and the opinion of the Board appeared to be unanimous that the production of such a certificate was very desirable if practicable. Mr. Brady had also reported to the London Board that the subject had been discussed by the deputation who went to Edinburgh with the members of the North British Board, and that those gentlemen held the same view and had passed a minute to that effect. The opinion was unanimously expressed by the Scotch Board that if a curriculum were recognized at all, it must be compulsory, not permissive. But it was also felt that as the subject was not free from difficulties, considering the existing rules and regulations of the Society, a more decided opinion could not be expressed until a definite scheme was brought forward.

The consideration of the report of the deputation to Scotland and correspondence on other matters was deferred until the next meeting.

Proceedings of Scientific Societies.

SOCIETY OF ARTS.

The Chemistry of Bread-Making.*

BY PROFESSOR GRAHAM, D.SC.

Lecture III.

(*Continued from page* 16.)

I have also here a series of results obtained by Mr. Brown, Demonstrator in the Laboratory of Chemical Technology of University College, for the purposes of these lectures, on the influence of moisture in the process which bakers submit the flour to when they add water at a certain temperature—100° Fahr., in degrading some flours compared with other flours.

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* Cantor Lectures: Delivered November and December 1879. Reprinted from the *Journal of the Society of Arts.*

INFUSION PRODUCTS OF FLOUR. (HENRY BROWN.)

	Cold.	2 Hours.	4 Hours.	8 Hours.
Viennd Whites.				
Maltose	trace.	2·41	3·65	4·09
Dextrin	trace.	2·17	2·79	4·35
Soluble albuminoids.	0·76	0·58	0·76	1·28
	0·76	5·16	7·20	9·73
Best Whites.				
Maltose	none.	1·57	2·04	3·41
Dextrin	1·21	1·48	2·74	2·85
Soluble albuminoids.	0·71	0·58	0·31	1·54
	1·92	3·63	5·59	7·80
Best Households.				
Maltose	1·00	1·36	4·09	3·93
Dextrin	1·13	2·46	2·09	3·79
Soluble albuminoids.	0·93	0·79	1·23	1·42
	3·06	4·61	7·41	9·14

		Cold.	9 Hours.	4 Hours.	8 Hours.
Second Households.	No. 1.	1·36	2·83	4·09	5·39
		0·89	2·34	2·40	3·80
		0·76	0·65	1·29	2·12
		3·01	5·82	7·78	11·81
	No. 2.	1·57	6·01	6·01	7·59
		1·04	0·84	1·21	0·67
		1·05	1·45	1·31	1·89
		3·66	8·30	8·53	10·15
Brown meal.		trace	3·41	3·93	4·99
		2·70	0·95	2·09	2·89
		0·62	0·70	1·39	1·33
		3·32	5·06	7·41	9·21

Inferior Flour.			With Lime.		High Dried.	
	4 Hours.	8 Hours.	4 Hours.	8 Hours	4 Hours.	8 Hours.
Maltose .	6·82	11·14	6·82	8·20	4·44	4·44
Dextrin .	0·43	1·23	0·11	2·19	1·78	2·91
Soluble albuminoids.	3·19	3·74	3·34	3·34	2·48	3·29
	10·49	16·11	10·27	13·69	8·70	10·64

You will find the varieties taken consist of Vienna whites, the best whites, the best households, second households and brown meal. They have been digested in cold water for a few minutes; then afterwards they have been kept up to a temperature of 100° Fahr. for two, four, and eight hours. If you look at the figures you will find, with these different kinds of flours, very remarkable differences are brought about by simply keeping the flours in a moist condition, at 100° Fahr. for these respective times. In the case of the Vienna whites, we find at the end of two hours, 5·16 is the amount of total soluble matters; at the end of four hours, 7·2; at the end of eight hours, 9·73, and so on. I will not go through the whole list. The point I wish to call your attention to is this. Here and there you will find some slight discrepancies, partly due, it may be, to slight errors of analysis, partly to the difference of manipulation, and partly also to some difference in the nature of the soluble albuminoids; but still, even allowing for all that, you will find that there is a considerable agreement. The longer you carry on this operation, the more you degrade, not merely the albuminoids, but the more also you degrade the starch down to the condition of maltose and dextrin. That process we call a hydration process. In the case of the second households, an inferior variety, we find, at the end of eight hours for example, the amount of the soluble albuminoid matter has increased to 1·89. In the case of No. 1, it has amounted to 2·12, giving us a total of 11·18 soluble matters.

We shall find afterwards the importance of these investigations when we come to consider the baker's process, when he has to submit, not flours very high in quality, but flours of inferior quality, to a long process of panification.

I pass on now to a very important matter, namely, the effect of kiln-drying. A few minutes ago I called your attention to the ways that man has of overcoming the marvellous activity of albuminoids in degrading the molecular structure of animal or vegetable substances. The same occurs of course in wheat as in other things. Now, the influence of kiln-drying I take to be this. In the first place, if you consider the corn that has not been thoroughly well matured in consequence of the insufficient amount of heat in the last stage of the ripening process, I think you will agree with me that kiln-drying must do much good in ripening, as it were, the albuminoids. In the case of wheat which has been fairly well matured, and yet somewhat injured on account of unfavourable harvest weather, we shall find also that the removal of moisture must tend to lessen the peculiar property of these albuminoids to become, in the presence of water, more and more soluble in their nature; and in addition to that, evidently it is of the highest importance that heat shall be given to the grain just as it is ripening—I mean at the end of the process. I am not speaking now of the earlier part of the process, but rather of the last portion of the maturation of the grain. Unfortunately, in a country like ours, we cannot always—indeed we very rarely—get such very excellent conditions as some of our foreign competitors have, and the result is that, every now and then, such as the harvest we have just passed through, we have conditions that are wholly unfavourable in giving the kind of wheat we want. We obtain a large ratio of nitrogen, and also a large ratio of the soluble albuminoids to the insoluble. In other words, we obtain what the baker would call a poor weak flour; weak in gluten—rich enough in total nitrogen, but weak in the important character of nitrogen compounds that he requires for his purpose.

Following the previous table, we have the results of a flour of inferior character which has been also submitted to this infusion process, or, as the brewer would call it, the mashing process—the action of moisture and heat for a certain time; in the first place, four hours, and then afterwards eight hours. I will not read all the details, but simply give you the totals in each case. The amount of matter dissolved at the end of four hours was 10·49 per cent. Indeed, it would have been more, had I employed a more accurate method than the one I have employed for the determination of the soluble albuminoid bodies, but the determination of the amount of albumen in infusions is very laborious, and, therefore, I have availed myself of the very ingenious and very valuable method known as Wanklyn's method for determining the al-between. This process does not give us the true totals, but merely gives relative results, so that the numbers are relatively correct, although, absolutely, they are rather too low. Still, 10·49 may be taken as the amount of soluble matter in every 100 parts. In the case of eight hours we have no less than 16 parts out of 100 become soluble, and you will see for yourselves what this soluble mass is composed of. While we are considering this table, I may as well call your attention to the next point. Many practical men may have heard of the use of lime in preventing too great a solution of the soluble albuminoids from the cereals. Now, in brewing, it is exceedingly important to have lime salts, especially carbonate of lime, and also to some extent sulphate of lime and sulphate of magnesia, in the water, to prevent too great solution of the albuminoid matters. Ladies who are present will understand this better, perhaps, if I give an illustration of the nature of hard water compared with soft, by referring to the ordinary method of boiling peas. Where you have peas, of what one would call a certain age, it would be most injurious to harden the water by the addition of a salt of lime, gypsum, or anything of that kind. Under these circumstances you require, in order to have the peas soft and tender, to use a soft water; whereas, where you boil young peas in a very soft water, the liquid is very highly coloured, due to the solution of the albuminoid called legumin. Now the addition here—see table—was simply of a little ordinary powdered chalk, not caustic lime, but the ordinary carbonate of lime, and therefore we find not much action at the end of four hours; but at the end of eight hours, instead of having 16 parts to the hundred made soluble, we have only 13·6. Now, I come to the interesting part of the table. It was done in order to illustrate the action of kiln-drying; but to have brought this before an audience like this, consisting of a great many practical millers and bakers, it would have been necessary to have given a very much larger series, in order to have illustrated the benefit to be derived from kiln-drying, than I have here. I merely made these experiments for the purpose of my argument, to show the action of a comparatively low temperature—about 140° Fahr., carried on for some six hours. It was a slow drying action, and at the same time, a slow heating one. We find now, in looking at the result, after the corn, or rather the flour, had been submitted to that action, there is a very marked effect. Upon mashing the flour with water in the same way as the others, with the same quantity of water, and the same quantity of flour, and at the same temperature, we find that in four hours, instead of 10·49, we have 8·7 only dissolved. But there is a still more marked decrease found when we submit that for eight hours to the same action; then instead of having 16·11, as we had in the first case after eight hours, we have now only 10·64. Now, 10·64, as the total amount of soluble matter obtained from 100 parts of flour, is, as you notice on that list, much lower than any. This method is far more efficacious than the employment of lime, and the difference between 10·64 and 16·1 is very marked.

As regards the question of kiln-drying, it is, of course, no new matter, and all practical men know that there are great advantages to be derived from it, especially in a year like the present, when many barleys are not fit for malting purposes until they are kiln-dried. Again, in such a bad year as we have had, and living, not in Egypt, but in a country that is constantly being flooded, we know perfectly well that no miller could make use of grain until it has been submitted, not merely to the drying action in the stack, but also to some extent to the heating action that goes on in the stack. This is more marked when you act upon corn that has been unfavourably garnered. If you submit that to a good process of kiln-drying, a process where the temperature is not high, say about 100° Fahr., increasing slowly to 140° Fahr., and at the same time submit it to a current of air, taking care that the thickness of the kiln floor is not too great, I feel convinced that, in many cases, our inferior wheats could be made, not into good wheats, perhaps, but they could be made much less inferior than they are now.

Before I pass from this, I will call your attention again to the fact that that drying was not done on the kiln floor, it was done with the actual flour; manifestly, therefore, we see that there must be many cases—I am not speaking of what may be called hard dried wheats, grown under very favourable conditions, but of our ordinary wheats, and especially in unfavourable years—there must be many instances where considerable benefits would be derived from a thorough drying of the flour after it has been made, not merely drying it at a low temperature, but at a temperature from 100° Fahr. to 120° Fahr., with a sufficient current of dry air to carry off the moisture.

I pass now to the next stage in the process of bread-making, that is to say, to the flour-making, or grinding down of the flour. I will not detain you long with reference to the process of milling, for a good many reasons. In the first place, we have not much time, there being so many other matters to be discussed. The second reason is one which, I daresay, practical millers who are present will consider all-sufficient, that is, I am perfectly ignorant of the subject, and, therefore, I think it is better that I should not go at all into the vexed question of high grinding or low grinding, or the use of rollers or disintegrators for the purpose of grinding. I would, therefore, rather pass on to the chemical aspect of the question. What is it that we theoretically conceive to be desirable to obtain in the process of converting grain into the flour that is required for the bread-making? Well, I think, in the first place, that no system of milling—whether it be a new method, or with stones, as has been the immemorial custom, and still is the chief method of grinding—can be perfect, unless the germ of the corn has been removed, and for this reason, although the germ bears a comparatively small ratio to the total weight of the corn, still it is an important factor. It contains very active albuminoid ferments, and, therefore, if that germ be ground up with the remainder of the flour, it must, to that extent, injure the value of the flour for bread-making purposes.

The next point that occurs to me as a chemist that should be attainable in any good system of milling, is the thorough removal of the bran; not even the slightest quantity of bran should be allowed to remain in the flour when prepared, and for the reason I pointed out to you that there is a soluble albuminoid ferment called cerealin. This is a very active diastasic body. An infusion of cerealin or an infusion of ordinary bran would give you a quantity of soluble ferments that will rapidly attack the starch cells, and in the presence of water hydrate the starch into maltose and dextrin. That is another reason why I consider that no system or milling is perfect, whether it be done by stones, or whether it be done by rollers or disintegrators, if it does not fulfil these two conditions, the removal of the germ and the removal of the bran.

I know that I am here treading upon very tender ground; not so much in regard to practical millers, they, perhaps, will not be so adverse to me, but I am about to criticize views that have been adopted by some scientific men, and followed by physicians, namely, the great value and importance of the bran. I admit of course, that bran amounts to about one-fifth of the total corn, and, therefore, the rejection of so much bran would, on a hasty view, seem to be a serious loss. It is true that, though there is much useless woody fibre, there are also some valuable albuminoid bodies, and, further, that there is a larger proportion of phosphoric acid and potash in the bran than is found in the ash of the rest of the berry. We may admit this, and yet decline to fall into the error made by some scientific writers and by physicians, who have looked solely to the results of chemical analysis and have overlooked the important question of the indigestibility of the hard, horny substance known as bran. We know that, if bran be introduced into the flour in large flakes, it acts as an irritant, producing well-known effects; now this powerful laxative action—though it may be in some cases of advantage to persons suffering from sedentary lives, and therefore preferable to aperient medicines—is not what the world at large desires. I may be answered that the bran need not thus be used, and that it should be ground to as fine a powder as the finest flour, and, therefore, there will remain no irritant particles. This view has been taken of a vexed question by many anxious to save the assumed high food value of bran, ignoring that, in so doing, they are reducing the value of wheaten flour for the purpose of bread-making. They might equally recommend that oatmeal or barley-meal should be mixed with flour intended for the manufacture of fermented bread. In grinding down the bran of wheat along with the husk of the corn, you have introduced into the flour an active albuminoid ferment; and so soon as you take such flour containing the whole of the bran ground down to a very fine condition, then, in the process of panification or bread-making, it imparts the peculiar power which soluble albuminoids have of rapidly converting the starch molecules into less simple ones. You have a large quantity of maltose sugar formed and dextrin, and these in the oven give considerable colour. Not merely do they give colour, but they produce another somewhat injurious action, which is, that it is more difficult to obtain, with a thorough admixture of impalpable bran, a light bread. The bread is not only high-coloured, but it is also more or less sodden, and this gives considerable trouble to the baker to avoid, even partially.

As regards the importance of the constituents of bran, I say that the analyst, and the physician who makes use of the analyst as his supporter, in bringing before us the importance of brown bread as compared with white, and who assert that, in rejecting the bran, we are guilty of a serious waste of flesh-forming and bone-forming material, should not take a mere chemical analysis as all-sufficient to establish their point. At our first meeting, you will remember, there was on the walls of the room a tabulated statement showing the amount of starch, dextrin, soluble and insoluble albuminoids, fatty substances, wooden fibre, mineral matter, and so on, found in various vegetable substances. The table was one of a series used by me in my lectures on agricultural chemistry at University College, and the object of the table was to show, from an analyst's point of view, the comparative merits of various substances for feeding purposes. Now, on this test, we found hay to be of high value as food, and even oat straw to be of considerable value, as, indeed, every farmer knows from experience. Still more valuable than these in heat-giving, and especially in flesh-forming materials, were linseed cake, and rape cake and decorticated cotton cakes. Now those who hold, from mere chemical analysis, that bran is of such high value as food material that its omission from flour should meet with grave censure, should, from a similar analytical standpoint, urge us to eat hay, oat-straw, linseed, and cotton cakes. Doubtless these substances are of high value as food for cattle, because the herbivoræ can digest and utilize them with ease; not so man, who would starve in a field where a cow or a sheep would fatten. As with hay and linseed cake, so with bran. I hold that the best mode of digesting such food substances is, first of all, by the aid of our hoofed friends, to convert them into milk and cheese, or bacon, beef, and mutton.

The admixture of finely ground bran is detrimental to the fermentation process of bread-making, and this admixture of an active albuminoid ferment, the cerealin of bran, reduces high class wheats, from a fermentation point of view, to inferior wheats. Those who still attach such high importance to bran must, therefore, use the Dauglish carbonic acid method, or muriatic acid and bicarbonate soda, in order to avoid the injurious action of the soluble albuminoids. Later in the course, I shall propose a plan by which inferior flour may be used in the common bread-making process without undergoing degradation, and I will point out how "whole meal" may also be so utilized without injury to the character of the bread. Though I am not a believer in the great merits of the vastly overrated bran, the suggestions I shall have to make will enable those who think so highly of it as a food material, to obtain it in their loaf made by the fermentation process, without being driven to use the loaf of the artificial carbonic acid processes.

I now pass to another matter of considerable interest to millers, that is, the admixture of wheats. Small millers in certain parts of the country, especially in olden times, were not content—but they were compelled—to take the produce of their immediate neighbourhood, but those living in the present age have to compete with people who are making flour in Hungary, the United States, and elsewhere, to invade our markets with, and have to consider the important problem of so utilizing our wheats, such as it may please God so give us from year to year, that although in the long run they may be inferior from some points of view to foreign wheats, yet they are fortunately usually so rich in some other qualities, that we can, by judicious admixture, obtain the flour requisite for a high class of bread; and even though we be visited with an unfavourable harvest, yet by judicious management—as for instance by kiln-drying, and by judicious admixture of foreign wheats—we can, to a considerable extent, remedy the evils from which we are suffering. Not that we shall be able to make them equal to foreign flours for fancy purposes, but we shall be able to make them good useful flours for ordinary household bread. The object, then, of the miller in this admixture of wheats—and in some cases, I understand that even as many as ten or twelve varieties may go into one flour—is to balance the soluble and insoluble albuminoids, so that he shall not have too great a quantity of soluble albuminoids, which our wheats are usually so rich in. Then, while he is looking for a foreign wheat that will fulfil the conditions of increasing this ratio of insoluble albuminoids to soluble, he must at the same time see that he does not reduce his starch too much. In this way—I was going to say he looks at Péligot's table, but of course he does not do that—he consults his own experience; but if we look at the table on the wall, we shall find that he will be influenced by these considerations. If he has an English wheat tolerably rich in starch, but yet, unfortunately containing too much soluble albuminoids, he would look out for some such wheat as the Taganrogg, some of the Hungarians, or some of the Egyptians. One of these Egyptians you see has 19 per cent. of insoluble and 1 per cent. of soluble albuminoids; and thus, by mixing these with some of the beautiful wheats grown in the centre and south of Spain, and in some parts of the United States, he will find that he gets wheats that are very rich in starch, but not rich in gluten, and at the same time not very rich in soluble albuminoids. He is able, by a judicious mixture of the various wheats, so to reduce the ratio of soluble albuminoids as to produce the desired result, and yet obtain a high ratio of starch.

The miller has various ways of testing wheats. One method is to judge from the appearance, the weight, and the general character of the corn, the ability to do which well long experience gives him. Perhaps he may grind some, and make bread of it. He also adopts the method of working it with water, so as to obtain the elastic gluten by constantly washing away the starch. Many years ago, a French baker, of considerable ability (M. Bolland), took this gluten, and, after thoroughly washing it, put it inside a copper tube, graduated to scale, and then placed it in the oven. The importance of the gluten is that, being an elastic material, it entangles the carbonic acid, and rises as the gas expands, so as to form a well piled loaf. He not only weighed the crude gluten after it had been heated in the oven, but he also measured the amount of expansion of the gluten in the tube. There have been, in addition to this, many other methods employed by which, in addition to the experience of the eye, the hand, and so on, the miller has been able to judge of the quality of the wheat; and it is wonderful the amount of ability with which men can deal with these matters, even without the aid of an apparatus or chemicals. So far as I know, most methods which have been recommended refer to the quantity of resisting gluten left after kneading with water. I would suggest the following as a useful method of examining flour, though I am not in a position at the present moment to recommend it strongly, because I have not had sufficient experience of it. We do not want merely to consider the amount of gluten—that is certainly a most important factor, because the greater the quantity of that the stronger the flour is—but we also wish—it may be as a subsidiary factor—to know the amount of soluble matters formed in the mashing or infusion process, the mixing with water, and keeping at a certain temperature for a certain time. We want to know, not merely the amount of gluten we can obtain, but also the amount of soluble albuminoids, maltose, and dextrin, that are formed. Now, I have here a series of test tubes properly labelled, and they refer to various qualities of flour—Vienna whites, best whites, first households, second households, and so on, and the process is as follows:—One ounce of flour is weighed out and mixed with four ounces of cold water. This is allowed to digest for one hour. Then it is filtered through a piece of filter paper into one of these test tubes, which cost about 8*d.* or 9*d.* a dozen. They can be marked in two places, at the half ounce and the one ounce. The first portion of the filtrate would be thick, and that you can throw away, but the second portion will be clear. If you were examining six kinds of flour, you would have six test tubes, into which you would filter the respective infusions.

According to Péligot's tables, and also according to the work done for these lectures by Mr. Brown, you will see that we get a rough idea—perhaps I ought not to say a rough, but a fairly good idea of the amount of degradation or hydration that goes on in a certain time from the different flours we take. I prefer, for the purpose of the test, to allow it to stand in the cold, because we want to know how much of the soluble albuminoids there are already formed which cold water will dissolve out. Perhaps some of you may prefer to let it stand two or four hours, instead of one, but whatever method you adopt, it will be a method of comparing one sample of flour with another under similar conditions. This being done, you add a little methylated alcohol. This is about 80 per cent. strong of spirit, and costs about five shillings a gallon, being sold without the excise duty. If you add alcohol up to the second mark, and allow it to stand for some little time, you will find, according to the inferiority of the flour, so is the amount of the precipitate, and, according to the superiority of the flour, so does the amount of the precipitate diminish. The more inferior the flour the greater the amount of matter precipitated, and *vice versâ*. At present, it is merely an opaque precipitate, but it will presently settle down to an apparently coherent flocculent precipitate, and then you can judge from the six tubes of the nature and the amount of soluble matter which has been obtained, by simply digesting the respective flours with cold water, either for one or two hours.

Parliamentary and Law Proceedings.

The Pharmaceutical Society of Great Britain *v.* Copping.

This case was heard before J. A. Russell, Esq., Judge of the Manchester County Court, on the 1st instant.

The particulars of the plaintiffs' claim show that they sued the defendant for a penalty of £5, incurred by him in selling or keeping open shop for the retailing, dispensing or compounding poisons.

Mr. J. M. Yates, of the Manchester bar, instructed by Messrs. Flux, Slade and Co., appeared for the plaintiffs, and Mr. Rideal, solicitor, of Manchester, appeared for the defendant.

The plaintiffs' counsel having opened the case, the defendant's solicitor raised points for argument, but the judge, intimating his opinion in the plaintiffs' favour, the defendant's solicitor consented to a verdict for the penalty and costs, without evidence being gone into.

The learned judge gave judgment accordingly for £5 and £4 17*s.* costs.

Obituary.

THOMAS D'AUBNEY.

On Friday the 2nd inst., the grave closed over the remains of the late Thomas D'Aubney, Chemist and Dentist, of 82, Shepherdess Walk, City Road, Member of the Pharmaceutical Society since February, 1870. Thomas D'Aubney was the second son of Charles D'Aubney, Surgeon, of Alford, Lincolnshire, and was born February 3rd, 1823. He was educated at Boston, and afterwards apprenticed to Mr. Thomas Curtis of Holbeach, Lincolnshire. For some time he lived as assistant at Kingston-on-Thames, and afterwards in London. In February, 1853, he commenced business on his own account at Shepherdess Walk. He was a member of the Quekett Microscopical Club, in which he felt great interest. For many years he was Treasurer to the Schools in connection with Holy Trinity Church, and for nine years he was Minister's Warden of Holy Trinity Church, Hoxton; and at Easter, 1867, was presented by his fellow parishioners with a testimonial in the form of a silver salver. It was Mr. D'Aubney, who in June, 1860, first suggested the formation of a new Society for Chemists not connected with the Pharmaceutical Society, and from that suggestion, made public in one of the earliest numbers of the *Chemists and Druggists' Trade Circular*, sprang the United Society of Chemists and Druggists and all its after consequences. He worked on the executive committee until 1866. About that time he first entertained the idea of forming a Wholesale and Export Drug Company, which very soon came into existence. He was chairman of the board of directors during its existence. Since the winding up of that unfortunate speculation he has not appeared to enter into trade politics, but was always ready to render assistance and give his support to any deserving object.

On the 28th ult. Mr. D'Aubney left home in his usual good spirits, intending to pass an hour at Madame Tussaud's Wax Exhibition, and whilst waiting for his train at the Baker Street Station, he incautiously ventured into the tunnel, where he was struck down and killed within a few feet of the platform. Those who remember Thomas D'Aubney, will call to mind his genial disposition and generosity of character.

Notice has also been received of the death of the following:—

On the 23rd of June, 1880, Mr. Walter Peat, Chemist and Druggist, Ryde, I. W. Aged 62 years.

On the 30th of June, 1880, Mr. John Prockter, Chemist and Druggist, Penzance. Aged 67 years.

On the 1st of July, 1880, Mr. Edward Beck, Chemist and Druggist, Whitchurch, Salop. Aged 57 years.

Dispensing Memoranda.

Replies.

[424]. If "Vis" had only dispensed the prescription strictly according to the ℞, he would not have got into such trouble. It can be clearly seen that the physician's

intention in ordering the "acid. sulph. dil." q.s., was simply that the quinine should be dissolved. It may look rather ridiculous to "Vis," but as acid. sulph. dil. was ordered he was not justified in dispensing the prescription *sine* acid. If he use ℈j of dilute acid, he will find the mixture keep without any deposit.

W. WATSON WILL.

[424]. In this prescription the writer ordered the acid. sulph. dil. to form a clear solution should the tinct. ferri perch. not effect the total solution of the quinine.

T. V. M.

[424]. H. G. C. met with great difficulty in obtaining a permanent solution of sulphate of quinine in tinct. ferri perchl., but was successful on using liq. ferri perchl. with water in place of the s.v.r.

[425]. Dissolve the iodide of potassium in 6 ounces of the water, then add the tinct. nucis vomicæ and spt. ammon. arom., and lastly add the ferri et quin. cit. dissolved in the remainder of the water. The mixture has a milky appearance and ought to have a "shake the bottle" label put on the bottle.

W. WATSON WILL.

[425]. I should first dissolve the ferri et quinæ cit. and pot. iodidi in about 4 ounces of the water. Then add tinct. nucis vom, and, lastly, add the sp. ammon. aromat., gradually shaking well after each addition. The colour will be similar to that of dec. cinchonæ flav., with the exception that it is a little lighter.

T. V. M.

[426]. This mixture ought to have a light opalescence, caused by the precipitation of the resin in the tinct. nucis vom.

W. WATSON WILL.

[426]. H. G. C.'s observation leads him to suppose that some dispensers adopt the improper practice of filtering slightly turbid mixtures, and so bring discredit upon the dispenser who simply mixes them as ordered. The best way of meeting the difficulty is to learn whether the mixture was quite transparent in the first instance, and then to follow suit. But it would be still better if some authoritative declaration were made against filtering, when not directed by the prescriber.

[427].

℞ Spt. Vini Rect. . . . . ℥ij.
Ung. Zinci Benzoat. . . . . . . ʒij.
M. Fiat ung.

The ung. zinci benzoat. here mentioned undoubtedly refers to the unguentum zinci, B.P. The addition of "benzoat." after zinci in this prescription is used because, prior to the Pharmacopœia of 1867, ung. zinci was made with lard, as C. B. will find by referring to London Pharmacopœia, 1851. Such a mode of ordering ung. zinci, B.P., is a daily occurrence amongst physicians. Zinci benzoas is a definite salt.

W. WATSON WILL.

[427]. Some dispensers use adeps præp. instead of adeps benz., and some use only common adeps in making ung. zinci, B.P., therefore I should imagine that the writer, being aware of this, specially signified that made with benzoated lard. If he wished zinci benz. to be used he would have written it so—

℞ Zinci Benz.,
Adipis Præp.

I have often had prescriptions with ung. zinci benz. written, and always use that of the B.P.

T. V. M.

[427]. The B.P. ung. zinci being made with adeps benzoatus, a great many prescribers write "ung. zinci benzoat." to distinguish from a commoner quality made in many establishments with plain lard for retail purposes, and which turns rancid in a very short time.

A JUNIOR DISPENSER.

[429]. Whatever method you adopt in mixing the ingredients in this ℞, you cannot prevent the precipitation of the ferri phosphas formed. "Pharmakon's" equation is correct if he dissolves the acetate in water and then adds the tincture, and lastly the acid, but the following may also take place if the order is reversed, namely, add the tincture to some water, then the acid and lastly, solution of the acetate—

$$Fe_2Cl_6 + 2H_3PO_4 = 2FePO_4 + 6HCl.$$
$$6KC_2H_3O_2 + 6HCl = 6KCl + 6HC_2H_3O_2,$$

The phosphate is not precipitated until the reaction takes place between the free hydrochloric acid and acetate potass. for the simple reason that ferri phosphas is soluble in hydrochloric acid and almost insoluble in free acetic acid.

W. WATSON WILL.

[430]. Rub the two powders together, then add the acid. After well mixing the result will be a moist powder, which ought to be sent out in a wide-mouthed stopping bottle.

W. WATSON WILL.

[431]. "Oxygen" will find a good excipient for permanganate of potassium in Canada balsam. By using a warm mortar 2 grains of balsam is sufficient to mass 12 grains of permanganate.

W. WATSON WILL.

[432]. I should add a few drops of acid. sulph. dil. to effect the total solution of the quinine.

T. V. M.

Notes and Queries.

[665]. TICKET INK.—"Brunswick black," thinned if requisite with a little turpentine.

Worthing. BURT.

[666]. ESS. COCHINEAL.—I should be glad to know the reason that ess. cochineal when made from the old formula so frequently ferments, even when a good proportion of s. v. r. is added as soon as the mixture is cool.

J. W. COTTRILL.

[667]. GERMAN YEAST POWDER.—Would any correspondent be kind enough to furnish me with a good recipe for this, and oblige

W. H. B.

[668]. Can any reader of the Journal oblige me with a formula for a perfectly white creamy liniment without fixed oil?

VIS.

Correspondence.

W. Stewart.—(1) *Carex vulpina.* (2) *Polygala vulgaris.* (3) *Alisma Plantago.*

"*Echinodermata.*"—The same question has been asked on two occasions recently without evoking an answer.

M. P. S.—See a note on the solubility of salicylic acid in Vichy and Seltzer waters in the Journal for June 26, page 1035.

"*Orchid.*"—*Orchis maculata.*

T. P. J.—(1) Blaine's 'Outlines of the Veterinary Art.' (2) Probably the book to which you refer is 'The House Surgeon, or the Doctor at Home,' by the late Mr. Smee, published by the Accident Insurance Company.

E. N. P.—See papers on the Hectograph in the *Pharm. Journal,* [3], vol. x., pp. 486, 644.

"*Wide Awake.*"—We are not aware that any steps are contemplated of the nature to which you refer, and therefore it will be desirable at least to defer the publication of your letter.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Modlen, Tilden, Pinchen, Burt, Forrester, Temporary Assistant, Nemo, Foam, M.P.S.

NOTE ON SOME "SPURIOUS GUMS" IMPORTED WITH MYRRH.*

BY R. H. PARKER.

Last year I had the opportunity of selecting from several bales of unpicked myrrh a considerable quantity of numerous kinds of "spurious gums," to which I briefly referred in a paper† previously read before this Association, and I propose submitting to you as a sequel to that paper the results of a somewhat more detailed examination of the impurities there referred to.

It will, of course, be understood that these substances rarely find their way into the best parcels of "picked Turkey myrrh," being carefully rejected by the wholesale houses.

Five substances will be referred to, those met with in largest quantity, viz.:—

(1). Opaque bdellium.
(2). African bdellium.
(3). Opaque tasteless gum-resin.
(4). Yellow tasteless gum-resin.
(5). Bitter acrid gum.

The percentage composition of these impurities as given in this note is based upon the solubility of the substance in absolute alcohol and water, and will serve to give an idea of their constitution; but the results do not, of course, indicate the exact proximate constituents.

The general outline of the analysis is as follows:—

Several of the largest and most characteristic of the tears were selected, the outer portions removed, so as to leave the "gum" quite free from extraneous impurity and, if sufficiently hard, reduced to a fine powder, otherwise, as in the case of "bitter acrid gum," cut into thin shavings with a knife.

Determination of Moisture and Ash.—About 1 gram of the powder, accurately weighed in a platinum dish, was exposed in a hot air-bath at 100° C. for several hours, until it ceased to lose weight. The loss of weight = moisture. A little volatile oil might be dissipated in this process, but it is probable that a dry heat of 100° C. would not cause much error from that cause. The dry residue was then ignited, until all traces of carbon were removed. The weight of dish and ash less that of dish (weighed after ignition) indicates "the ash." The "ash" is not included as a separate item in the percentage composition, because all extraneous matter had been removed; it would, therefore, have been in a state of combination with the gum, and would be included in the weight of that constituent.

Determination of Gum.—2 or 3 grams of the powder were digested with successive portions of absolute alcohol and the tincture decanted; when the soluble portion was nearly all removed, the residue was collected in a weighed filter, washed till the evaporated filtrate left no residue, dried at 90° C. till constant, and its weight taken; from this is calculated total percentage of gum.

An accurately weighed portion of the dried gum was treated with water until nothing further dissolved, the residue collected in a tared filter, dried at 100° C., and weighed. This weight, less that of filter, gives weight of gum insoluble in water; this deducted from that of total gum gives by difference gum soluble in water.

Determination of Resin, etc.—The weight of this is taken "by difference," and includes resins, volatile oil, if any, and other substances soluble in absolute alcohol.

(1). *Opaque Bdellium* (*Balsamodendron Playfairii*) is a very hard, yellow ochre coloured, opaque gum-resin, with but slight odour and a bitter taste. In common with other exudations from the genera *Balsamodendron* and *Boswellia*, tears of this substance frequently have portions of papery bark attached to their surface. Triturated with water, opaque bdellium forms a very good cream coloured emulsion. Cold absolute alcohol dissolves about 50 per cent.; the residue is not entirely soluble in water, the insoluble portion swelling up and giving the characters of bassorin.

The colouring matter appears to be due to a resin very soluble in alcohol, giving a canary yellow coloured tincture; this resin is also soluble in ether, benzol and chloroform. The tincture (1 of gum-resin to 6 of rectified spirit) becomes slightly milky with alcoholic solution of plumbic acetate, gives a slight yellow precipitate with one drop of liq. plumbi subacet., and an intense greenish-black colour with tinct. ferri perchlor.* The tincture is bitter and becomes milky with water.

The mucilage made by dissolving 1 part of the gum (completely washed with rectified spirit) in 40 of water, is tasteless, partly precipitated by subacetate of lead and not at all by neutral acetate.

The ash (1·6 per cent.) appears to be chiefly calcic carbonate, dissolving entirely with effervescence in dilute acetic acid and giving a copious precipitate with ammonium oxalate.

Water distilled from opaque bdellium had the slight odour of the drug, but there was no appearance of oil globules in working on a small scale.

Composition of opaque bdellium—

Soluble in alcohol (by difference)	47·42
Gum soluble in water	30·01
Gum insoluble in water	11·07
Moisture	11·50
	100·00

(2). *African Bdellium* (*Balsamodendron Africanum*) is a gum-resin, the fracture of which is of a dull slaty hue, the margins possessing a powdery resinous appearance; it is hard, translucent in thin layers, red by transmitted light, has a bitter taste and its slight aromatic odour recalls that of black pepper. Triturated with water it does not form an emulsion, but on standing gives a nearly bright mucilage with a copious brown sediment. The mucilage is very thick unless a large quantity be added, indicating presence of a considerable proportion of gum allied to tragacanth.

The tincture of African bdellium is very light yellow; almost the whole of the brown colouring matter is insoluble in alcohol, chloroform, ether and turpentine. Alcohol extracts about 15 per cent.; one-half of the residue, including the colouring matter, is insoluble in water, simply swelling up like tragacanth, but dissolves to a brown solution with a little caustic potash.

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* Read before the School of Pharmacy Students' Association, July 8, 1880.

† *Pharm. Journ.*, [3], x., p. 81.

* Ferric chloride does not give this reaction with a tincture of "gum hodthai" or "gum hotai," a substance which has been referred to the same botanical source as opaque bdellium.

The tincture (1 to 6) gives no precipitate with bromine, plumbic acetate, nor with ferric chloride; a drop of liq. plumbi subacet. produces a slight precipitate, and water renders it milky.

The mucilage (made by treating with water the residue insoluble in alcohol) is tasteless, and gives a slight precipitate with subacetate but none with neutral acetate of lead.

The estimation of moisture and ash gave 13·6 per cent. of the former and 1·16 per cent. of the latter, consisting chiefly of calcic carbonate.

Distilled with water, African bdellium gave indication of the presence of a considerable quantity of volatile oil possessing the characteristic odour of the drug; the first portion which came over was nearly colourless, the latter portion rather deep yellow, both lighter than water. The small quantity operated on did not admit of an exact percentage calculation.

Composition of African bdellium—

Soluble in alcohol (by difference)	15·4
Gum soluble in water	33·2
Gum insoluble in water	37·8
Moisture	13·6
	100·0

Recorded analyses of African bdellium differ widely. Guibourt, in his fourth edition of 'Drogues Simples,' gives—

Resin	59·0
Soluble gum	9·2
Bassorin	30·6
Volatile oil and loss	1·2
	100·0

while Planchon, in the seventh edition of the same work, says it yields 70·3 per cent. to boiling alcohol, the rest being a *gum completely soluble in water*.

(3). *Opaque Tasteless Gum-Resin* occurs in large tears with smooth surface, is very hard, has a dull waxy fracture, and is almost devoid of colour, odour and taste. Several pieces have papery bark attached, and two or three large tears were found imbedded in fine specimens of myrrh, suggesting their exudation from the same trunk under abnormal conditions, but the gum and resin differ materially from those of myrrh.

Triturated with water this substance gives a very slightly milky solution and a copious sediment. It is soft and adhesive between the teeth.

Alcohol dissolves about 60 per cent.; the residue is almost entirely soluble in water

In the air bath a portion lost 7·6 per cent. at 100° C., and when ignited left ·865 per cent. of ash, chiefly calcic carbonate.

The tincture (1 in 6) is not precipitated by bromine or plumbic acetate, or changed by ferric chloride or lead subacetate; it becomes milky with water.

The mucilage is not affected by neutral acetate of lead and only slightly precipitated by subacetate.

Composition of opaque tasteless gum-resin:—

Soluble in alcohol (by difference)	60·54
Gum soluble in water	30·32
Gum insoluble in water	1·54
Moisture	7·60
	100·00

(4). *Yellow Tasteless Gum-Resin.*—This is at once recognized by the peculiar powdery yellow appearance of the surface of the tears, which are mostly small and irregular. It is yellowish-white in colour, almost devoid of taste and odour, hard and easily powdered; resinous when chewed. It does not emulsify when triturated with water, the liquid becoming quite clear after deposition of much sediment.

Alcohol dissolves about 63 per cent.; the residue is almost entirely soluble in water.

A portion lost 3·62 per cent. at 100° C., and on ignition left a residue, mostly calcic carbonate, equal to ·48 per cent.

The tincture (1 in 6) is not changed by either lead solution, bromine solution, or by ferric chloride.

The mucilage gives a slight precipitate with subacetate, but none with neutral acetate of lead.

Composition of yellow tasteless gum-resin:—

Soluble in alcohol (by difference)	63·16
Gum soluble in water	31·76
Gum insoluble in water	1·46
Moisture	3·62
	100·00

Chemically and constitutionally this appears almost identical with opaque tasteless gum-resin, but it differs physically in its gritty character when chewed, and in the powdery yellow and irregular surface of the tears.

(5). *Bitter Acrid Gum.*—This appears to be one of the several substances that have received the native designation "googul," and seems identical with the specimen 139*l* in the Pharmaceutical Society's Museum, but differs from the "googul" 139*j*. It occurs in very irregular tears of a yellowish-brown or dark-brown colour, sometimes very nearly colourless and transparent. Its taste is very bitter and persistently acrid, somewhat resembling ammoniacum. It is soft, receiving the impress of the nail, and a small piece can be kneaded between the fingers.

It readily forms when triturated with a small quantity of water a thick opaque mucilage, and, with the exception of a trifling residue, is entirely soluble in about 25 parts of water. This residue examined microscopically was seen to consist entirely of vegetable tissue, chiefly long fusiform prosenchymatous cells, with a few fragments of pitted vessels.

A portion lost at 100° C. 6·6 per cent., and left on ignition an ash of calcic carbonate equal to 1·11 per cent.

Cold absolute alcohol dissolves about 63 per cent.

The tincture (1 in 6) contains the bitter acrid principle, and is not rendered milky by addition of water; gives a very copious precipitate with subacetate of lead, becomes milky with neutral acetate, and gives a slight whitish precipitate with ferric chloride, but none with bromine solution.

The gum insoluble in alcohol forms with water a tasteless mucilage, which gives a copious precipitate with subacetate, but very little with neutral acetate.

On treating this substance with about six parts of water, the colouring matter and gum precipitated by subacetate of lead dissolve; the remainder forming a thick oily layer at the bottom of the vessel; this layer again treated with three or four parts of water becomes of a very light yellow colour and dissolves entirely in more water, giving a nearly colourless solution which is scarcely precipitated by subacetate of lead, and possesses in a marked degree the characteristic bitterness and acridity of the original substance. Distilled with water a very small quantity of oil came over slowly, floating on the distillate, which possessed the odour but not the taste of the gum.

Composition of bitter acrid gum:—

Soluble in alcohol (by difference) . . .	63·0
Gum insoluble in alcohol	30·4
Moisture	6·6
	100·0

The alcoholic solution appears to contain the bitter acrid principle, essential oil, and a substance precipitated by subacetate of lead, for the oily layer separating from the aqueous solution washed and dissolved in water gives scarcely any precipitate with subacetate, and the subsequent addition of alcohol causes no separation.

Bissa bôl was almost entirely absent from the bales of myrrh examined; so also was Indian bdellium, unless the yellow tasteless gum-resin be that substance; it differs, however, materially from the specimen of Indian bdellium in the Society's Museum.

A considerable quantity of transparent gum was found which appears to resemble inferior acacia gum; also several tears resembling externally the yellow tasteless gum-resin, some having an oily interior and an aromatic terebenthinate odour, while one tear, when broken, possessed an odour strongly resembling jargonelle pear.

DIKA BREAD.

The following interesting note concerning the preparation of the dika or odika bread of Western Africa has recently been received from Dr. H. W. Bachelor, in the Gaboon, by Mr. Thomas Christy, to whom we are indebted for it:—

"The plums are gathered as they fall from the tree, and are emptied from the baskets one after another until a large heap is formed. They are allowed to remain many days until the outside has putrefied, and then the nuts are cracked, the seeds or kernels taken out and smoked for many days. Then they are put into a large mortar and crushed into a homogeneous mass. The rays of the sun are now allowed to pour on the mass, which melts and is put into a mould. This mould is of the shape of a frustum of a cone, and the cakes vary in diameter from 8 inches to a foot at the base. These will keep for six months."

Dr. Bachelor also makes the following interesting remarks with regard to the native medicinal plants of the country:—

"The only way of ascertaining the properties of any product here is to ask the natives 'if it poisons goats,' or 'if the monkeys eat it,' and by direct experiment. The natives themselves know nothing of one medicine for one disease, and another for another. It is in their opinion the *witchcraft* that cures, not the leaf itself."

ALBUMINATE OF IRON.*

BY C. LEWIS DIEHL.

Among the ferric compounds introduced during the past few years, albuminate of iron has attracted some attention abroad, but has been noticed only to a limited extent in the United States, if I may be allowed to judge by the demand for it in this locality. Recently, however, I was called upon to prepare a solution of albuminate of iron by a formula suggested by Dr. W. Dönitz, of Tôkiô, Japan. This formula differed so radically from those that had previously come under my observation, both in the manipulation directed and the proportion of ferric chloride and egg albumen employed, that I was led to make some comparisons, and eventually a series of experiments, during the course of which some facts were developed that seem to merit publication. But before giving these experiments in detail a brief review of the methods and experiments that have been made public, or as far as they have come under my observation, is necessary; and it is also necessary to explain that, in so far as the method of Dr. H. Hager is concerned, which anticipates me in the application of common salt to the precipitation of the ferric compound, but differs widely in some particulars, I had no knowledge of it at the time my method was developed.

Friese* first recommended albuminate of iron for the treatment of chlorosis, rhachitis, etc. He obtained it by adding 10 grams of liq. ferri sesquichlor., Phar. Ger., to the white of one egg; washing the precipitate with distilled water until the excess of ferric chloride was removed, then macerating the residue for twenty-four hours in 500 c.c. of distilled water and 12 drops of hydrochloric acid to effect solution. The albuminate of iron so produced is said to contain 2·8 per cent. iron.

Koblight† observed that an albuminate containing uniformly as much iron as stated by Friese cannot be obtained. Also, that the albuminate is somewhat soluble in water, and that therefore it should not be mixed with large quantities of that fluid, but should be washed upon a filter as long as the water passes clear.

Bernbeck‡ makes the same observation as Koblight regarding the solubility of the albuminate produced by Friese's method, but ascribes the solubility to the excess of hydrochloric acid in the officinal (Phar. Ger.) solution of ferric chloride. He recommends that 6 parts of dry ferric chloride, obtained by evaporating the officinal (Phar. Ger.) liquor, be dissolved in 10 parts of distilled water, the solution filtered and mixed intimately with 20 parts of albumen; the brown-yellow magma is transferred to a wetted cloth, expressed with the hands, and this is repeated with the addition of distilled water until the excess of ferric chloride is removed. The residue is then dissolved by macerating it for one or two days in half a litre of water containing 12 drops of muriatic acid. By parts, the author evidently means grams; by albumen, the white of eggs.

Biel§ recommends the following method:—10 grams of dry egg albumen are dissolved in 100 grams distilled water, clarified by subsidence, and mixed with 3·2 gram liq. ferr. chlor. of 30 per cent. (or 2·4 grams Phar. Ger.), previously diluted with ten times the quantity of water; the mixture is gently heated and agitated vigorously, after which 20 grams of 90 per cent. alcohol and sufficient water are added to make the mixture weigh 200 grams. When used, the concentrated liquor is to be diluted with four times its weight of water, and then contains 0·033 per cent. iron. By subjecting the solution to dialysis, a neutral product was obtained, but it still contained chlorine, and appeared to possess no advantage over the normal solution. Dry albuminate of iron is obtained by evaporating the solution to syrup, spreading this on glass plates, and drying at 40° C. (= 104° F.) The golden-yellow lamellæ contain 3·34 per cent. iron, and readily dissolve in warm water after the addition of 1 or 2 drops of hydrochloric acid (to how much of the albuminate?).

Holdermann‖ records some experiments relative to the conditions which favour the precipitation of the albuminates, the influence of acidity, alkalinity, etc. The nature of the acid in the ferric salt employed appears to exercise a decided influence on the composition (proportion of iron) of the albuminate, but the latter, after its formation, does not appear to become changed in its composition by fractional washings.

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* From the *American Journal of Pharmacy*, April, 1880.

* *Berlin. Klin. Wochenschr.*, 1877; *Phar. Centralh.*, August 2, 1877, p. 251.

† *Schweiz. Wochenschr. f. Phar.*, 1877, No. 47, p. 381.

‡ *Arch. d. Phar.*, Dec. 1877, p. 521.

§ *Phar. Zeitschr. f. Russ.*, 1878, No. 7, p. 193

‖ *Arch. der Pharm.*, February, 1878, p. 149.

Merck* recommends the method of Dr. Hoffmann (?) for preparing dry albuminate of iron. 15 parts crystallized ferric chloride (containing 20 per cent. Fe), or 20 parts liquor ferr. sesquichlor. (Phar. Ger.), are dried with 10 parts dextrin at 40° to 50° C. (= 104° to 122° F.), and pulverized; then 80 parts pulverized egg albumen are mixed with it. He describes it to form luminous brownish-red crystals (?), not hygroscopic, soluble in 50 parts cold water, and most readily at a temperature of 30° to 35° C. (= 86° to 95° F.). A slight deposit may form on standing, which is readily dissolved by a few drops of hydrochloric acid.

Dönitz† gives the following formula:—The white of one or two eggs is thoroughly mixed with about 150 c.c. water, and a solution of 6 drops of officinal (Phar. Ger.?) solution of ferric chloride in 30 c.c. water is gradually added, agitating vigorously after each addition. The turbidity at first produced gradually disappears on the further addition of the ferric solution, but the addition of a few drops of hydrochloric acid may be necessary if the ferric solution has been added too rapidly. The solution is finally filtered, which it does more easily than if it is attempted to filter the solution of albumen before the addition of ferric chloride. Upon evaporating the solution at a moderate temperature a permanent and readily soluble dry albuminate is obtained. Finally,

Hager, in an appendix (p. 1338) to his recently completed 'Handbuch der Pharmaceutischen Praxis,' gives the following formula for "ferrum albuminatum saccharatum":—100 c.c. albumen (from five hen's eggs) are vigorously shaken with 400 c.c. water, the solution is strained without expression, mixed with 250 c.c. of a cold saturated solution of common salt, and then with 40 c.c. liq. ferri sesquichlor. (Phar. Ger.) diluted with 160 c.c. water. After about half a day, the mixture is diluted with 3 litres of water, well shaken, the precipitate collected upon a muslin strainer, washed with water, etc. The well drained magma, which when dry amounts to about 10 grams, is mixed with 60 grams of powdered refined sugar, dried at the temperature of the water-bath on porcelain plates, weighed, powdered, and mixed with sufficient sugar to make 100 grams of saccharate. This contains 0·65 to 0·66 per cent. ferric oxide; the pure albuminate 6·5 to 6·6 ferric oxide. The same preparation may be obtained by precipitating the solution of the albuminate of iron with alcohol, etc.

As mentioned, my first practical acquaintance with albuminate of iron was with the solution produced by the formula of Dr. Dönitz. This solution is, as described by the author, a perfectly transparent light brown liquid, nearly tasteless, and will keep well in cool weather for several weeks. It contains, as I have determined by calculation and subsequent experiments, an excess of albumen, even when the smaller quantity of egg-white is employed, for which reason the latter quantity was adopted for the experiments made with this solution. When such a solution is evaporated in a current of warm air a light-brown, transparent residue is obtained, which may be detached in the form of scales, and readily furnishes a powder having a very light cinnamon-brown colour. This dry albuminate also corresponds to the description of Dr. Dönitz, being readily dissolved by water to form a clear solution, particularly if a modicum of dilute hydrochloric acid is added. The yield, however, is necessarily very small, owing to the dilute character of the solution;* and the preparation of dry albuminate from such, on any considerable scale, is therefore out of question; and though subsequent experiments showed that a far more concentrated solution of albuminate of iron could be obtained by a modification of the method, it nevertheless seemed desirable to ascertain some process —if possible, one of precipitation—whereby the evaporation and consequent exposure of any considerable proportion of liquid should be avoided. To this end, it became necessary to subject the known or accepted characters of albumen and its compounds to critical review, when, among others, the following points bearing directly upon the subject under consideration were developed.†

1. Albumen is not precipitated from its aqueous solutions by ferric chloride,‡ and even prevents the precipitation of the oxide of that metal by alkalies.

2. Albumen is precipitated from its aqueous solutions by dilute sulphuric, nitric, hydrochloric and pyro- and meta-phosphoric acids; but by the ordinary tribasic phosphoric acid, or by organic acids, only upon the addition of chloride or sulphate of sodium, or other alkali salts.

3. Albumen appears to form acid and normal salts, the first containing one molecule of base, the second two molecules. It also appears to combine directly with some salts—principally basic—in the same proportions.

4. The acid salts of albumen are sometimes soluble, the normal salts generally insoluble in water; but neither are insoluble in excess of metallic salt or albumen.

5. The formula for albumen is, according to Lieverkühn, $C_{144}H_{122}N_{18}S_2O_{44}$,§ and is so generally accepted. That of its acid salts would be represented by the formula $MO,C_{144}H_{122}N_{18}S_2O_{44}$, and that of its normal salts by $2\,MO,C_{144}H_{122}N_{18}S_2O_{44}$.

It becomes evident, from the above, that my inquiries gave no clue to a precipitant for albuminate of iron, and it was therefore by a purely empirical process of reasoning that I decided to try the effect of a saturated solution of common salt upon a quantity of Dönitz's solution of albuminate of iron, to which an excess of ferric chloride had been previously added. The result was an immediate, copious and evidently complete precipitate, which my experiments seem to prove to be an albuminate of definite composition, and which is obtainable from solutions containing an excess of albumen as well as from such that contain an excess of ferric chloride. The following is a brief account of the experiments made:—

1. To a quantity of Dönitz's solution corresponding to one egg-white, 1 fluid drachm liq. ferri chlor., U. S. P., diluted with water and partly neutralized with ammonia, was added, whereby no other change than a slight deepening in colour was produced. On now adding a quantity of saturated solution of chloride of sodium (hereafter designated as "solution of salt"), a copious, light brown precipitate was produced, while the supernatant fluid had a decided yellow colour, gave abundant evidence of iron, and only faint evidence of albumen. The precipitate was collected, expressed, shaken with distilled water, in which it dissolved completely, and again precipitated with solution of salt. The filtrate now passed colourless, and gave only faint evidence of iron and of albumen. The strongly expressed precipitate

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* *Pharm. Zeit.*, March, 1878.

† *Berlin. Klin. Wochenschr.*, September 8, 1879, page 535.

* Egg-white contains about 12·5 per cent. dry albumen (which quantity has been accepted by me in my experiments); consequently 6 fluid ounces of Dönitz's solution will yield only about 1 drachm of albuminate.

† The principal works consulted were Graham-Otto's 'Lehrbuch der Chemie,' 'Organische Chemie,' vol. iii., by H. v. Fehling, and 'Dictionary of Solubilities of Chemical Substances,' by Frank A. Storer.

‡ This does not, however, apply to the egg-white in its natural condition, as is evident from the methods hitherto pursued for the preparation of albuminate of iron.

§ The old notation is retained in this paper.

constituted a translucent mass, light brown in thin, dark reddish-brown in thick layers, very friable when dry, and then easily reduced to a very fine powder having a light cinnamon-brown colour. It was readily soluble in water. Its quantity was not determined.

2. A quantity of Dönitz's solution corresponding to one egg-white (1 ounce, more or less) yielded, upon evaporation in a current of warm air, 56 grains of albuminate of iron in the form of friable, light yellowish-brown, translucent scales, which produced a very light cinnamon-brown powder.

3. A portion of the same solution, corresponding to the same quantity of egg-white, was treated with one-third its volume of solution of salt, the precipitate collected, washed with a mixture of one volume of solution of salt and three volumes of distilled water (hereafter designated "dilute solution of salt"), subjected to powerful expression and dried. It weighed 34 grains and possessed all the characters of the albuminate of iron obtained by experiment 1. The filtrate from the precipitate, however, gave but faint evidence of iron and abundant evidence of albumen, the washing being continued as long as decided evidence of the latter was given. Both the filtrate and washings appeared colourless.

From these experiments it became evident that, while in experiment 1 a very decided excess of ferric chloride had been used, in experiments 2 and 3 albumen was in excess. This excess of albumen is represented in the dry albuminate obtained by experiment 2, but is removed by washing in experiment 3, just as the excess of ferric chloride is removed by washing in experiment 1. The quantity of ferric chloride employed in experiment 1 was therefore reduced, some attempt being also made to establish a working formula.

4. Ten troy ounces of egg-white were diluted to 20 fluid ounces with distilled water, a solution of 3 fluid drachms of liq. ferri chlor., U. S. P., in 10 fluid ounces of distilled water was added, and the solution filtered. 10 fluid ounces of solution of salt were now added, the precipitate collected on wetted muslin, washed with dilute solution of salt, drained, expressed powerfully, and dried. The product weighed 9 drachms (=11·25 per cent. of the egg-white employed) and had all the characters of the albuminate obtained by experiment 1. The filtrate was yellow, though much lighter than that obtained by experiment 1; the washings finally gave evidence only of traces of iron and of albumen. The press cake, though obtained by powerful pressure, was translucent dark reddish-brown only in the centre, the margins, upon which the pressure was evidently not so strong, being opaque and light brownish.

5. One troy ounce of egg-white was treated precisely as in experiment 4, but instead of precipitating the albuminate, the solution was evaporated to dryness. It yielded 60 grains (= 12·5 per cent. of the egg-white employed) of dry substance in the form of dirty dark brownish scales, having a greenish tinge, and when powdered had a light brownish-grey colour, very distinct from that of the products previously obtained.

6. Experiments 4 and 5 having convinced me that the quantity of ferric chloride used was still in excess, a series of experiments were made, which are not necessarily given in detail, but which consisted in adding variable proportions of ferric chloride to solution of egg-white, precipitating the solutions, and selecting from among the proportions so determined that in which there was evidence of a decided but small excess of ferric chloride in the filtrate. This was found to be 50 minims of liq. ferri chlor., U. S. P., to 4 troy ounces of egg-white, and operating with these proportions at different times, the following yields of albuminate of iron were obtained, all of which corresponded in their physical characters, solubilities, etc., with the albuminate obtained by the first experiment:—

Four troy ounces egg-white yielded 214 grs.=11·23 per cent. albuminate.

Twelve troy ounces egg-white yielded 720 grs.=12·50 per cent. albuminate.

Twenty-two troy ounces egg-white yielded 1312 grs. =12·42 per cent. albuminate.

With the above proportions the filtrate still had a faint yellow colour and gave a decided ferric reaction, but only a faint reaction for albumen, while, when completely washed with dilute solution of salt, the final washings failed to give any appreciable evidence of either.

Assuming now, for the purpose of comparison, that albuminate of iron is a definite compound in which 1 molecule of ferric chloride (Fe_2Cl_6) is united with 1 molecule of albumen ($C_{144}H_{122}N_{18}S_2O_{44}$),* the following table will show the relation of the former to the latter in the different processes that have been suggested.

Process.	Liq. Ferri Chlor. U. S. Ph., sp. gr. 1·385 = 12·8 p. c. Fe.	Liq. Ferri Chlor. Phar. Ger. sp. gr. 1·480 = 15 p. c. Fe.	Natural egg-white (taken to contain 12·5 p. c. dry albumen.	Dry egg-albumen.	Excess of dry egg-albumen directed.	Excess of Liq. Ferri Chlor., U. S. P. directed
	Grm.	Gram.	Grams.	Grams.	Grams.	Gram.
Theory . .	1·0	0·854		3·669		
Friese's . .	1·0	0·854	2·628	0·341		0·907
Bernbeck's .	1·0	0·854	2·800	0·350		0·9047
Biel's . . .	1·0	0·854		3·570		0·0272
Merck's . .	1·0	0·854		3·410		0·0908
Dönitz's, *a* .	1·0	0·854	40·960	5·120	1·451	
Dönitz's, *b* .	1·0	0·854	82·000	10·250	6·581	
Hager's . .	1·0	0·854	1·640	0·205		0·9442
Diehl's . .	1·0	0·854	89·030	3·629		0·0111

An examination of the table will make it clear that in Friese's, Bernbeck's and Hager's processes the quantity of ferric chloride is largely in excess of that required to form an albuminate; that Dönitz directs a considerable excess of albumen when the smaller quantity (*a*) of the latter is employed, and a very large excess when the larger quantity (*b*) is used; while Biel and Merck, whose processes are based upon the direct combination of ferric chloride and albumen, direct proportions that agree well with that theoretically required. The quantity used by me corresponds still more closely with that required by the formula provisionally accepted, and the proportion having been arrived at experimentally, before any calculation of the required quantity was made, seems to support the view that in the formation of albuminate of iron 1 molecule of ferric chloride and 1 molecule of albumen are concerned. The large excess of ferric chloride used by Hager is, as has been shown, unnecessary, and was probably adopted by him without proper reflection. That employed by Friese and Bernbeck, however, seems to have been arrived at by practical observation, and, inasmuch as I had failed to obtain precipitates by the direct action of solution of ferric chloride upon egg-white, if the latter was at all diluted with water, the following experiments were made to throw some light upon this subject, as well as upon some points embraced in the foregoing.

7. To 204 grains of egg-white, beaten to destroy stringiness, 75 minims of liq. ferri chlor., U. S. P. (corresponding to Friese's method and proportions) were added. A light yellow turbid magma was produced, which was mixed with an equal volume of water, transferred to a filter and washed with water until the washings passed colourless. The residue upon the filter, which was quite bulky, formed a gelatinous mass upon

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* A normal salt would require 2 molecules Fe_2O_3 to 3 molecules albumen.

standing, and, when diluted with water after it had attained that condition, failed to pass through the filter. After several days the contents of the filter were further diluted with water and transferred to a new filter, when, very slowly, the solution passed through the filter. The clear liquid yielded, on evaporation, an albuminate of iron in the form of transparent yellowish-brown scales. Owing to unavoidable loss its quantity was not determined.

8. Simultaneously with this experiment (7) a parallel experiment was made in which liq. ferri chlor. was evaporated to dryness, redissolved in water, filtered and then added to the pure egg-white (corresponding to Bernbeck's methods and proportions). In this instance a copious precipitate was obtained which was quite distinct from that obtained by Friese's method, and may be described as granular. It was very readily washed, but when allowed to drain over night it had completely changed its character. A gelatinous thick liquid had formed, a portion of which had passed through the filter, and was consequently lost. The receiving vessel being changed, the liquid was further diluted with water, when it very slowly passed through the filter, forming a clear liquid. This yielded a dry albuminate corresponding in appearance with that obtained by experiment 7. It was not weighed.

9. Two troy ounces of egg-white were dissolved in 7 fluid ounces of water, 5 fluid ounces of solution of salt added and the solution filtered. The filtration proceeded quite slowly when compared with the filtration of a similar solution of albumen to which ferric chloride had been added in place of salt. Upon the addition of 25 minims of liq. ferr. chlor., U.S.P., previously diluted with 3½ fluid ounces of water, a precipitate of albuminate of iron was obtained, just as in the instances in which the inverse process was employed, and the filtrate and washings gave very faint evidence of albumen, though the former gave decided evidence of iron. The albuminate produced had the same character as that obtained by experiment 1.

10. The same quantity of the same egg-white was dissolved in water, the solution mixed with solution of salt, and filtered just as in experiment 9. Diluted hydrochloric acid was then added drop by drop. When 25 drops had been added, the liquid became permanently turbid; with 5 drops more a decided turbidity was produced, and after adding 5 drops more, a further addition failed to produce a precipitate in the clear filtrate. The precipitated albumen was not subjected to nearer experiment, but it deserves a thorough examination since there were decided evidences of change, it being no longer coagulable by heat. Its quantity, also, was not determined, but it appeared to be less, both in volume and weight, than that obtained from the same albumen by precipitation with ferric chloride.

The first two experiments (7 and 8) have shown, beyond a doubt, that concentrated solutions of albumen (in the form of the natural egg-white) are readily precipitated by ferric chloride, either in the presence or absence of hydrochloric acid, but that the precipitates obtained under either condition again become soluble when the excess of ferric chloride has been removed by washing. They likewise show that while Bernbeck's view, that the solubility of the albuminate is due to excess of hydrochloric acid in the liq. ferri chlor., is probaby incorrect, the condition in which the albuminate of iron is precipitated when ferric chloride, free from hydrochloric acid, is employed, is of such a character that it can be readily washed so as to free it from excess of ferric chloride; while that obtained by Friese's method, being in a very finely divided condition, cannot be washed with the same readiness, and that, therefore, a portion of the precipitate, being completely freed from excess of ferric chloride, may again enter solution before the remainder is sufficiently washed.

Experiment 9 has shown that the process of precipitation, by the intervention of common salt, can be inverted so that the ferric chloride will act as the final precipitant.* The method, however, has the disadvantage in that the solution of albumen and salt filters very slowly, while that of albumen and ferric chloride filters with comparative rapidity. It is not clear, on the one hand, why common salt should effect the precipitation in dilute solutions of albuminate of iron, and why, on the other hand, ferric chloride should only precipitate albumen when it is in its natural solution. Both propositions must for the present be accepted as facts, which may find explanation by further experiments. It may be, furthermore, inferred that the small quantity of chloride of sodium and other salts, naturally present in egg-white in its concentrated natural solution, is sufficient to effect precipitation upon the addition of ferric chloride; but in this event a much smaller quantity of the latter than that employed by Friese or Bernbeck should effect the same result.

Experiment 10 was made simply to determine the probable effect of an excess of hydrochloric acid in the liq. ferri chlor., and is, perhaps, of greater interest in its relation to albumen itself than in its relation to albuminate of iron. Judging from the action of ferric chloride, free from hydrochloric acid, upon albumen (experiment 8), as well as from the evidently incomplete precipitation of albumen by the dilute hydrochloric acid (experiment 10), it seems justifiable to conclude that in the precipitation of albuminate of iron in the presence of common salt the action of the ferric chloride is independent of the presence of free hydrochloric acid. The whole question in these bearings is, however, too intricate to be disposed of without further and comprehensive study, and may rest here for the present.

In the foregoing, a ready method for preparing dry albuminate of iron has been given. It remains to consider whether the product obtained by the method is uniformly the same. In order to satisfy myself on this point, the ferric oxide was determined by a method, which, for the purpose, appeared to me sufficiently accurate, but would not be sufficiently so if my object had been the establishment of a formula for the compound.

1·0 gram of albuminate of iron obtained by experiment 4 was subjected to incineration, at a dull red heat, until it ceased to lose weight. The weight of the ash being ascertained, this was exhausted with water, the solutions obtained were evaporated, dried, and heated at an incipient red heat as long as it lost weight. The weight of soluble salts (principally chloride of sodium) so determined being deducted from the total ash, the quantity of ferric oxide in 1 gram of the original albuminate was ascertained, and from the figures so obtained the percentage of ferric oxide in the pure albuminate was determined as shown in the following:—

1·0 gram albuminate, experiment 4, incinerated until it ceases to lose weight = ...	0·121	gram ash
Ash yielded to water . . .	0·073	„ salt
Difference is ferric oxide .	0·048	„ Fe_2O_3

100 grams of the albuminate, therefore, contains 7·3 grams of salt and 92·7 grams pure albuminate of iron, representing 4·8 grams of ferric oxide.

Then, if 92·7 grams of pure albuminate contain 4·8 grams of ferric oxide, 100 grams of pure albuminate contain 5·16 grams = 5·16 per cent. Fe_2O_3.

The experiment showed that the product obtained by the process of precipitation contains a considerable proportion of chloride of sodium. Remembering that the expressed precipitate was translucent in the centre and opaque in the margin, a portion of the clear central mass of the press cake obtained by experiment 6 was dried and treated precisely as the above. The result was as follows:—

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* This is already shown by Hager's method, but his method was not known to me at the time the experiment was made.

1·0 gram clear albuminate, exp. 6, yielded	0·105 gram	ash
Ash yielded	0·056 „	salt
Difference	0·049 „	Fe_2O_3

100 grams of this albuminate, therefore, contains only 5·6 grams of salt, and the pure albuminate of iron, constituting the remainder, = 5·19 per cent. Fe_2O_3.

Equal portions of the three lots of albuminate of iron obtained according to experiment 6 were now powdered together, and 1 gram of this powder treated as above. The result now was follows:—

1·0 gram mixed albuminate, exp. 6, yielded	0·120 gram	ash
Ash yielded	0·072 „	salt
Difference	0·048 „	Fe_2O_3

Showing that 100 grams contained 7·2 grams of salt, and that the pure albuminate contained 5·17 per cent. Fe_2O_3.

It remained now to subject the albuminates of iron obtained by Friese's (experiment 7) and Bernbeck's (experiment 8) methods to similar quantitative examination. But, inasmuch as the peculiar method by which these albuminates were obtained seemed to exclude the presence of saline components other than ferric compounds, these were simply incinerated, and the residue weighed as ferric oxide.

1 gram albuminate, experiment 7, yielded 0·048 gram = 4·8 per cent Fe_2O_3.

1 gram albuminate, experiment 8, yielded 0·048 gram = 4·8 per cent. Fe_2O_3, thus pointing to identity in their composition, notwithstanding that the one was obtained with normal solution of ferric chloride, and the other with ferric chloride which had been previously deprived of its excess of acid.

As before stated, the method of determination is not such as should be employed to secure that degree of accuracy that is necessary to determine the chemical constitution of albuminate of iron. The results are, however, sufficiently accurate to show that the compound obtained by the method of precipitation is uniform in its composition, and points out very clearly that an albuminate of iron of definite constitution exists.

What its precise constitution may be, however, is a question which I must leave to others, who have more time for such investigation, to decide; and I will simply observe in this connection that, if the formula of albuminate of iron represents 1 molecule albumen ($C_{144}H_{122}N_{18}S_2O_{22} = 1612$) and 1 molecule ferric chloride ($Fe_2Cl_3 = 162·5$), the compound would represent 4·5 per cent. ferric oxide; or, if it represents 1 molecule each of albumen and ferric oxide ($Fe_2O_3 = 80$), it would contain 4·728 per cent. ferric oxide.

The following table shows the percentages of ferric oxide that have been obtained or are claimed for the different albuminates:—

Albuminate.	Ferric Oxide.	Corresponding to	
		Metallic Iron.	Ferric Chloride
	p. c.	p. c.	p. c.
If $Fe_2Cl_3,C_{144}H_{122}N_{18}S_2O_{44}$ . .	4·500	3·147	9·150
If $Fe_2O_3,C_{144}H_{122}N_{18}S_2O_{44}$ . .	4·728	3·304	9·600
Friese's	3·998	2·800	8·122
Biel's	4·769	3·340	9·719
Hager's	6·500	4·550	13·201
Diehl's exp. 4	5·160	3·612	10·479
„ clear „ 6	5·190	3·633	10·540
„ mixed „ 6	5·170	3·619	10·500
Friese's „ 7	4·800	3·360	9·748
Bernbeck's „ 8	4·800	3·360	9·748

Finally, my observations may be summed up as follows:—

1. Albuminate of iron, in a dry condition, can be obtained with great ease by a method of precipitating its solutions with common salt.
2. So obtained, whether from solutions containing an excess of ferric chloride or an excess of albumen, it is constant in its composition as regards the relation of albumen to iron.
3. The dried and powdered product is readily dissolved by water.
4. Obtained by the method recommended, it contains a certain percentage of common salt, the presence of which, however, does not interfere with its solubility, nor, it is likely, with its therapeutic application.*
5. The process recommended is rapid, and conducted under conditions in which the albumen cannot be unfavourably affected by exposure to the heat of summer; and, even if exposed for a longer period than is necessary, the presence of salt is calculated to prevent the changes to which albumen or its compounds, in a moist condition, are subject.
6. The albuminate represents about 5 per cent. of ferric oxide, or 10 per cent. of ferric chloride.

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THE PREPARATION OF PEPSINE.†

BY A. PETIT.

In a preceding article,‡ I have given the mode of testing pepsine; I will now pass rapidly in review the various processes of preparation. It would otherwise be impossible to account for the very diverse appearances of the pepsines found in commerce, the action of which is so different. A large number of specimens are absolutely without physiological action, and as will be seen subsequently, they are often those which have undergone treatment having for its object to obtain them in a state of great purity. It is certain that these specimens have been overheated, or that evaporation has been effected in the presence of hydrochloric acid, which, as the liquors concentrate, determines more or less considerable alterations of the active principle. I shall lay stress especially upon the processes that have been recently recommended and which yield active products.

Wasmann's Process.—Wasmann gave the first process for the extraction of pepsine in 1839. The mucous portion of a pig's stomach is first washed during several hours in distilled water at the temperature of 30° to 35° C., and then allowed to macerate in the water until it commences to develop a fetid odour. The liquid after filtration is precipitated with acetate of lead and the precipitate is washed, suspended in water, and decomposed by a current of sulphuretted hydrogen. The liquid is then filtered and evaporated to the consistence of a syrup and an excess of alcohol added which precipitates the pepsine.

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* Dr. Hager recommends for his preparation, which is preliminarily obtained essentially like mine, that, after the addition of solution of salt, the mixture be diluted with a considerable quantity of water, the precipitate collected, and washed with water so as to remove the salt as much as possible. I have not had opportunity to test the value of this direction, though my observations lead me to fear that the entire precipitate might by such procedure again enter solution. Some experiments made within the last few days show that a considerable quantity of the salt can be removed from the dry powder by shaking it with water and immediately throwing the mixture on a filter. The larger portion of the liquid passes colourless, and contains much salt; but the residue on the filter very soon assumes a gelatinous condition, and finally dissolves. It is my opinion that the larger part of the salt may be removed from the moist press-cake by immersing it in water until it begins to exercise solvent action on the albuminate, then removing the cake and drying.

† *Journal de Pharmacie et de Chimie*, [5], vol. ii., p. 85.

‡ *Pharmaceutical Journal*, [3], vol. x., p. 583.

Vogel's Process.—The pepsine obtained by the process of Wasmann is several times redissolved in water and reprecipitated by alcohol in order to obtain it in a state of greater purity.

Bidder and Schmidt's Process.—The gastric juice is neutralized with lime water, and the filtered liquor is evaporated to the consistence of a syrup and precipitated by alcohol. The precipitate is redissolved in alcohol and reprecipitated by a great excess of mercury bichloride; the mercury is eliminated by a current of sulphuretted hydrogen, and the solution separated from the sulphide of mercury is evaporated to dryness.

Deschamps d'Avallon's Process.—In saturating the free acids of calf's rennet with ammonia, Deschamps d'Avallon precipitated the syntonine held in solution, which carried with it a portion of the pepsine. It was to this substance that he gave the name "chymosine."

Payen's Process.—Payen added to the filtered gastric juice of a dog ten to twelve times its weight of alcohol. The precipitate was redissolved in water and again precipitated by alcohol. Payen called this product "gasterase."

Mialhe's Process.—M. Mialhe demonstrated in 1846 that there existed in the gastric juice a digestive ferment, and that the pepsine of Wasmann, the chymosine of Deschamps d'Avallon, and the gasterase of Payen are identical with each other, and constitute one and the same principle. He proposed to extract the pepsine either from the gastric juice itself, or from the liquids (rennets) in which are put to macerate the mucous membrane of the stomach itself, which was much more practical and allowed of the obtaining of a commercial product possessing considerable activity.

Wittich's Process.—The mucous portion of the stomach is macerated in glycerine and the liquid from the maceration is precipitated by alcohol.

Brücke's Process.—Brücke recommended to digest at a temperature of 38°, in dilute phosphoric acid, the mucous portions of a pig's stomach until completely disaggregated. The liquid after filtration should be limpid and should no longer be precipitated by ferrocyanide of potassium After having added lime water to nearly complete neutralization the precipitate of phosphate of lime, which has carried down the pepsine with it, is collected. This is again dissolved in water containing hydrochloric acid and precipitated by lime water. It is then dissolved in dilute hydrochloric acid, filtered, and to this new solution is added cholesterine dissolved in the cold in a mixture of four parts of 94° alcohol and one part of ether. The cholesterine soon rises to the surface, carrying with it the pepsine, which is fixed upon it. The whole is collected upon a filter, washed first with dilute hydrochloric acid, then with water, and shaken with ether, which dissolves the cholesterine, whilst the water adherent to the precipitate is charged with the pepsine. It only remains to evaporate this water at a moderate temperature to obtain the pepsine pure.

Process of the French Codex. (1867).—This process, which closely resembles that of Wasmann, consists in taking a number of stomachs of freshly killed sheep, emptying and washing them rapidly and then tearing away the internal membrane by beating them sharply with a brush of couch grass. The pulp which results is macerated during two hours only in water at a temperature of 15° C., then the whole is thrown upon a coarse strainer, and to the liquid that passes through, but unfiltered, a solution of neutral acetate of lead is added. The precipitate which forms is very abundant. The supernatant liquid is decanted and replaced twice with distilled water. The precipitate is suspended for the last time in water through which a current of sulphuretted hydrogen is passed until excess is manifest. The liquid and the black precipitate are distributed upon a number of filters, and the filtered liquid is evaporated as rapidly as possible in deep vessels, exposing only a small surface at a temperature not exceeding 45° C. When dry the product is removed by means of a flexible knife, and presents the form of a firm paste of a light colour, slightly acid taste, and with a special odour that is not at all putrid.

Process of the British Pharmacopœia.—The stomach of a pig, calf, or sheep, is carefully washed, the mucous membrane thus cleansed is scraped, and the viscous matter so obtained is spread out and rapidly dried at a temperature not exceeding 100° F., or 37° C. The dry product is pulverized.

Scheffer's Process.—This process consists in macerating in water acidulated with hydrochloric acid, with frequent agitation, during several days, the mucous membrane of a pig's stomach, carefully cleaned and cut into small pieces. If after filtration the liquid is not clear it is allowed to stand twenty-four hours. An equal volume of a saturated solution of chloride of sodium is then added to the clarified liquor. After several hours the pepsine, separated by the chloride of sodium, floats to the surface, from whence it is removed with a spoon and deposited upon a calico filter, which is finally submitted to pressure to remove as much as possible of the saline solution.

Petit's Process.—The studies which for upwards of ten years I have pursued upon the digestive ferments have led me to the conclusion that these very alterable principles ought to be submitted to manipulations as little complicated as possible. In the experiments that I shall cite to support this opinion it will be seen that the precipitations by alcohol and other agents do not allow of the recovery of more than a portion of the original digestive substance.

The stomachs of pigs, calves, or sheep are carefully washed with water and the mucous membrane, separated by scraping with a rounded knife, is cut as small as possible and put to macerate in four times its volume of distilled water, to which is added 5 per cent. of alcohol. The mixture is agitated every half-hour. After four hours' maceration the liquor is filtered and evaporated at a temperature not exceeding 40° C., in vessels exposing a large surface and in a well ventilated place, so that a renewal of the atmosphere takes place readily.

Comparative Examination of the Various Processes for the Preparation of Pepsine.

In presence of such various processes given by authors and recommended in pharmacopœias, it was indispensable to prepare pepsine by following them exactly. It was necessary also that the conditions of experiment should be absolutely comparable. This has been attained by operating upon the same liquids or upon the same mucous membranes. Each process has been repeated several times in order to be sure of the exactitude of the results obtained.

The process of Wasmann presents the inconveniences that I shall notice in speaking of the process of the French Codex, besides that which results from precipitation by an excess of alcohol.

Precipitation by alcohol only allows of the separation of a portion of the digestive power.

Vogel's process is still more defective, since the pepsine is submitted to several precipitations by alcohol.

The processes of Bidder and Schmidt, Deschamps d'Avallon and Payen cannot be used for the preparation of medicinal pepsine and have yielded me bad results.

Brücke's process has always appeared to me a little strange. The carrying down of a soluble substance by means of a precipitate would appear likely to leave in solution a large part of the active principle. This is in fact what takes place. The phosphate of lime precipitate does, however, carry down a large proportion of the pepsine; but in following the process to the letter and washing the cholesterine to which the pepsine adheres, first with acidulated hydrochloric acid and then with pure water, it is very evident that the pepsine should all be dissolved. Consequently the aqueous liquid that separates in the treatment of the moist cholesterine with ether contains only traces of the digestive principle.

Repeated three times this process yielded me as a definite result insignificant quantities of a product containing more or less phosphate of lime.

In treating by this method 5 grams of excellent pepsine I obtained only a few centigrams of slightly active product.

Although this process cannot be employed in the preparation of commercial pepsine, I have called attention to it because it has been indicated as an excellent method of preparing pepsine in a state of great purity.

According to Brücke his pepsine would not be a nitrogenous body. It is nearly certain that this author had not pure pepsine at his disposition, but foreign substances retaining a certain proportion of pepsine. I have, in fact, ascertained that a pepsine converting into peptone one thousand times its weight of fibrin, and giving when moderately calcined 17 per cent. of ash, contained in a first estimation 10·80 per cent. of nitrogen, and in a second 11·40 per cent., or a mean of 11·10. Taking account of the ash this would be 13·37 per cent. of nitrogen, which approaches closely to the composition of albuminoid substances.

It appears, therefore, that the process of Brücke ought to be rejected even for the purposes of research where it would only be required to prepare small quantities of pure pepsine.

It now remains to discuss the five following processes:—Maceration of the mucous portion of the stomach in water and precipitation by alcohol, the French Codex process, the British Pharmacopœia process, the American process of Scheffer, and that which I have myself proposed.

In each experiment 25 grams of water, containing 3 grams of HCl per litre, were added to 5 grams of fibrin and heated twelve hours at 50° C. in presence of variable quantities of pepsine. By afterwards adding nitric acid drop by drop to the filtered liquid, it was ascertained whether the transformation into peptone was complete or more or less advanced. The results are indicated by the figures given below, which were obtained in operating upon pigs' stomachs.

Yield.—550 grams of liquid from the same maceration gave by—

	Grams.
Codex process	1·10
Precipitation by 3 volumes of alcohol	3·50
Precipitation by 10 volumes of alcohol	3·50
Petit's process	5·70

Activity.—These products employed and tested as described gave the following results:—

Method of Preparation of Product used.	Quantity used.	Result when tested with Nitric Acid.
Precipitated by 3 vols. of alcohol	0·30 gr.	Abundant precipitate.
Precipitated by 10 vols. of alcohol	0·30 „	Abundant precipitate.
Codex process	0·20 „	Clear liquid.
Codex process	0·10 „	Abundant precipitate.
Petit's process	0·01 „	Clear liquid.

In a second series of experiments the yield was—

	Grams.
Codex process	0·22
Scheffer's process	11·00
Precipitation by 3 vols. of alcohol	3·50
Petit's process without filtration	6·80
Petit's process with filtration	3·25

These products upon testing gave the following results:—

Method of Preparation of Product used.	Quantity used.	Result when tested with Nitric Acid.
Codex process	0·10 gr.	Very abundant precipitate.
Scheffer's process	0·10 „	Clear liquid.
Precipitation by 3 vols. of alcohol	0·10 „	Very abundant precipitate.
Petit's process, without filtration	0·01 „	Clear liquid.
Petit's process, with filtration	0·005 „	Clear liquid.

The Codex process gives, as will be seen, variable quantities of pepsine, of which the activity is very inferior.

By Scheffer's process an active product can be obtained, but the pepsine so prepared contains more or less chloride of sodium. In the foregoing case there was left upon calcination four-fifths of saline residue. Twice I obtained good results by adding the chloride of sodium to the unfiltered liquors; but when the liquor was filtered, as recommended by Scheffer, the product was much less active.

The process of the British Pharmacopœia, compared with my own, gave a nearly identical yield, but the pepsine so obtained was more impure, less soluble and less active.

Method of Preparation of Product used.	Quantity used.	Result when tested with Nitric Acid.
British Pharmacopœia	0·05 gr.	Clear liquid.
Petit's process	0·01 and 0·005 gr.	Clear liquid.

I might have determined in the various cases the quantity of pepsine, prepared by alcohol or by the Codex process, which is necessary for the absolute conversion of 5 grams of fibrin into albuminose; but the results were so conclusive that I thought it useless to continue the experiments. They proved in the clearest manner the superiority of my process.

It is very generally believed that water is a bad solvent of pepsine. This is an error already combatted by Witt. The mucous portion of the stomach yields as much pepsine to simple water as to acidulated water or glycerine. Comparative experiments have shown to me that the liquors acidulated with hydrochloric acid are inferior in activity to those prepared with water only.

Some mucous membranes were separated from the muscular coats, cut fine and mixed. Equal weights of this mixture were macerated in equal volumes of (1) Water; (2) Water containing 5 per cent. of alcohol; (3) Water containing 5 grams of true hydrochloric acid per litre. After macerating the same time, a test of artificial digestion gave the following results:—

Aqueous liquor	½ c.c.	Rather abundant precipitate.
„ „	1 „	Clear liquid.
Alcoholic liquor	½ „	Turbid liquid.
„ „	1 „	Clear liquid.
Hydrochloric liquor	1 „	Rather abundant precipitate.
„ „	2 „	Turbid liquid.

Following my own process in the preparation of calves' and sheep's pepsine, I obtained the following results:—

Calves' pepsine,	Filtered liquor	0·10 gr.	Clear liquid.
„ „	„ „	0·05 „	Precipitate.
„ „	Unfiltered liquor	0·20 „	Clear liquid.
„ „	„ „	0·10 „	Precipitate.
Sheep's „	Filtered liquor	0·05 „	Clear liquid.
„ „	„ „	0·025 „	Turbid liquid.
„ „	Unfiltered liquor	0·10 „	Clear liquid.
„ „	„ „	0·05 „	Precipitate.

The Codex process, tested with the same quantity of sheep's stomach, gave—

Yield.—Petit's process . . . . 10·30 gram.
Codex process . . . . 2·50 „
Activity.—Petit's process, filtered liquor 0·05 gr. Clear liquid.
Codex process . . . . . 0·50 „ Precipitate.

To sum up, it will be seen that it is easy to prepare pepsines of great activity.

With fresh pigs' stomachs that have not undergone any alteration, taking the most minute precautions during the evaporation, I have succeeded in preparing pepsines converting into albuminose one thousand times their weight of strongly dried fibrin.

With sheep's stomachs the activity of the pepsine prepared is about one-tenth.

After the experiments that I have already published[*] relative to the simple solution of fibrin, it will, I hope, be clearly established that there exists an absolute difference between the solution of fibrin and its conversion into albuminose, and that pepsines which only dissolve ten times their weight of fibrin will no longer be considered good. With the most active pepsine prepared by my process, I have been able to obtain in seven hours the solution of five hundred thousand times its weight of fibrin. The contents of several comparison flasks, placed in the same conditions, were not liquefied, and had preserved their gelatinous appearance. In making comparative experiments it is necessary to take the greatest care not to introduce into the flask the least trace of pepsine, however small.

It may further be useful to add that by prolonged exposure in the stove acidulated water alone would determine the more or less complete solution of the fibrin.

NOTE ON A SIMPLE MEANS FOR INCREASING CERTAINTY OF PERCEPTION OF COLOUR CHANGE IN VARIOUS TITRATIONS.[†]

BY A. DUPRÉ, PH.D., F.R.S.

As is well known, the change from pale yellow to red, in the titration of chlorides by means of nitrate silver with neutral chromate as indicator, is more distinctly perceived by gaslight than by daylight. No doubt eyes differ in regard to their power of perceiving slight variation of colour tint, and in my case I have always found it advisable, in the analysis of potable waters, containing from one to two grains of chlorine per gallon, considerably to concentrate by evaporation previous to titration, or else to perform the titration by gaslight. The adoption of the following simple plan enables us, however, to perceive the change of colour as sharply and with as great a certainty by daylight as by gaslight.

The water is placed into a white porcelain dish (100 c.c. are a useful quantity), a moderate amount of neutral chromate is added (sufficient to impart a marked yellow colour to the water), but instead of looking at the water directly a flat glass cell containing some of the neutral chromate solution is interposed between the eye and the dish. The effect of this is to neutralize the yellow tint of the water, or, in other words, if the concentration of the solution in the cell is even moderately fairly adjusted to the depth of tint imparted to the water, the appearance of the latter, looked at through the cell, is the same as if the dish were filled with pure water. If now the standard silver solution is run in, still looking through the cell, the first faint appearance of a red coloration becomes strikingly manifest, and what is more, when once the correct point has been reached the eye is never left in doubt however long we may be looking at the water. A check experiment in which the water with just a slight deficiency of silver, or excess of chloride, is used for comparison is therefore unnecessary. The plan is useful chiefly with very dilute solutions, one or two grains of chlorine per gallon, and since I have adopted it I have entirely given up the concentration of the water prior to titration formerly practised.

A similar plan will, I think, be found useful in other titrations. Thus, in the case of turmeric, the change from yellow to brown is perceived more sharply and with greater certainty when looking through a flat cell containing tincture of turmeric of suitable concentration than with the naked eye. The liquid to be titrated should, as in the former case, be placed into a white porcelain dish. Again, in estimating the amount of carbonate of lime in a water by means of decinormal sulphuric acid and cochineal, the exact point of neutrality can be more sharply fixed by looking through the cell filled with a cochineal solution. In this case, the following is the plan I have found to answer best. The water to be tested—about 250 c.c.—is placed into a flat porcelain evaporating dish, part of which is covered over with a white porcelain plate. The water is now tinted with cochineal as usual, and the sulphuric acid run in, the operator looking at the dish through the cell containing the neutral cochineal solution. At first, the tint of the water and the tint in which the porcelain plate is seen are widely different; as, however, the carbonate becomes gradually neutralized, the two tints approach each other more and more, and when neutrality is reached they appear identical; assuming that the strength of the cochineal solution in the cell and the amount of this solution added to the water have been fairly well matched. Working in this manner I have found no difficulty (taking ½ litre of water) to come within 0·1 c.c. of decinormal acid in two successive experiments, and the difference need never exceed 0·2 c.c. In the cell I employ, the two glass plates are a little less than half-an-inch apart.

A somewhat similar plan may be found useful in other titrations, or in fact in many operations depending on the perceptions of colour change.

MANUFACTURE OF GLAUBER'S SALT IN THE SOUTH OF FRANCE.[*]

The following interesting description of the extraction of Glauber's salt from the sea-brines, as now practised at the large salines at the mouth of the Rhone River, contains several items of interest to the chemist:—

The sodium sulphate is obtained by decomposing a liquor which contains common salt and magnesium sulphate in proper proportions by the aid of artificial cold. The Carré ice machine is used for this purpose. The crude material, the *sel mixte*, crystallizes out at a certain stage in the evaporation of the mother liquor left after common salt has crystallized. This special liquor is then cooled by an ingenious application of the refrigerating process until —6° is reached, when Glauber's salt separates out as a crystalline scum, which is removed and carried by elevators to large draining casks. Here the salt is freed from adhering water and is now ready to be made anhydrous. This operation had given great difficulty, as the evaporation in iron pans was not possible, on account of the tendency of the separating anhydrous sulphate to burn, and calcination with the aid of a reverberatory flame was also extremely difficult to carry out. The difficulty has been overcome very simply. The water of crystallization is not driven off by heat, but is displaced. For this purpose, the crystallized Glauber's salt, in quantities of 1500 kilograms, is fused with a small amount of the mother liquor in a wooden tank heated by a copper worm and provided with stirrers, when 250 kilos of common salt are added. In the degree that the salt dissolves, anhydrous Glauber's salt is precipitated, and at the end of the operation about 85 per cent. of the Glauber's salt originally used is obtained as an anhydrous precipitate. The salt so obtained has at most 0·5 per cent. sodium chloride and 5 per cent. of water present.

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[*] See *Pharmaceutical Journal*, [3], vol. x., p. 584.

[†] Read before the Society of Public Analysts, on June 2, 1880. From the *Analyst*, July, 1880.

[*] From *Chem. Industrie*, January, 1880, p. 9. Reprinted from the *American Journal of Pharmacy*, May.

The Pharmaceutical Journal.

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SATURDAY, JULY 17, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

WHAT IS ACONITINE?

INDIRECTLY rather than otherwise this question has been forced upon the attention of medical men and pharmacists by most of the work that has been carried out during the last few years in connection with the active principle of aconite. For a long time the amorphous pulverulent substances known as aconitine were distinguished, according to the place where they were made, as German, French, or English aconitine, and they were generally credited with widely different characters, and it was not until Mr. GROVES directed his attention to the mode of extracting from aconite root the alkaloid constituent present in it that some indications of the existence of at least two distinct alkaloids were obtained. It was not even then shown distinctly that this was the case, but it seems to have been inferred rather than proved that true aconitine was a crystalline substance, and that the unequal activity of the various kinds of commercial aconitine was a consequence of the admixture with that substance of other alkaloids associated with it in aconite root and differing from it in physiological action.

Subsequently, when DUQUESNEL published his process for preparing crystalline aconitine, there appeared to be some reason for anticipating that the various products known as English, German and French aconitine would be superseded by the introduction of a substance possessing definite chemical individuality. That result, however, has not yet been achieved, and though crystalline aconitine can be obtained, its cost is so great as almost to preclude its use.

In America, among other incidents of the Pharmacopœia revision now in progress, the question "What is aconitine?" has come under consideration, and, as stated in a late number of this Journal, Dr. RICE has applied to Dr. WRIGHT for a statement of the characteristics of pure crystalline aconitine, such as would serve for adoption in the new Pharmacopœia. Considering what is known to be the case as regards the variable activity of commercial aconitine it is not surprising that medical men should be, as Dr. RICE says, disgusted with it, and that they should desire to be supplied with a more definite preparation.

The characteristics of aconitine as laid down by Dr. WRIGHT may be regarded as expressing the result of his extended investigation of this alkaloid and as furnishing satisfactory means of recognizing it and ascertaining its purity; but while admitting in this respect the value of the information furnished by Dr. WRIGHT, we are irresistibly reminded of the sage direction of an ancient teacher of the culinary art when describing the preparation of a hare, "First catch your hare," and in like manner it occurs to us as needful that we should first catch our aconitine. Dr. WRIGHT considers that if prescribers would insist that the pure alkaloid only shall be used all difficulty would be got over, dispensers would necessarily procure the pure article as defined by Dr. WRIGHT, and its cost, however much that might be, would only be a matter affecting the patients' pockets and of no comparative moment when considering the advantage they would gain from their medical advisers being able to use the alkaloid with confidence.

But there are obstacles in the way which deserve consideration, since they may render such a solution of the question more difficult and less desirable than is supposed. Thus for instance there are many persons influenced by commercial considerations who would object to paying the high price of the pure crystalline article so long as another article is in the market at a lower price. Then, again, there are the difficulties of obtaining aconitine in the crystalline state; from some roots it cannot be obtained at all, while in others the quantity obtainable varies very much.

According to Dr. WRIGHT's own interpretation of these differences of results in practical operations it is clear that what is chiefly needed for the introduction of crystalline aconitine is a process by which it may be separated from those non-crystallizable substances which prevent it from crystallizing. This applies both to the actual manufacture of the alkaloid, and to the valuation of the roots by which, as Dr. WRIGHT suggests, their suitability for that purpose should be determined; for if the valuation test gives a result which cannot be realized in manufacturing operations, or if in both cases there be equal difficulty in separating crystallizable aconitine from associated impurities which prevent it from crystallizing, we shall still have to follow the initial direction of the old cook as best we may before we can go any further towards making crystalline aconitine take the place of that which is now generally used.

Then comes the further question whether in the case of aconitine the crystalline condition is in itself such a trustworthy indication of purity and individuality as to make it desirable to insist that all the aconitine used in medicine should be actually in the crystalline state? Dr. WRIGHT's definition of aconitine, given in this Journal two weeks ago, and his letter on the subject, furnish evidence that the crystallization of aconitine is so much influenced by the presence of other substances that it may be looked upon almost as a matter of accident. Moreover, it is probable that in converting true aconitine into the crystalline state this can only be effected partially and with a large waste. What is wanted much more than the crystalline condition of the aconitine to be used in medicine is a knowledge of means by which the particular substance, possessing such powerful physiological activity, can be identified and distinguished from other analogous inert or less active substances associated with it, and by which it can also be practically separated from them in manufacturing operations. In this sense we have still not only to catch our hare, but also to learn how to do this.

In reference to the testing of the materials from which aconitine is to be prepared, it is certainly very desirable to have some means of determining in such materials the amount of the particular alkaloid required; but we cannot endorse Dr. WRIGHT'S suggestion that this should be done after the manner of an anthracene test, by a method prescribing specific details of operation, for, in a general way, there is no more vicious method of testing the value of an article, and, in the case referred to as an example, the results are always liable to defect arising from accidental presence of some substance not separated by the operations prescribed. It seems more reasonable to assume our knowledge of the chemistry of aconite and of the alkaloids contained in it to be still too imperfect to admit of chemical tests being prescribed for ascertaining their individuality or the purity of any one in particular by the aid of its chemical characteristics.

As to the physiological action of the aconite alkaloids, we are also in want of satisfactory knowledge, and we must look to the future results of such investigations as are in progress for the assistance which may be derived from this source.

It must not, however, be supposed that by the foregoing remarks we desire in any degree to disparage the information given by Dr. WRIGHT as the result of his labours; our intention is only to point out that it falls far short of what is required for a satisfactory settlement of the question "What is aconitine?" and that it goes but a very little way towards showing how the existence of the physiologically active alkaloid in aconite root can be ascertained and how the extraction of it economically is to be carried out. Before these questions can be decided a very large amount of work will have to be done, and we hope that Dr. WRIGHT will be able to continue his investigations to those ends.

SUNDAY TRADING.

A RETURN that has been prepared by the Chief Constable of Glasgow, showing the number of shops and other places of business found open within that city on Sunday the 6th of last month, offers but a sorry comment upon some correspondence that appeared not long ago in this Journal. According to this return on the Sunday mentioned, out of 2243 shops that were kept open in Glasgow 203, or rather over 9 per cent., were drug shops. This is not only an absolute but a relative increase as compared with the year 1876, when the numbers were 166 out of 2109, or not quite 8 per cent. In the same period the shops kept open in Glasgow on Sunday for the sale of such necessaries as milk, meat and bread show a decrease.

JAVA CINCHONA BARK.

MR. CONSUL CAMERON reports from Java that the Government cinchona crop of 1878, shipped to Holland during 1879, amounted to 91,649 kilos, and netted 179,700 florins, while the total expenses of cultivation amounted only to 52,862 florins. A commission appointed to investigate the rival merits of "mossing" and "coppicing" has presented an indecisive Report. Meanwhile a new method of collecting the bark, recommended by the Superintendent of the Government, is attracting attention. It differs from "mossing" in that it consists in scraping off the outer portions of the bark of the trunk only, allowing the inner bark, which by the "mossing" system is removed, to remain on the tree.

PHARMACY IN NEW ZEALAND.

WITH reference to the movement for the regulation of pharmacy in New Zealand, which was mentioned as being promoted some months since, we learn that a letter has been received from the colonial premier by the President of the New Zealand Pharceutical Society stating that the proposed Pharmacy Bill was being printed and would be submitted to the Crown law officers. This was thought to indicate that the ministry considered the Bill of so much importance that it had been adopted as a Government measure and would be laid before the Legislature in the following session. Meanwhile efforts are being made to develop the newly formed Pharmaceutical Society by the securing of rooms, the formation of a library and other measures.

DEATH OF DR. PHOEBUS.

INTELLIGENCE has been received of the death of Professor Dr. PHILIPP PHOEBUS, of Giessen, on the 1st inst., in his 76th year. For many years Professor PHOEBUS advocated the compilation of a European Pharmacopœia, and for the furtherance of this object he eventually joined with some other leading continental pharmacists in the formation of a Pharmaconomic Society. Some progress was made in the drawing up of a scheme, and proofs showing the arrangement of the type, were prepared. The work of the society was brought before the Pharmaceutical Society of Great Britain by Dr. THUDICHUM at an evening meeting in 1872; but since that time very little has been heard concerning it in this country.

Provincial Transactions.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

MEETING OF EXECUTIVE COMMITTEE.

A meeting of the Executive Committee of this Association was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, Friday, July 9, 1880, at 1 p.m. Mr. Thomas Barclay (Birmingham), President, in the chair; Mr. Robert Hampson (London), Vice-President.

Present—Messrs. Andrews (London), Arblaster (Birmingham), Bell (Hull), Churchill (Birmingham), Cross (Shrewsbury), Davison (Glasgow), Harrison (Sunderland), Holdsworth (Birmingham), Owen (London), Stead (Leeds), Symes (Liverpool), Walker (Coventry), Williams (Manchester), and the Solicitor of the Association.

The minutes of the previous meeting of the Executive and Sub-Committee meetings held on May 28 and July 5 were read and approved.

The Secretary said that the Association had defended two of its members since the last meeting of the Executive, in summonses issued against them under the Weights and Measures Act. In the first of these, Mr. W. Wilkinson, of 114, Lambeth Walk, Surrey, on May 19, was fined the nominal penalty of 1*s.* per weight for having in his possession several apothecaries' weights which were inaccurate. A report of the case had appeared in the trade journals. On the previous Wednesday their Solicitor had defended Mr. E. Freeman, of Ledbury, in a summons charging him with having in his possession for use of trade one fourteen pound weight, which was false or unjust. This summons was dismissed on its being proved to the satisfaction of the bench that the weight was not used for the purpose of buying or selling goods.*

Letters from Mr. Wilkinson and Mr. Freeman were read, expressing the thanks of those gentlemen for the assistance rendered by the officers of the Association. The latter sent also a donation of £2 to the Funds.

The President said, after the prosecution in London, he felt there was no time to be lost in endeavouring to put a stop to such proceedings. He called upon Mr. Harrison, the Birmingham inspector appointed under the Act, who readily consented to an arrangement, by which he promised to send out a printed form to all chemists residing in his district, stating when he was ready to stamp their weights. He (Mr. Harrison) further promised to give them at least a month's notice before they would be interfered with. That being the case, he thought it advisable to bring the matter before the President of the Board of Trade, with a view of inducing him to get other inspectors to do the same. He addressed a letter on the subject to Mr. Chamberlain, who in his reply, said—"Having regard to the operation of the Act, as referred to in your communication, as well as in previous communications with the Pharmaceutical Society, a circular to the several local authorities will be prepared and issued from this department, referring to this correspondence, and telling them what has been done with regard to apothecaries' weights and measures. By this means the President hopes to remedy to some extent the grievance of which you complain." In continuation, the President said he was in favour of an effort being made to get the Act amended; he thought it most desirable that inspectors should not be paid by results, and the rural police who acted as inspectors of weights in country places were thoroughly incapable of testing small grain weights.

Mr. Glaisyer thought it should be insisted on in any alteration of the Act "that defendants should be allowed to give evidence in their own defence."

Mr. Hampson could not see why defendants under the Weights and Measures Act should not be allowed to give evidence, seeing that defendants under the Adulteration Act were allowed to do so.

It was moved by Mr. Hampson, seconded by Mr. Symes, and unanimously resolved:—"That a Sub-Committee, consisting of the officers of the Association, together with Messrs. Arblaster and Churchill, be appointed to consider the working of the Weights and Measures Act, and to deal with the same as they think fit."

It was moved by Mr. Hampson, seconded by Mr. Davison, and unanimously resolved:—"That the officers of the Association, together with Messrs. Andrews, Bell, Churchill, Cross, Jervis, Johnson, Maltby, Williams, Stead and Symes, form a Law and Parliamentary Committee for the ensuing year, with power to deal with such cases as it deems expedient."

It was moved by Mr. Andrews, seconded by Mr. Bell, and unanimously resolved:—"That the officers of the Association, together with Messrs. Arblaster and Churchill, form a Finance Committee for the ensuing year."

It was moved by Mr. Williams, seconded by Mr. Arblaster, and unanimously resolved:—"That the officers of the Association, together with Messrs. Andrews, Arblaster, Bell, Churchill, Cross, Harrison, Jervis, Johnson, Maltby, Owen, Phillips, Stead, Symes and Walker, form a General Purposes Committee for the ensuing year."

It was moved by Mr. Andrews, seconded by Mr. Owen, and unanimously resolved:—"That Mr. Henry Glaisyer be reappointed Solicitor to the Association for the ensuing year."

It was moved by Mr. Bell, seconded by Mr. Harrison, and unanimously resolved:—"That Mr. W. F. Haydon be reappointed Secretary to the Association on the same terms as before."

It was moved by Mr. Arblaster, seconded by Mr. Stead, and unanimously resolved:—"That Mr. G. R. Templeman be reappointed Assistant-Secretary to the Association on the same terms as before."

It was moved by Mr. Hampson, seconded by Mr. Symes, and unanimously resolved:—"That Professor Attfield be reappointed Analytical Referee to the Association for the ensuing year."

It was moved by the President, seconded by Mr. Owen, and unanimously resolved:—"That Messrs. Laundy and Company, Public Accountants, be reappointed Auditors to the Association for the ensuing year."

It was moved by Mr. Cross, seconded by Mr. Arblaster, and unanimously resolved:—"That Messrs. Lloyd's Banking Company be reappointed Bankers to the Association for the ensuing year."

The Solicitor directed the attention of the Committee to several clauses in the Bill to Consolidate and Amend the Law relating to the Manufacture and Sale of Spirits, before the House of Commons, which he considered required their attention.

It was moved by Mr. Cross, seconded by Mr. Owen, and unanimously resolved:—"That the Bill to Consolidate and Amend the Law relating to the Manufacture and Sale of Spirits be referred to the Law and Parliamentary Committee, with power to deal with it as they deem desirable."

A letter was read from Mr. C. W. Warriner, of Nottingham, stating that the Nottingham and Notts Chemists' Association had appointed a committee "to consider and inquire into the present high rates charged by railway companies for the carriage of drugs in hampers, and to put themselves into communication with anyone whom they might think proper with a view to their reduction, and to report thereon."

The President said the letter just read was the outcome of a debate on the subject by the Nottingham Chemists' Association, and therefore merited their best attention.

Mr. Symes said the question of the carriage of drugs was a serious matter for both the wholesale houses and the country chemists. He had often found railway companies very exacting; their rates were very high and their charges generally required very careful watching, as they frequently endeavoured to obtain more than their legitimate charges.

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* See p 59.

Mr. Harrison said he thought the best plan would be to refer the Nottingham chemists to their Chamber of Commerce, as, in his opinion, that body would have more influence with the railway companies than an association representing one trade only.

Mr. Churchill said he thought the matter was one that the Association might deal with as affecting chemists and not the Chamber of Commerce. Drugs paid a high rate of carriage. The drug rate from London to Birmingham was forty shillings per ton, whereas the mineral water and earthenware rates was twenty-eight shillings per ton.

Mr. Hampson said the wholesale houses would be deeply interested in the matter, as it must be to their advantage to send their goods at a cheap rate.

Mr. Walker said, as a representative of the wholesale trade, he might remark that their firm had repeatedly addressed railway companies on the subject, but to very little purpose.

It was moved by Mr. Bell, seconded by Mr. Williams, and unanimously resolved:—"That the question of the rates charged by railway companies for the carriage of drugs be referred to the Sub-Committee previously appointed to deal with the working of the Weights and Measures Act."

It was moved by Mr. Harrison, seconded by Mr. Owen, and unanimously resolved:—"That the Law and Parliamentary Committee be directed to address the Government with a view of obtaining such an amendment of the Jury Act as may provide that the exemption from service on juries enjoyed by pharmaceutical chemists should be extended to all registered chemists and druggists."

The particulars of several cases of illegal trading in poisons were laid on the table, and the Solicitor and Secretary were instructed to take proceedings under the 17th section of the Pharmacy Act in such cases as they deemed expedient.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The last ordinary meeting of this Association for the present session was held on Thursday, July 8, Mr. R. H. Parker, Vice-President, in the chair.

The Secretary gave his Report on Organic Chemistry, the subject being:—

THE RELATION BETWEEN THE CHEMICAL CONSTITUTION OF CERTAIN ORGANIC COMPOUNDS AND THEIR ACTION UPON THE ULTRA-VIOLET RAYS.

BY WYNDHAM R. DUNSTAN, F.C.S.,

Assistant Demonstrator of Chemistry in the Laboratories of the Pharmaceutical Society.

The three principal methods of examining the action of various substances upon the ultra-violet rays of the spectrum are—

(1). The photographic method proposed by W. A. Miller,* in which the spectrum was obtained from electric sparks passing between silver electrodes, the liquid to be examined being placed in a cell with quartz faces. Glass cannot be used on account of its absorptive action upon the ultra-violet. The cell is placed immediately before the slit, the rays passing through a quartz prism and finally concentrated by means of a rock crystal lens upon an iodized collodion plate placed within a camera.

(2). The method of Stokes,† in which the spectrum is received upon a fluorescent screen, the ultra-violet portion thus being rendered visible.

(3). The method more recently proposed by Soret,* in which a spectroscope having a fluorescent eye-piece is employed.

Hartley and Huntington† have examined the action of various organic compounds upon the ultra-violet portion of the spectrum, with a view of discovering if any connection existed between the chemical constitution of the bodies and their power of actinic absorption. To this end they have examined homologous series of alcohols, acids and hydrocarbons.

The apparatus used was a modification of Miller's, using generally nickel instead of silver as electrodes and gelatine plates instead of iodized collodion, with other modifications. The position of the absorption bands and their measurement were determined by reference to the lines of cadmium, zinc and aluminium in the ultra-violet portion of the spectrum. Quartz cells filled with water were found to exert no action upon the ultra-violet rays, *i.e.*, were diactinic.

The alcohols of the C_nH_{2n+1} series were then examined, and were found to be characterized by their diactinic properties. Methylic alcohol, CH_3OH, when pure, was found to be nearly as transparent as water.

Ethylic alcohol, C_2H_5OH, is less diactinic than methylic alcohol, and propylic alcohol, C_3H_7OH, is still less diactinic. A higher homologue of this series, octylic alcohol, C_8H_7OH, possessed considerably more absorptive power.

It will be seen from the diagram exhibiting the results that every increment of CH_2 in the homologous series is accompanied by increased absorption of the more refrangible ultra-violet rays, but no absorption bands are produced.

The fatty acids were next examined, but owing to the difficulty of obtaining pure formic acid the sodium salts were examined, molecular weights of the salts being dissolved in equal volumes of water. The results which are shown in the diagram indicate increased absorption as the series is ascended, and it will be also observed that the fatty acids are less diactinic than their corresponding alcohols. This is probably due to the absorptive power of the carboxyl group (COOH) contained in the former. This theory is strengthened by the fact that oxalic acid $(COOH)_2$ produces a much greater absorptive action than acetic acid $\left\{\begin{matrix}CH_3\\COOH\end{matrix}\right.$. From an examination of the ethereal salts of the fatty acids it was found that they resemble their corresponding alcohols and acids in their diactinic power, and do not produce absorption bands.

The diagram shows the result of the examination of benzene and the substances containing the benzene nucleus. It will be seen that they all possess a great absorptive action and are further characterized by the production of well marked absorption bands at certain degrees of dilution.

Benzene itself possesses great absorptive power, and is characterized by six absorption bands which appear when 1 part of benzene is dissolved in 750 parts of alcohol, and are well seen after a dilution to 1500. The layer of benzene solution used was ·75 inch thick, consequently a layer of benzene $\frac{1}{1000}$th of an inch will exhibit the absorption bands. Phenol and thymol exhibit absorption bands which are more persistent after dilution than those of benzene. Benzoic acid, C_6H_5COOH, exhibits bands which are not destroyed when the dilution has reached more than 1 part per million.

Phthalic acid, $C_6H_4(COOH)_2$, is less diactinic than benzoic acid, and the absorption bands are not destroyed when the dilution is equal to 1 part in 4,000,000. This gives further support to the theory that the carboxyl group possesses special absorptive powers. Phthalic acid stands in the same relation to benzoic acid as oxalic acid to acetic acid, and benzoic acid and phenol are related in the same manner as acetic acid and alcohol.

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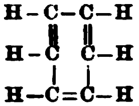
* 'Phil. Trans.,' 1863, i.

† 'Phil. Trans.,' 1862, 606.

* 'Archives des Sciences Physique et Naturelles,' Geneva, 1878.

† 'Phil. Trans.,' 1879, 257.

From the examination of various substances Hartley has arrived at the conclusion that the production of absorption bands is due to the double linking of three pairs of carbon atoms in a closed chain, as is generally assumed in the graphic formula of benzene.



Compounds having two adjacent carbon atoms doubly linked as in ethylene

$CH_2{=}CH_2$

do not exhibit absorption bands, neither do compounds having two carbon atoms trebly linked, as is assumed with acetylene.

$CH{\equiv}CH$

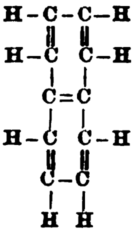
Absorption bands only occur, as far as experiments have shown, when the compound contains a closed chain of three pairs of doubly linked carbon atoms. When hydrocarbons contain six or more carbon atoms the atoms admit of the three following arrangements, so as to form a closed ring:—

(1). The six carbon atoms may be singly linked, as in the case of camphor. This compound as well as camphoric acid exhibits no absorption bands.

(2). Two pairs of atoms may be doubly linked, as is assumed in the case of the terpenes. Neither the terpenes, nor their oxidized or hydrated derivatives, occasion any absorption bands, although they possess in a marked degree the power of absorbing the ultra-violet rays, which power increases as the number of carbon atoms in the molecule; thus terpenes of the constitution $C_{15}H_{24}$ possess a greater absorptive power than those of the formula $C_{10}H_{16}$.

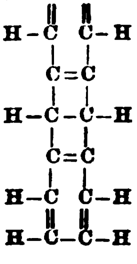
(3). Three pairs of carbon atoms may be doubly linked, as in the case of benzene. Bodies having this constitution, as has been noticed before, yield characteristic absorption bands.

As might be expected from the generally adopted formulæ of naphthalene and anthracene, the absorption bands are much stronger than those of benzene. Naphthalene is considered to be formed by the union of two benzene nuclei, as the formula represents.



A solution of one part of naphthalene in 60,000 produces four characteristic absorption bands.

Anthracene has the following constitution:—



The absorption bands are shown by a solution of anthracene containing one part of anthracene in 50,000,000 of glacial acetic acid.

Hartley and Huntington* have examined the action of a number of essential oils upon the ultra-violet rays.

The following oils and hydrocarbons transmit continuous spectra:—

Australene from oil of turpentine.
Birch bark.
Cajuputene dihydrate.
Caraway hydrocarbon, No. 2.
Cedrat hydrocarbon.
Calamus.
Citron.
Citronella.
Cedar wood.
Nutmeg hydrocarbon.
Cubebs.
Elder.
Hesperidene from oil of orange-peel.
Indian geranium.
Juniper.
Lavender.
Lign aloes.
Melaleuca ericifolia.
Menthol from oil of mint.
Terebene.
Vitivert.
Patchouli, oil of (1 and 2).
Rose, otto of.
Rosemary,
Santal wood.
Terebenthene.

Cajuputene hydrate, which is the principal constituent of oleum cajuputi, B.P., is probably a terpene of the formula $C_{10}H_{16}$.

Oleum carui, B.P., is a mixture of two hydrocarbons, one of which, No. 2, is probably a terpene of the formula $C_{10}H_{16}$.

Oil of citronella is chiefly composed of citronellol, which is a body probably isomeric with camphor.

Oil of cubebs contains a terpene of the formula $C_{15}H_{24}$.

Most of the other substances have similar constitutions and, as expected, do not produce absorption bands.

Hydrocarbons showing the absorption bands of cymene ($C_{10}H_{14}$):—

Thyme. Nutmeg.
Lemon. Caraway, No. 1.

Cymene is a higher homologue of the benzene series, and exhibits characteristic absorption bands.

Substances showing strong bands of absorption in the spectrum transmitted by dilute solutions:—

Oil of aniseed.
Oil of bay.
Oil of bergamot.
Oil of bitter almonds.
Oil of cassia.
Oil of cloves.
Carvol from caraway oil.
Myristicol from nutmeg oil.
Patchouli, blue oil of.
Oil of peppermint.
Oil of pimento.
Oil of thyme.

These substances nearly all contain compounds having the benzene nucleus; thus oils of bay, pimento and cloves contain eugenol, $C_6H_3OHOCH_3C_3H_5$; oil of cassia, cinnamic aldehyde, $C_6H_5C_2H_2COH$; oil of aniseed, anethol, $C_6H_4OCH_3C_3H_5$; oil of thyme, thymol $C_6H_3OHCH_3C_3H_7$; and cymene $C_{10}H_{14}$ Bergamot is known to contain hesperidene, a terpene of the formula $C_{10}H_{16}$, and another hydrocarbon which, from these experiments, is probably a derivative of benzene. Menthol, carvol and myristicol ($C_{10}H_{14}O$) have been shown to be isomeric (Gladstone);

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* 'Proc. Roy. Soc.,' 1879, 290.

the nucleus of the former from its action upon the ultra-violet rays is probably a terpene, whilst benzene is the nucleus of the two latter.

From the varying action of essential oils upon the ultra-violet rays they may be distinguished, if diluted with alcohol, before observation is made. Bodies of the aromatic series will be distinguished by their absorption bands, and terpenes by the transmission of continuous spectra.

General Conclusions:—

Every increment of CH_2 in a homologous series of alcohols, acids, etc., is accompanied by an absorption of the more refrangible ultra-violet rays, the amount of spectrum transmitted being inversely as the number of carbon atoms in the molecule. Absorption bands only occur when three pairs of carbon atoms are doubly linked in a closed chain.

The terpenes of the formula $C_{10}H_{16}$ and $C_{15}H_{24}$ both possess a great absorptive action upon the ultra-violet rays, the action of the latter being the greatest.

Isomeric terpenes generally transmit spectra which differ in length or in other respects on dilution.

Compounds containing the benzene nucleus exercise a greater absorptive power than the terpenes upon the ultra-violet rays, and produce absorption bands which are characterized by their intensity.

Isomeric bodies containing the benzene nucleus produce bands which differ in position and in intensity.

Mr. W. Elborne then took the chair while Mr. R. H. Parker made his Report upon Materia Medica, the subject being "Spurious Gums Imported with Myrrh." The paper will be found on p. 41.

Mr. C. H. Hutchinson then delivered his Report on Inorganic Chemistry on "The Formulæ of some Inorganic Substances," being a continuation of a former report upon vapour densities at high temperatures. This report will be published in a future number of this Journal.

The meeting then adjourned.

SOCIETY OF ARTS.

THE CHEMISTRY OF BREAD-MAKING.[*]

BY PROFESSOR GRAHAM, D.SC.

(*Continued from page* 39.)

Lecture IV.

I have, at last, arrived at that stage of the course which, I fear, many of you must have thought I might have come to before; but when one considers the very important and somewhat obscure phenomena underlying the baker's art, I think that the careful study of the properties of the different substances entering into the composition of bread, and of the very interesting phenomena connected with the hydration-products formed in the panification process, will be deemed of sufficient importance to justify the time that I have given to this preliminary part of the subject.

I, therefore, proceed this evening to the manufacture of bread, giving you a short outline of the process; but I do not propose to discuss at much length this part of the subject, because we shall have ample matter to consider, irrespective of the technical details of bread making. I must preface my brief description of the process by the statement that bakers, in different parts of England, employ different methods in their art, and probably many here present, who are practical men, and who have done me the honour of attending this course, will find in some points—perhaps not many—that I do not describe the particular method they follow; but, for the purposes of a general audience, I think it will be advisable to take bread-making as known in London, or in the West-end of London, as an illustration of the art generally.

The first part of the process consists in the preparation of what is technically called the "ferment." I ought to say, first of all, that a sack of flour weighs 280 lbs., and that a sack will turn out about 90 to 94 loaves of 4 lbs. each, according to the quality of the flour; so that I shall deal with a sack of flour as the unit of the operation which I shall proceed to describe. Bakers themselves, inasmuch as it is much more convenient to measure water than to weigh flour, are in the habit of speaking not so much of the flour employed as of the water. The first part of the process is the preparation of the ferment. This consists in taking potatoes, about 6 lbs. to 8 lbs. to the sack—some use as much as 12 lbs.—and the potatoes should be, of course, well selected, mealy, not waxy or unripe and ill-matured. These are well washed, then boiled, in order to burst the cell walls of the potato starch. After they have been boiled thoroughly, they are mixed with additional water, and then put into a fermenting tub, and when the temperature of the water and of the mashed potato has cooled to 85° Fahr., the yeast is added. One quart of brewers' yeast is employed to the sack of flour, and, in addition to this, a pound or two of flour is added to supply albuminous food to the yeast, and this constitutes the "ferment." Fermentation commences, the soluble starch—the properties of which I have previously described—is affected partly by the direct action of the yeast, and partly by the action set up by the yeast-ferment on the soluble albuminoids in the flour which has been added, and the result is the hydration of the starch and the conversion of the starch into the sugars and dextrin, which I have described so fully. This process goes on for some five hours; it rises during that time, and at about the end of five hours, varying a little with the temperature, the head falls in. The head having fallen in, it is allowed to remain in a quiescent condition for two or three hours, and then the baker proceeds to the next stage, which is called the preparation of the "sponge." They call it "stirring the sponge." In the preparation of the sponge, about one-fourth of the total flour—or one-third according to the practice of those bakers who prefer a stiffer sponge—is taken. This is placed in the trough, and the "ferment" is added, along with some more water at 85° Fahr., the whole of the ferment being forced through a sieve, to remove the skins of the potatoes used, and thus the skins do not come into contact with the sponge. The potato skins and flour on the sieve are well washed by the water here added. The total amount of water used in the ferment and sponge stages being about half of the whole amount used for the sack of flour, this amount is about 60 quarts, varying somewhat with the character of the flour. Thus, up to and including the "sponge," one-fourth—or one-third according to some bakers—of the flour and some 30 to 32 quarts of water have been used.

In the preparation of the sponge, some bakers—not many, but still some who occupy a prominent position in the trade—add a part of the salt, I have been told, about one-half of the total salt; but probably this will depend entirely upon the temperature, as, for example, whether it is winter time or summer. The object of the salt is to check somewhat the activity of the ferment, and I shall presently allude to this matter again, because many bakers do not adopt the plan of adding salt at this particular stage.

The sponge being made, it is allowed to go on fermenting for some time. At the end of about an hour it increases visibly in size, and this increase, due to the production of carbonic acid gas, causes it, at the end of about five hours, to "break." When the mass has risen to its fullest extent, the sponge breaks, owing to the escape of some of the carbonic acid gas, and, having broken and fallen down, it commences to rise again, and in about another hour, varying somewhat according to the temperature at the time, or of the room, the sponge rises again, and breaks again. This is called the second break. So soon as it has broken a second time, the remaining part of the flour—which would be about three-fourths, or two-thirds, according to the practice followed by the baker—and the remainder of the water are added.

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[*] Cantor Lectures: Delivered November and December, 1879. Reprinted from the *Journal of the Society of Arts.*

We pass thus to the dough. The remainder of the flour having been added, and the remainder of the water, the whole is thoroughly well mixed, and it is at this stage when most bakers add the whole of the salt. Other bakers only use that which remains over after having employed a little at the sponge stage. The total quantity of salt used I find to be about 3 lbs. to the sack, or 48 ounces, which would give about half an ounce of salt to the 4 lb. loaf of bread. This part of the operation of bread-making entails a very great deal of hard manual labour, and it has, therefore, often been proposed that one should introduce machinery, with a view to lessening the amount of mechanical labour. There was exhibited at our last meeting an instrument, the invention of Mr. Pfleiderer, which seems to be a very successful piece of machinery. My business, however, is not to discuss the mechanical advantages of this piece of machinery or that, but rather to confine myself to the chemical phenomena. I did hear an objection to it, that, in order to be a really useful instrument, it would require to have other power than manual, but those of you who are practically interested in the matter must judge of this for yourselves.

The dough having been thoroughly well worked is now left for one hour, in order to rise again. It is then scaled; that is, it is cut and weighed off in proper quantity and made up into loaves. By the time a large batch of bread has been scaled and made up, of course, the previous portions are ready for the oven. They are then put into the oven, and are there heated for about an hour and a half, the temperature of the oven at the time of the introduction of the bread varying from about 400° Fahr. to 450° Fahr. Of course, that is not the temperature of the bread, because the bread contains water, and therefore, it rises little, if at all, above the ordinary temperature of boiling water.

There are some modifications of this process as just described. First of all, some bakers use the whole of the salt in the stage which is called the preparation of the dough; whereas, as I have pointed out, some use a part of the salt at an earlier stage, namely, in the sponge stage. Again, some use a thicker sponge, some use as much as one-third of the total flour, and others only one-fourth. Again, some employ what is called patent yeast, instead of brewers' yeast. Patent yeast is made by taking an infusion of malt and boiling that with hops, and then, when it is sufficiently cooled, yeast is added, and in that way young active yeast cells are formed. Those who employ patent yeast take, I believe, about 6 lbs. of this patent yeast—in winter 7 lbs.—to the sack of flour. One other point, to which I need only briefly allude, is the preparation of what are called fancy breads, more especially the beautiful rolls and loaves introduced during the last few years to the London public in imitation of the bread made in Vienna, and afterwards in Paris. These fancy breads are fermented, not with the ordinary brewers' yeast, but with German yeast; and the process—as I understand, followed by almost every one—is, to make the "ferment" first. This ferment is made with potatoes, and also with brewers' yeast, as usual, but, in the sponge stage, German yeast is employed, and a considerable quantity, so that the fermentation is very rapid, and thus one obtains very large, light, and porous bread.

I will now briefly consider the chemical changes of the process. In the first place, in the preparation of the ferment, I said that potato, or fruit, as it is technically termed in the trade, is employed. Now, this is not used for the purpose of adulteration, nor is it used for the purpose of increasing the profit. On the contrary, very often the baker has to give a very much greater price for the starch in the potato than for the starch in flour or in rice, for it would be much cheaper for him to buy cereals for this purpose. His object is this. With the exception of the maranta arrowroot and the tous-les-mois arrowroot, potato starch is the largest of the starches, and it readily lends itself to the expansive action which takes place in boiling. On bursting, the granular matter, the starchy matter of the cells exudes from the ruptured cell-wall, as I have pointed out to you before; and it is only on the starch after it has been made in this soluble form that the soluble ferments of the yeast can act. Therefore, the baker has found out for himself long before science was able to teach him—I do not know how old the custom is, but certainly long before science could have taught him—the baker found out for himself the advantage of using a small weight of potatoes to develop the fermenting organisms required to do the work of converting a sack of 280 lbs. of flour into bread. Now, in 8 lbs. of potatoes there is only, at the very outside, one-fifth of its weight of starch, and one-fifth of 8 lbs. is but a very small quantity when dealing with 280 lbs. of flour; and manifestly, then, this arises from some other reason than a desire to substitute a cheap material for a dearer. Its real value is to enable the baker to obtain an active propagation of the yeast, and to enable him to get a larger quantity of sugars and dextrin formed in a given quantity of time than if he were to employ flour only. I believe, in some cases, bakers also scald a little flour, in order to obtain some soluble starch in that way, in addition to the employment of potato. During the preparation of the ferment, which lasts something like eight hours, there is a continuous action, to which I called your attention at our last meeting, when I showed you, from the analyses of Mr. Henry Brown, that soluble albuminoids, in the presence of moisture at about 100°, and also at 85°, gradually become degraded, less and less complex, and, therefore, more and more mobile; and this action converts soluble starch into those more hydrated products, maltose and dextrin, which I described to you at our second meeting.

The ferment having been much increased by the treatment with the potato and the small quantity of flour employed, the next stage is the preparation of the sponge. Here the baker adds a portion of the flour, either one-third or one-fourth, according to his custom, and, of course, a portion of the water. This is thoroughly intermixed, and so the fermenting action goes on; partly upon the sugars already formed in the first or fermenting stage, and partly also (and to a great extent with inferior flours) upon the albuminoids and starch of the flour added in stirring the sponge.

The third stage is what I will call, chemically, the inactive stage. I do not mean to say that no change goes on, but that, as compared with the very great chemical activity of the fermenting stage, and the powerful fermenting activity of the sponge stage, we may call the dough stage—when it is made thick and firm, and when salt is added in order to check further action—the inert stage, the object now being that there shall be no more degradation of the albuminoids, no more breaking up of the complex starch into simpler molecular groupings. Sufficient of the sugar has been formed to carry on all that is required at this particular stage. The period given for the carrying on of the fermentation is only about an hour, and then the dough is put into the oven in order that the action shall be stopped; but, of course, before it is stopped, the temperature acts on the globules of carbonic acid gas; they expand under the heat, and so they lift the bread, and they are able to lift it on account of the resisting elastic property which the gluten of the wheat possesses.

The first object aimed at by the baker in the process of bread-making, is to get a thoroughly good aeration o the finished bread, so that it shall be light, not heavy, that the air spaces which lighten it shall not be large, but that there shall be a large quantity of smaller air-spaces, and to obtain, in other words, a well-piled, well-aerated bread. The next point the baker aims at is to have as little colour produced in the panification process and in the oven process as possible, and his object in endeavouring to obtain as little as possible of coloured products is, doubtless, derived from the fact that inferior flours are pre-eminently prone to give coloured products, and the world at large has come to conclude that high-coloured bread is due, of course, to inferior flour. These are by no means the only objects that the baker has in view: he also desires to obtain a loaf that has a nice aroma, and a sweet, I think they call it a "nutty," taste on the palate.

The use of salt is a very interesting discovery on the part of the unscientific baker. The baker found out the value of it long ago, and also in this case before there was any science to tell him of it. In a very interesting lecture, delivered some few years ago by Mr. Callard, a baker of well recognized eminence in the trade, it was pointed out that the salt might be compared to the bridle, and the yeast to the whip, that the one was a check on the other, and that by a judicious use of salt at the different stages, one could guide and arrest the fermentation.

I proceed now to a matter which must have arisen in the minds of all of you. What is the cause of fermentation? To what is this production of carbonic acid gas due, and to what is the production of alcohol which is always noticed in the fermentation of bread due? I will not detain you long with a matter which has interested scientific men for many years; but inasmuch as it is an exceedingly interesting branch of science, I think it well to give you a short account of the various views which have been held upon this question, and to point out to you the knowledge we now possess in regard to it. The first philosophical explanation of alcoholic fermentation was that given by Stahl and Willis. They said that alcoholic fermentation was due to a peculiar motion imparted from the degrading body to a body in its neighbourhood, and the body receiving this peculiar impulse or motion was degraded from a complex structure to structures more and more simple. This idea that a body having a peculiar kind of motion or vibration can communicate to another body in its neighbourhood the same kind of vibration or motion is certainly not unphilosophical. For example, if we were to take a rod of iron, say, a small poker, and suspend it by a string in the middle of this room, so that the pointed end would be directed to this side of the room, which is the north side, and were then to tap the poker for a short time with a small hammer, or piece of wood even, we should find that the poker becomes possessed of properties which it did not manifest before. Thus, if we were to suspend it in any other room in London, or in England, the pointed end would be directed to the north side of the room when free to swing. The extent to which it would manifest this peculiar property would depend on the amount of tapping, and the conditions observed by the operator, and for a time the poker would retain this peculiar tendency of pointing north and south.

Now, by this peculiar mode of tapping the poker, we set up a number of vibrations, which would, under ordinary circumstances, produce no manifest effect on the poker, but, because we placed the poker at right angles to the diurnal rotation of the earth, then we have those vibrations compelled to take a peculiar, and, as we term it, polar arrangement, so that the vibrations circle round the axis of the poker, and the result is that, for some time, that poker acts as a magnetic needle. In much the same way, if I had a large finger-glass, and if I were to strike a particular note on the string of a fiddle, I could compel that glass, supposing I knew its dominant key, also to give forth the same note as the one I had produced from the string of the fiddle. Doubtless, there are many other instances you may, yourselves, think of in support of the idea of Stahl and Willis. This idea was taken up by Liebig and by others, who developed it to a considerable extent. Liebig said that the peculiar kind of motion was an oxidation action, that it was due to the oxidation of complex albuminoids, and by the oxidation of albuminoids he accounted for alcoholic fermentation of saccharine molecules, and for the fact that the sugars, therefore, were broken up into alcohol and carbonic acid, or, at a higher temperature into lactic acid and acetic acid. The view of Stahl and Willis would, at the present day, account for the peculiar action of the hydration of starch, but it certainly does not account for the alcoholic fermentation. While these views were held so recently, strangely enough, in 1680, a Dutchman, Leuwenhoeck, contended that yeast consisted of minute globules. The matter was forgotten, however, for microscopes in those days were not of very great power, until the year 1837, when Cagnard de la Tour, and also Schwann, corroborated by Kützing, distinctly proved that yeast was a cellular organism. But the great workman in this field of investigation has been Pasteur, to whose labours throughout a long period of his life, labours carried out even at the sacrifice, to a great extent, of his health, and certainly to the injury of his sight, we owe the true clue to the nature of alcoholic and many other fermentations. The problem whence come ferments has been, to a great extent, answered by Pasteur. If you take an ordinary grape, well-grown in the south of Europe, you will find a beautiful bloom upon it. That bloom partly consists of minute organisms and dust that has fallen on to the skin of the grape. Now, Pasteur proved that it was this dust adhering to the outside of the grape that set up fermentation in the expressed juice of the grape. I will not detain you by a long account of his work, but I will merely say that, in the first place, he so arranged his experiment that he could take from the inside of the grape a part of the juice without any trace of the dust on the skin coming in contact with it. He found when that juice was put in small tubes, and in tubes which had been previously heated so that there should be no trace of organized dust existing in them, and with proper means taken to prevent any more dust getting into such a tube, the juice would not ferment. On the other hand, when he took a small portion of the dust of the skin of the grape, and added it to the juice from the interior of the grape, he got vinous fermentation. The juice was converted into wine by alcoholic fermentation. Not only does the grape contain this minute ferment on the skin, but also the dust of the air generally contains the spores of ferments, and ferments themselves, which may produce alcoholic, butyric, ropy, or other kinds of fermentation. Not long ago, in England, it was customary in Dorsetshire to allow the wort made from malt to spontaneously ferment, and, if you go over to Brussels, even at the present day, you will find there beers well known in Belgium under the names of Lambic and Faro, produced by spontaneous fermentation. After the wort has been made it is placed in large tuns, and whatever dust falls from the atmosphere goes into the large hole at the top, and sets up fermentation. The old process of making bread by means of leaven was also a haphazard process of the same kind; that is, you could not predict exactly what kind of organisms would follow. The result is, as you know, that the old leavened bread was certainly by no means a sweet, pleasant bread, and those who have had the misfortune to drink Lambic and Faro must know how sour and bad they are.

I said that the old leaven contains alcoholic organisms. These have been carefully examined by Engel, and he has given them the term *Saccharomyces minor*, because they are smaller than the ordinary beer yeast, called *Saccharomyces Cerevisiæ*. These names may seem somewhat long for organisms so small. I am unable to make use of simpler terms, however, without running the danger of confusion. The *Saccharomyces minor*, discovered by Engel in leaven, measures only $\frac{3}{10000}$th of an inch in diameter. It is an alcoholic organism, and produces spirit and carbonic acid like the ordinary beer yeast; at present, however, we have no knowledge of the ratio of alcohol to gas. Along with these organisms in leaven occur also the common beer yeast, and numerous organisms of disease, producing lactic, acetic and butyric acids, also the ropy organisms; indeed, left to chance as the leaven process is, we may expect numerous sources of diseased action. Thus, the spontaneous fermentation of bread (and the leaven process is eventually this) as with the Belgian beer, leaves us the sport of chance.

(*To be continued.*)

Parliamentary and Law Proceedings.

PROSECUTION UNDER THE WEIGHTS AND MEASURES ACT.

At the Ledbury Petty Sessions, on July 7, 1880, before John Hopton, Esq., Chairman, Rev. J. Buckle, Colonel Webb, and Dr. Henry, Ernest Freeman, pharmaceutical chemist, of Ledbury was charged—"That on the 10th day of June last, at the parish of Ledbury, he unlawfully had in his possession for use for trade a certain false or unjust weight, intending to represent 14 pounds, contrary to the form of the statute in such case made and provided."

Mr. Glaisyer, Birmingham, Solicitor of the Chemists and Druggists' Trade Association of Great Britain, conducted the defence.

Inspector Blunsdon, inspector of weights and measures for the district, deposed that on the 10th June last he visited the shop of Mr. Freeman and examined all the weights in the shop. Witness then asked the assistant if there were no more weights, and he said yes, there was a 14 lb. weight. Witness believed he said it was upstairs. He then went away and fetched it; he was away about a couple of minutes. Witness tested the weight and found it was 3 drachms deficient.

Chairman of the Bench: Was it a weight that had been long in use?—It appeared like it, sir.

Cross-examined by Mr. Glaisyer: The witness said that he examined the weights in the shop first, and found them all correct. There was a 14 lb. weight in the shop, and that was right weight.

Mr. Glaisyer: My defence in this case is a very simple one. It is that this weight, which is admitted by the inspector to have been fetched from upstairs, is not used at all for the purposes of sale or purchase, but was simply used by defendant to roughly weigh the ingredients which he inserts into two substances which he prepares, namely, pig food and horse powders. It is not used in the shop at all, and therefore I think there is no case, as this summons alleges, and is bound to allege, that the weight is used for trade. Trade by the terms of the Act is stated to be sale and purchase, and I think if I can prove these facts to the satisfaction of the bench, that they will see their way to dismiss the summons. They will bear in mind that the weights found in defendant's shop were on the inspector's own admission found perfectly accurate, and that amongst these weights was a 14 lb. weight, which was used by him for selling his goods.

Harry Chard, a servant of the defendant, recollected the inspector visiting his master's shop. The superintendent came in, and asked for their weights. Witness put the weights before him that were in the shop. He tested them, and found them all right. He then asked if they had not some more weights. Witness said yes, one 14 lb. weight upstairs in the warehouse. He asked witness to fetch it, and witness told him they did not sell with it, but only used it for weighing things for pig food and horse powders. He said never mind, you fetch it. Witness said they only used it for mixing pig food and powders. He again told him to fetch it, which witness then did, and he said it was half a drachm light.

Now as a matter of fact is this 14 lb. weight also kept upstairs?—Yes.

Is it used to sell by?—No.

Do you test by it anything that is purchased?—No.

Is the only purpose for which it is used that of weighing substances for mixing into those powders which you have spoken of?—Yes.

Had it ever been taken down into the shop for any other purpose except to be produced to the inspector?—No.

Is it never used in the shop?—Never.

Mr. Glaisyer: I am prepared to call another witness to verify the boy's statement if the bench think it necessary.

Chairman of the Bench: The decision of the bench in this case is that the summons be dismissed, but no costs will be allowed, as we think the inspector was justified in the course he has taken.

Mr. Glaisyer: I presume the weight in question will be returned to the defendant?

Chairman of the Bench: Yes, certainly.

Reviews.

AN ELEMENTARY TEXT-BOOK OF BOTANY. Translated from the German of Dr. K. PRANTL, and revised by Dr. S. H. VINES. London: W. Swan Sonnenschein and Allen. 1880.

The natural consequence of examinations is to lead students to follow in the lines indicated by the questions asked, and one need only glance at some of the published questions of the Science School and University examinations to see that botany has made great strides of late years, and that it has become necessary to learn many terms and many ideas only to be found in such recent text-books as Sachs' and Thomé's, or to search through the most recent papers in the *Journal and Transactions of the Linnean Society*, or other similar publications, if the knowledge required by the examiners is to be mastered. But Sachs' text-book is one rather for reference than for regular reading, and a work which should equal it in advanced information, but be more easy to peruse, has for some time been felt to be a desideratum. Such a one is now offered to the botanical public, as may be gathered from the preface, in which Dr. Vines says:—"This book was written by Professor Prantl to meet a growing demand for a work on botany, which, while less voluminous than the well known 'Lehrbuch' of Professor Sachs, should resemble it in its mode of treatment of the subjects, and should serve as an introduction to it." This exactly represents the character of the present volume, which gives a kind of bird's-eye view of the most advanced botanical knowledge of the present day in a clear and concise form. The book is divided into four parts, which treat respectively of the morphology, anatomy, physiology, and classification of plants.

In the last part the author has adopted Sachs' classification of the thallophytes in preference to that followed by Dr. Prantl, regarding the former as being of considerable assistance to the student. That of the higher groups is based upon the system professed by Alexander Braun. In morphology the term scorpioid and helicoid, as applied to inflorescence, are used in a manner exactly opposite to that understood by the majority of English botanists.

The book is written for the most part in a lucid style, and the typographical arrangements are excellent. In a few cases only the meaning becomes obscure from the condensed character of the wording. For instance, a berry is defined thus:—"The endocarp is soft and juicy, as well as the mesocarp, so that the *solitary* hard *seeds* are imbedded in the pericarp." The descriptions of fruits, and the explanation of their structure is one of the least satisfactory portions of the book, and the student who peruses it will find out for himself a truth which is generally recognized as regards chemistry, but too often forgotten by those who attempt to obtain a knowledge of botany, viz., that there are many facts which can only be learned by a *practical* course of study under an experienced teacher, and that books alone are not sufficient without examination of the objects themselves.

The plants mentioned as examples of the different families are, it must be remembered, copied from the German work, and the remarks concerning them do not always apply equally to this country. Thus *Lycopodium annotinum* is not one of the "commonest species which occur in our woods." *Selaginella helvetica* and *S. spinulosa*, do not occur in *this country* "on mountainous districts, on walls, and on the ground," and *Orthotrichum speciosum* is not "*common* on trees" in this country, nor are *Ophrys myodes* and *Epipogon Gmelini* natives of this country, as might be supposed from the context.

The grouping of the nearly allied families of plants into orders is an improvement which will probably greatly assist the student in obtaining a clearer view of the relationship of plants, although the changes in names and the use of new terms will be no welcome addition to our already overloaded botanical vocabulary, even if necessary for scientific examinations

The woodcuts are in a few cases difficult to understand, *e.g.*, the antherozoids of ferns; but regarded as a whole the book is one that, in spite of its modest description as an "elementary" text-book, will be welcomed by many advanced students of botany, and may be safely recommended as a clear and useful exponent of the views held by botanists of the present day. Those whose regular botanical studies are over, but who meet with new terms not found in many of the text-books which have hitherto been regarded as standard works, such as zygomorphic, lysigenous, hypsophyllary, eucyclic, metabolism, etc., will find this work most useful for reference. It has also the recommendations of portability, moderate price, clear type, and lucid explanations of the terms used. The work will undoubtedly take a high position among botanical treatises for educational purposes.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Traité d'Anesthésie Chirurgicale, contenant la Description et les Applications de la Méthode Anesthésique de M. Paul Bert. Par le docteur J.-B. Roltenstein. Paris: G. Bailliere and Co. 1880. From the Publishers.

Annuaire des Spécialités Médicales et Pharmaceutiques. Paris. 1880. From the Editor.

Jahresbericht uber die Fortschritte der Chemie und verwandter Theile anderer Wissenschaften. Fur 1878. Drittes Heft. Giessen: J. Ricker. 1880. From the Publisher.

On Brain and Nerve Exhaustion. "Neurasthenia." Its Nature and Curative Treatment. By Thomas Stretch Dowse, M.D., etc. London: Baillière, Tindall and Cox. 1880. From the Publishers.

Alcohol Tables, giving for all Specific Gravities, from 1·0000 to 0·7938, the Percentages of Absolute Alcohol, by Weight and Volume and of Proof Spirit. Calculated by Otto Hehner, F.C.S., F.I.C., etc. London: J. and A. Churchill. 1880. From the Publishers.

Notes and Queries.

[666]. ESS. COCHINEAL.—In reply to the inquiry of Mr. Cottrill, I recommend the old formula without any s. v. r., and adding a proportion of chloride of sodium, as recommended by Mr. Church, *Pharmaceutical Journal*, 2nd series, vol. vi., page 552. About half the quantity of salt there ordered will suffice, and produce an article which will remain sweet for many months. The fermentation spoken of is probably effervescence; this may be prevented by continuing the ebullition of the liquid until the effervescence caused by the addition of the acid salts has ceased.

R. Griffith.

[666]. ESS. COCHINEAL.—In answer to Mr. Cottrill, I believe the reason which he seeks is that although the old formula may be followed, the old fashioned alum is not used. Ammonia alum, the kind in general use, may and probably does yield traces of free ammonia when boiled with carbonate of potash, as in making the essence; this would induce putridity in animal matter accompanying it, either in the case given or in others—egg liniments, for instance.

From this drawback the use of potash alum is entirely free, and I have now by me a sample of ess. cocci prepared with potash alum on May 1, 1875, which is covered with a firm mouldy crust, but is entirely free from taint.

J. F. Brown.

[669]. FROTHING FOR FERMENTED LIQUIDS.—Will some one be kind enough to furnish "A" with a recipe for making a fluid for giving a permanent head to ginger beer, ginger ale, ale, beer, and fermented ginger beer which will keep in any climate and not turn turbid?

[670]. BLACK WRITING INK.—"Nemo" would be glad if any reader of the Journal will oblige him with a formula for making good permanent black writing ink that would not deposit on keeping, as the ink made from galls and ferri sulph. does.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[434]. R. S. T. will be obliged for information concerning the following prescription:—

℞ Quinisæ Disulph. . . . . gr. xxv.
Liq. Ferri Phosph. Magnet. (Lightfoot's steel) . . . . ℥ivss.
Aquæ . . . . ad ℥iij.
M. ft. mist.

My customer states that it has been made up without any precipitate. I find the quinine to dissolve almost entirely in the mixture of liq. ferri phosph. and aq.; but upon standing, a copious precipitate forms.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

X. Y. Z.—The formula for the Syrup of the Phosphates was reprinted *in extenso* from Parrish's 'Practical Pharmacy' in the *Pharmaceutical Journal* for April 22, 1871, p. 857. Applications for books from the library should be sent to the Librarian.

M. P. S.—We think there are other books better suited for the purpose, for instance, Attfield's 'Chemistry, General, Medical, and Pharmaceutical' (Van Voorst).

Nemo.—For recipe for ruby liquid see vol. x., p. 40.

Communications, Letters, etc., have been received from Messrs. Golding, Harvey, Parker, Richardson, Hughes, Nemo, Country Druggist, Inquirer.

The Pharmaceutical Journal.

SATURDAY, JULY 24, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

COMPANIES AND THE PHARMACY ACT.

After another long trial of patience the question raised by the Council of the Pharmaceutical Society in the prosecution of the London and Provincial Supply Association (Limited), for alleged infringement of the Pharmacy Act, 1868, came before the House of Lords last Tuesday, and after the arguments of counsel on both sides had lasted during the greater part of that day and Thursday, the decision given just at the moment of our going to press has supported the previous judgment of the Lords Justices, against which the Pharmaceutical Society had appealed to the House of Lords.

This litigation is therefore now at an end, and the result is one leaving the Pharmaceutical Society powerless to prevent the continuance of limited liability companies to carry on the business of a chemist and druggist, so far at least as the Pharmacy Act, 1868, is concerned, and it now only remains to consider whether there are not other means by which the true object and intention of that Act will admit of being secured. This further question will doubtless engage at an early period the attention of the Council and of the Committee that is entrusted with the inquiry into the amendment of the Pharmacy Acts.

In our present issue we give a full report of the arguments brought forward by Mr. Benjamin on the part of the Pharmaceutical Society during the first day's hearing, and in the Journal of next week we shall publish the remainder of the proceedings, so that our readers may be able to follow the course of the arguments on both sides, as well as to become acquainted with the opinions of the Lord Chancellor and the other members of the Court of Appeal. This report will doubtless be read with deep interest by all members of the trade and will furnish matter for consideration by local associations of chemists and druggists, as well as by the Council itself. It would be premature to speculate now upon the possible result of these deliberations, and we will therefore confine ourselves to stating what seems to be the result of the decision arrived at by the House of Lords.

As regards the contention of Mr. Benjamin, that a corporation was not to be excused from compliance with the provisions of the Pharmacy Act on the ground that it could not become qualified as the Act directs, it was argued by him to be most consistent with the spirit of the Act to hold that a corporation could not lawfully carry on the business of a chemist and druggist. But it was held by the House of Lords that this would be lawful provided that the persons actually selling or compounding drugs and medicines were themselves qualified and on the Register of Chemists and Druggists. Consequently, the decision of the House of Lords in favour of limited liability companies being at liberty to carry on the business of a chemist and druggist is qualified by the important condition that the persons employed by such companies to sell or to compound medicines must be qualified in accordance with the Pharmacy Act. This is certainly calculated to operate as some mitigation of the mischief to be apprehended if a limited liability company were free to carry on business altogether independent of the Pharmacy Act, and Lord Blackburn very clearly stated his opinion that if such a company had not a qualified manager to conduct the selling the company would be liable under the Act.

To a great extent, therefore, we may take it as having been established by the decision now given by the House of Lords that it is in a general way expedient and desirable for the safety of the public that the provisions of the Pharmacy Act should be respected. This question was left open by the judgment of the Lord Justices, and as we pointed out in a previous article, it was the question which chiefly required consideration. The answer now given to it by the House of Lords may be regarded as a recognition of the principle which has always guided the action of the Pharmaceutical Society in seeking to restrict the conduct of pharmaceutical business to such persons as were properly qualified for the purpose.

At the same time it must be stated that, in the course of the hearing of the appeal, there were some indications of a tendency to regard the Pharmacy Act less in the light of a measure for ensuring the safety of the public than as one for the protection of a class of traders by upholding for them a monopoly of the trade in drugs. If, in future, co-operative stores and limited liability companies are to be free to carry on the business of a chemist and druggist it would seem that they must do so in some way under the supervision of the Pharmaceutical Society similar to that hitherto exercised by it in regard to individual traders; and, inasmuch as the existing Pharmacy Act does not contain any provisions specifically relating to the conduct of the business of a chemist and druggist under such conditions it may be necessary, by further legislation, to provide for this being done in a manner consistent with the spirit of the present Act.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

July 8, 1880.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

MAJOR EXAMINATION.

Ten candidates were examined. *Five* failed. The following *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bancroft, James	Halifax.
Elborne, William	Grantham.
Fazan, Charles Herbert	Colchester.
Fowler, William	Sunderland.
Hardwick, Arthur	Sheffield.

MINOR EXAMINATION.

Thirteen candidates were examined. *Ten* failed. The following *three* passed, and were declared qualified to be registered as Chemists and Druggists:—

Alexander, George	Liverpool.
Bakewell, William Whitehorn	Uttoxeter.
Bell, George	Hull.

MODIFIED EXAMINATION.

One candidate was examined, but failed to pass.

July 9, 1880.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

MAJOR EXAMINATION.

Eleven candidates were examined. *Nine* failed. The following *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Hooper, David	Southwark.
Slicer, Walter	Bingley.

MINOR EXAMINATION.

Fifteen candidates were examined. *Eleven* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Biddles, William Byron	Reading.
Bright, Frederick	Taunton.
Burrows, Richard	London.
Thomas, David Robert	Aberystwith.

July 13, 1880.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

MAJOR EXAMINATION.

Seven candidates were examined. *One* failed. The following *six* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Barnes, James William	Spalding.
Price, Robert John	Wrexham.
Smith, John Ord	Scarborough.
Taylor, Fred	Exeter.
Thornton, John	Aldridge.
Wyatt, Charles Frederick	Old Brompton.

MINOR EXAMINATION.

Eighteen candidates were examined. *Thirteen* failed. The following *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Crompton, Henry	Bury.
Elkington, William Alfred	Spalding.
Evans, John	Carnarvon.
Fentiman, Charles Henry	London.
Gibson, Atkin Brewster	Grantham.

July 14, 1880.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

Dr. Greenhow was also present, on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-six candidates were examined. *Sixteen* failed. The following *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Freeman, William Harrison	Leeds.
Grover, Sydney	Lower Norwood.
Hamnett, Thomas	London.
Harrison, William	Wisbeach.
Hopkins, John Henry	Leicester.
Knight, Thomas	Nottingham.
Last, Alfred John	Rochford.
Lawson, Arthur	Liverpool.
Leicester, Frederick	Northwich.
Livesey, James Thomas	Preston.

July 15, 1880.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

Dr. Greenhow was also present, on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-six candidates were examined. *Sixteen* failed. The following *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Matthews, Charles William	London.
Mears, Henry	Eastover.
Morgan, Albert Hall	Birmingham.
Pearce, Thomas Ellery	Tavistock.
Phipps, Frederick	Birmingham.
Powell, Samuel John	Swansea.
Preston, Henry	Mansfield.
Puntan, Herbert Harding C.	Turriff.
Rendall, Theodore Stancombe	Torquay.
Wilson, William Joseph	Oxford.

July 16, 1880.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

Dr. Greenhow was also present, on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Nine* failed. The following *fourteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Jones, Samuel	Flint.
Ross, Andrew Leighton	London.
Boutly, John	Brighton.
Slater, William Martin	Ipswich.
Smith, Lewis	Grassendale.
Taberham, Frederick William	Wells.
Thompson, James	Hull.
Warner, Matthew Richard	Shrewsbury.
Williams, Charles Edward	Bayswater.
Williamson, James	Ash.
Wilson, Thomas Whiting	Harrogate.
Woolcott, John Newton	Sidmouth.
Woollings, Frank	London.
Young, Pelham Charles	Salisbury.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's Examination:—

Certificate of the University of Cambridge.

Gardner, Frederick William	Newark.

Certificate of the University of Oxford.

Hicks, Joseph ....Banbury.

The report of the College of Preceptors on the examination held on July 6, was received.

Three hundred and forty-one candidates had presented themselves for examination, of whom *one hundred and seventy-four* had failed. The following *one hundred and sixty-seven* passed, and the Registrar was authorised to place their names upon the Register of Apprentices or Students:—

(Arranged alphabetically).

Acton, Samuel	Liverpool.
Aubrey, Henry James	Leamington.
Baker, Edmund Gilbert	London.
Barlow, Arthur Edward	Rothwell.
Barratt, Herbert	Snaith.
Bates, John	Manchester.
Bax, Robert William	Rawtenstall.
Beauchamp, Frederic Crawley	Hemel Hempsted.
Bell, John Henry	Windsor.
Bevan, Tom Webb	London.
Bird, John	Manchester.
Birkett, Benjamin Brelesford	Workington.
Blenkinsop, John	Carlisle.
Bromwich, Edmund George	Birmingham.
Brown, Charles Ezra	Morley.
Buchan, David Donaldson	Stirling.
Buckley, Walter	Manchester.
Cairns, Peter	Galashiels.
Caswell, Joseph Alban	Sedgley.
Cooke, George Harry	Altrincham.
Corrie, Thomas	Moniaive.
Cossins, John Benjamin	Rhyl.
Crofts, Robert	Canterbury.
Crosthwaite, Daniel	Blackpool.
Davy, Arthur	Bradford.
Day, Stephen	London.
Day, William	Oswestry.
Deans, George	London.
Dell, Frederick Barton	Llanelly.
Dobb, Thomas	Sheffield.
Dorman, George	Ashford.
Dorn, Thomas	Oxford.
Drouet, Harry Anthony	Lower Norwood.
Eastland, John	Margate.
Edington, Alexander	Edinburgh.
Ellingworth, Alfred Thomas	Bromsgrove.
Ellis, Frederic Edward Evans	Kettering.
Emms, Sidney Riley Wilson	Chipping Sodbury.
Evans, Josiah	Pencader.
Fardon, Arthur Edwin	Bristol.
Farrage, William Thomas R.	Rothbury.
Flanagan, Andrew	Richmond, Surrey.
Fraser, John M.	Inverness.
Geary, Frederic Charles	Coalville.
George, Isaac	Great Yarmouth.
Graham, Gilbert	Girvan.
Grant, John Merson	Cullen.
Graves, Richard	London.
Greenwood, William Joseph H.	Cirencester.
Griffiths, Cornelius Albert	Cinderford.
Grigor, William George	Edinburgh.
Hay, Arthur	Great Yarmouth.
Haynes, Joseph Alfred	Fairford.
Heale, Henry	London.
Henderson, Isaac	Workington.
Hickinbottom, John William	Sleaford.
Hill, Edward	Lower Tottenham.
Holloway, William Alfred	Redruth.
Holstius, Otto	London.
Hood, Thomas	Leith.
Hoyles, Henry Richardson	Sheffield.
Hughes, Daniel	Holywell.
Hughes, Joseph	Dyserth.
Hunt, Oliver Kirby	Bath.
Ingle, George	Bradford.
Jackson, Frederick Daniel	Boston.
James, Hugh	Bodedern.
Jamieson, Simpson	St. Andrews.
Johnson, John Mountfort	Leek.
Jones, Evan	London.
Jones, George Henry	Brighton.
Jones, John Edmund	Llanerchymedd.
Jones, William Alexander	Stoke-on-Trent.
Kay, James Spencer	Rochdale.
Keyworth, Alexr. Barrington	Bedford.
Kirtlan, Samuel	Blackburn.
Langton, Wm. James Rivers	Maidstone.
Layman, Ernest Blakesley	Anerley.
Lewis, David John	Aberystwith.
Ligertwood, Alexander L.	Johnstone.
Llewellyn, Lewis Herbert	Shrewsbury.
Low, Maxwell	Dumfries.
Lucas, Edward William	Ashbourne.
McGlashan, James	Edinburgh.
McHarg, William Boyd	Glasgow.
McKenzie, James	Fochabers.
Manuel, Walter	Grimsby.
Martin, William	Exeter.
Massey, John, junr.	Manchester.
Mathieson, Robert	Aberdeen.
Melville, Samuel Lightfoot	Liverpool.
Menzies, Robert	Hardgate.
Mitchell, Leonard Montague	Bristol.
Molineux, William	Preston.
Morris, John Buchan	Stirling.
Morton, Alexander	Edinburgh.
Mossop, Samuel	Ashton-under-Lyne.
Newdick, John	Ashford.
Page, William Armstrong	Ironbridge.
Passmore, William Edwin	Maidstone.
Philpott, Frederick William	London.
Pirie, James Crichton	Arbroath.
Polack, Emanuel	Rochester.
Pottage, John William Dick	Edinburgh.
Potter, Charles Compton	London.
Price, John Charles	Taffs Well.
Prince, Henry Rhodes	Taunton.
Pullan, Herbert Newman	Low Harrogate.
Rackham, Frederick William	Norwich.
Rainford, Walter	Blackburn.
Reed, John William	St. Helens, Auckland.
Reid, David	Montrose.
Reynolds, Ernest James	Milton-next-Sittingbourne.
Richardson, George	Lancaster.
Roberts, William	Bangor.
Robertson, William	St. Andrews.
Robson, William	Blaydon-on-Tyne.
Rogers, Frank Ashley	Nottingham.
Royston, Arthur Seymour	Bentley.
Rutherford, Thomas Melvill	Peterborough.
Saltmarsh, Mark Alfred	Deal.
Sansom, Frederick James	Barrow-in-Furness.
Sayer, Arthur	Huddersfield.
Sharp, Stephen	Heywood.
Sherburne, John Chester	London.
Slinn, Albert Edward	Rhyl.
Smith, Joe Harry	Keighley.
Smith, Walter Edward	Preston.
Smout, Charles Lickfold	London.
Spong, John Fuller	Leeds.
Stiles, Theodore Mayo	Poole.
Swift, Arthur Hayball	York.
Swinton, Thomas Henry	Crewe.
Tabor, Charles James	London.
Thacker, Harry Ransley	Nottingham.
Thomas, Edward	Garstang.
Thomas, John Abraham	Cardiff.
Thompson, Henry Edward	Sheffield.
Thompson, John Park	Alston.
Thomson, Alexander	Arbroath.

Thomson, William	Cullen.
Tillett, Arthur John	Market Rasen.
Turnbull, William	Newcastle-on-Tyne.
Turner, John F.	Ramsgate.
Verity, Harry	Leeds.
Waind, Walter Harry	Kirby Moorside.
Wake, George	Howden.
Wallace, William	Edinburgh.
Walwin, Walter	Warminster.
Ward, Albert Edward	Bradford.
Warner, George O.	Clifton.
Watts, Joseph Wormall	Brighton.
Weall, George Alexander	Preston.
Wild, Tom Arthur	Hyde.
Wilkinson, Robert	Kirkham.
Wilkinson, Thomas	Crook.
Willcocks, Arthur Squire	Portsea.
Williams, Alfred Griffiths	Hereford.
Williamson, Leonard Wright	Darlington.
Wilson, James	Chesterfield.
Wilson, John Herbert	Downham Market.
Wood, James Beaumont	Huddersfield.
Woodcock, Page Hornor	Norwich.
Woods, Joseph James Birkett	Tunstall.
Wright, David Morgan	Kirkcaldy.
Wyatt, William	Mansfield.
Young, Arthur	London.

The questions for the examination were as follows:—

Time allowed: Three Hours for the three subjects.

I. LATIN.

1. Translate into English the following passages:—

A. Ariovistus ad postulata Caesaris respondit: *se* prius in Galliam venisse, quam Populum Romanum. Nunquam ante *hoc* tempus exercitum Populi Romani Galliae provinciae fines egressum. Quid sibi vellet? Cur in suas possessiones veniret? Provinciam suam hanc esse Galliam, sicut *illam* nostram. Ut *ipsi* concedi non oporteret, si in nostros fines impetum faceret, sic item *nos* esse iniquos, *qui* in suo jure se interpellaremus.

B. Itaque priusquam quicquam conaretur, Divitiacum ad se vocari jubet et, quotidianis interpretibus remotis, per Caium Valerium Procillum, principem Galliae provinciae, familiarem suum, cui summam omnium rerum fidem habebat, cum eo colloquitur: simul commonefacit, quae ipso praesente in concilio Gallorum de Dumnorige sint dicta, et ostendit, quae separatim quisque de eo apud se dixerit: petit atque hortatur, ut sine ejus offensione animi vel ipse de eo, causa cognita, statuat, vel civitatem statuere jubeat.

2. Name the deponent verbs in the above extracts, and give the present, perfect and infinitive of each.

3. Decline in full *se, hoc, illam, ipsi, nos, qui,* occurring in extract A. What is the person of *qui*?

4. Translate into Latin:—(i.) At the break of day Caesar was distant from the camp of the enemy not further than fifteen hundred paces. (ii.) Having heard of the arrival of Caesar, Ariovistus sent ambassadors to him. (iii.) Then at length Ariovistus sent a part of his forces to attack the smaller camp, and there was sharp fighting on both sides until the evening.

II. ARITHMETIC.

[The working of these examples, as well as the answers, must be written out in full.]

5. A mixture is made of 6 gallons of spirit at 12*s.* 6*d.* per gallon, 4 gallons at 18*s.* 9*d.*, and 10 gallons at 22*s.* 8*d.*; what is the value of a gallon of it?

6. Find the value of $\frac{2}{3} \div 1\frac{4}{7} - \frac{3}{8} \div 3\frac{3}{11}$.

7. Divide 15 by 625, by 6·25, and by ·625.

8. If the tax on a rent of £25 is £2 10*s*, what will it be on a rent of £10 9*s.* 4½*d.*

9. How are the *gramme* and the *litre*, the units of weight and capacity, related to the *metre*, the unit of length?

III. ENGLISH.

10. Define a Pronoun. Classify Pronouns. Give the inflexions of the Personal Pronouns.

11. State clearly the difference between the four present forms—"I write," "I am writing," "I have written," and "I have been writing,"—in respect of (*a*) the duration; (*b*) the incompleteness or completeness of the action.

12. Name some verbs which are followed by the infinitive without "to."

13. Parse the works in italics:—"Travel *not early, before* thy judgment be risen; *lest* thou *observe rather* shows *than* substance."

14. Write a short composition on one of the following subjects:—

"The advantages of using the metric system,"
"The elements of a good character,"
"How to ventilate a room,"
"Bicycling."

The following is a list of the centres at which the examination was held, showing the number of candidates at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	8	5	3	Lancaster	13	8	5
Birmingham	17	6	11	Leeds	15	8	7
Brighton	5	2	3	Lincoln	7	3	4
Bristol	15	7	8	Liverpool	18	4	14
Cambridge	1	1	0	London	46	23	23
Canterbury	11	7	4	Manchester	23	16	7
Cardiff	3	3	0	Newcastle-on-T.	10	2	8
Carlisle	8	4	4	Northampton	7	3	4
Carmarthen	4	3	1	Norwich	11	5	6
Carnarvon	10	6	4	Nottingham	12	3	9
Cheltenham	1	1	0	Oxford	3	2	1
Darlington	7	3	4	Peterborough	3	1	2
Dundee	7	4	3	Sheffield	13	8	5
Edinburgh	27	11	16	Shrewsbury	4	2	2
Exeter	4	1	3	Southampton	5	2	3
Glasgow	11	7	4	Truro	1	1	0
Hull	3	0	3	Worcester	1	1	0
Inverness	1	1	0	York	6	3	3

EXAMINATIONS IN EDINBURGH.

July 13, 14 *and* 15, 1880.

Present—Messrs. Ainslie, Borland, Gilmour, Kemp, Kinninmont, Stephenson and Young.

MAJOR EXAMINATION.

13*th*.—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Hardie, James Miller	Dundee.

MINOR EXAMINATION.

13*th*.—*Nine* candidates were examined. *Five* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Dick, James Miller	Edinburgh.
Dyer, Charles Frederick	High Wycombe.
Eunson, John	Kirkwall.
Sanderson, William John	Edinburgh.

14*th*.—*Nine* candidates were examined. *Three* failed. The following *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Farquhar, Robert Forbes	Aberdeen.
Fleming, Ebenezer	Castle Douglas.
Grant, Alexander	Cullen.
Hughes, John Smith	Spalding.
Kerr, William	Edinburgh.
Kinross, William Malloch	Edinburgh.

15*th*.—*Ten* candidates were examined. *Four* failed

The following *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bowman, George Fell	London.
McNiven, James	Edinburgh.
Nettleship, Thomas William	Bawtry.
Ray, William Frederic	Westerham.
Walker, Thomas Farmery	York.
Westwater, George	Lochgelly.

MODIFIED EXAMINATION.

15th.—*Two* candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Chemist and Druggist:—

McLaren, David	Edinburgh.

PRELIMINARY EXAMINATION.

The *Certificate of the University of Glasgow* in favour of the undermentioned was received in lieu of the Society's examination:—

Martyn, James	Airdrie.

Parliamentary and Law Proceedings.

The Pharmaceutical Society of Great Britain *v.* The London and Provincial Supply Association.

This case was opened in the House of Lords on Tuesday July 20, 1880, before the Lord Chancellor, Lord Blackburn and Lord Watson.

The counsel for the Appellants were Sir John Holker, Q.C., Mr. Benjamin, Q.C., and Mr. Lumley Smith, Q.C., instructed by Messrs. Flux, Slade and Co., Solicitors to the Pharmaceutical Society. The counsel for the Respondents were Mr. Wills, Q.C., and Mr. Finlay.

Mr. Benjamin: My lords, this case was argued both in the Divisional Court and in the Court of Appeal, by Sir John Holker, who leads me in the case, and I hope and have reason to believe he will be able to appear before I finish the opening. He is in an important case in Manchester, and I hope he is on his way now, but he has not arrived, and, therefore, it becomes necessary for me to take his place in opening the case. My lords, the amount in dispute in this case is £5, but the question is whether the Act of Parliament, providing protection for Her Majesty's subjects with regard to the sale of poisons is to become a dead letter, as it would be made according to our contention by the decision appealed from, given by Her Majesty's Court of Appeal, or whether it should be treated as an Act protecting the lives of the subjects, as determined by the Court of Queen's Bench. The shortest mode for me to bring your lordships' attention to the facts of the case will be by referring to the special case, which you will find at page 10 of the Appendix, which was stated by the judge of the county court, the late lamented Mr. Lake Russell:—"This action was brought in the Bloomsbury County Court to recover a penalty under section 15 of an Act of 31 and 32 Vic. c. 121, intituled 'The Pharmacy Act, 1868.' The plaintiffs are a corporation duly incorporated in the year 1843 by Royal Charter (which was confirmed by the Pharmacy Act, 15 and 16 Vic. c. 56), and entitled under section 12 of the said Pharmacy Act, 15 and 16 Vic. c. 56, to sue for penalties in the county court. The defendants are a company registered under the Companies Acts, 1862 and 1867, as a limited company, with a nominal capital of £10,000 divided into 1000 shares of £10 each, of which one William Mackness holds 564 shares fully paid up. Six persons (one of whom was Henry Edward Longmore) hold five shares each, with £2 10*s.* paid on each share. Three persons hold one share each with £2 10*s.* paid on each share, and the remaining shares are unallotted. The register of the shareholders was put in evidence, and a copy of it may be referred to as part of this case. The said company was registered on the 29th January, 1878, and was formed, *inter alia*, 'To purchase or acquire the trade or business of a wholesale and retail grocer and general warehouseman, then carried on by Mr. William Mackness at No. 113, Tottenham Court Road, Middlesex.' A copy of the memorandum and articles of association of the company was put in evidence, and may be referred to as part of this case. The said William Mackness is the managing director of the said company. He is not a duly registered pharmaceutical chemist or chemist and druggist within the meaning of the said Pharmacy Act, 1868. Henry Edward Longmore is the only shareholder who is a 'pharmaceutical chemist' or 'chemist and druggist,' within the meaning of the Pharmacy Act, 1868. The business of the said company is carried on at 113, Tottenham Court Road aforesaid, and includes, amongst other departments for the sale of various goods, a chemist and druggist's shop or drug department, which is an open shop for the retailing, dispensing and compounding poisons within the meaning of the Pharmacy Act, 1868. The said poisons are sold to the public, and not merely to members of the defendant company. The said Henry Edward Longmore is, and at the time of the sales of poisons hereinafter mentioned was, a duly registered chemist and druggist within the Pharmacy Act, 1868, and the business of the said drug department was at the several times aforesaid and is conducted by the said Henry Edward Longmore, with the aid of two qualified assistants. The said Henry Edward Longmore (with the aid aforesaid) at the times aforesaid attended and still attends regularly to the said drug department, and to nothing else, and he and his assistants were and are the servants of the defendants, the company, and paid by salary or wages. On the 4th of February, 1878, the said Henry Edward Longmore, acting on behalf of the defendants, sold at the said premises two pennyworth of oxalic acid. On the 19th of March, 1878, the said Henry Edward Longmore, acting on behalf of the defendants, sold at the said premises solution of perchloride of mercury, as an ingredient in a prescription then made up by him. On the 20th of March, 1878, the said Henry Edward Longmore, acting on behalf of the defendants, sold at the said premises a pennyworth of white precipitate. All the articles mentioned in paragraphs 8, 9, 10 and 11 inclusive, are poisons, within the meaning of section 15 of the Pharmacy Act, 1868." Then follow the judge's notes; but I do not think it desirable to read them; if my friends think it necessary they can read them. The findings of the county court judge are quite sufficient to raise the point on which your lordships' judgment is solicited. Paragraph 14, page 16, of the case proceeds:—"On the part of the defendants it was contended, first, that as the business of their drug department was conducted by the said H. E. Longmore, who was a duly registered chemist and druggist, the defendants had not incurred any penalty under the said section. Second, that even if it were otherwise the defendants, as an incorporated company, are not within the said Pharmacy Act, 1868." It is this second contention, which has been maintained by the Appeal Court, which, as we say, practically destroys the entire value of the Act for protecting the subject against the sale of poisons. "It was on behalf of the plaintiffs contended, first, that as the defendants kept an open shop for the retailing, dispensing and compounding of poisons, and as the said H. E. Longmore did not keep the said shop, and did not sell poisons therein on his own account, but as the servant and on account of the defendants, the defendants had incurred the penalties mentioned in the said section; and, secondly, that an incorporated company is within the Pharmacy Act, 1868. I decided that according to the true construction of the Pharmacy Act, 1868, and upon the facts of this case, no offence within the Act was committed by or on the part of defendants, the company, and that the defendants, the company, had not incurred, and were not liable to any penalty under the Act."

Lord Watson: It does not appear there very clearly what view he took of the subject.

Mr. Benjamin: His judgment is here, my lord, but I hardly think it necessary to read it, because I understand my learned friends on the other side do not rely on it. His view of what was done was not a contravention of the statute, but I believe that point will not be maintained. The second point on which my friend relies is that the Act does not include an incorporate company, and that therefore any incorporated company may sell poisons as they please without reference to the terms of the Act.

Lord Blackburn: The corporation are not liable to a penalty; but as they cannot sell poisons without employing qualified persons, I do not think it would destroy the Act so thoroughly. I do not think the decision destroys the Act so thoroughly as you say.

Mr. Benjamin: Of course, that point will come later. I think it does, that it is an absolute destruction of the Act; because there is nothing to prevent the incorporated company from having little boys to sell their drugs, and it would be perfectly impossible to sue the little boys for the penalties, or to attempt to check the sale by seeking for penalties against lads in a shop who sell one pennyworth of oxalic acid to a customer.

The Lord Chancellor: As I understand, the learned judge who stated this case proceeded on the ground that Longmore being a duly registered chemist and druggist, the defendants had not incurred any penalty under the statute.

Mr. Benjamin: Quite so, my lord, but that overlooked one clause in the Act, and I think my learned friend Mr. Wills will not contend that the learned judge's view was right; because the Act punishes not only the sale of the poisons, but it punishes the keeping of a shop open for the sale of poisons to the public, which it is expressly found in this case that the defendants did.

The Lord Chancellor: But, as I understand—I do not know whether I am right or not—I thought they would have been liable, but for the fact that Longmore was a duly registered chemist and druggist.

Mr. Benjamin: Longmore was the one that sold, and it might be possible to contend that it only applied to him, but they overlooked the clause in the Act which makes it penal to keep open shop, and Longmore did not keep open shop; he was a servant there.

The Lord Chancellor: Is the Act printed here, or the material clauses of it, or will you give me a reference to it, and I will send for it?

Mr. Benjamin: My lord, we have here some smaller volumes, which will be convenient to your lordships. All the Acts are there, my lord. It is necessary to call your lordships' attention first to the Act of 1852. It is the 15 and 16 Vict. cap. 56. Now, my lords, that is an Act for regulating the qualification of pharmaceutical chemists; "Whereas it is expedient for the safety of the public that persons exercising the business or calling of pharmaceutical chemists in Great Britain should possess a competent practical knowledge of pharmaceutical and general chemistry." Then it goes on and organizes the Society, and about half way down the preamble it says this, "and whereas it is expedient to prevent ignorant and incompetent persons from assuming the title of or pretending to be pharmaceutical chemists or pharmaceutists in Great Britain, or members of the said Pharmaceutical Society, and to that end it is desirable that all persons before assuming such title should be duly examined as to their skill and knowledge by competent persons and that a register should be kept," and so forth. Then it is enacted, first, that the charter granted to this Society is confirmed save as altered. Then the Council are authorized to make bye-laws. Then by Section 8 they are empowered to conduct examinations of persons who present themselves for examination under the provisions of this Act, in their knowledge of the Latin language, botany, materia medica and in pharmaceutical and general chemistry, and such other subjects as may from time to time be determined. Then the examiners are to be appointed. Then Section 12 says: "From and after the passing of this Act, it shall not be lawful for any person not being duly registered as a pharmaceutical chemist according to the provisions of this Act to assume or use the title of pharmaceutical chemist or pharmaceutist in any part of Great Britain, or to assume, use, or exhibit any name, title, or sign implying that he is registered under this Act, or that he is a member of the said Society, and if any person not being duly registered under this Act shall assume or use the title of pharmaceutical chemist or pharmaceutist, or shall use, assume, or exhibit any name, title, or sign implying that he is a person registered under this Act, or that he is a member of the said Society, every such person shall be liable to a penalty of £5, and such penalty may be recovered by the Registrar to be appointed under this Act in the name and by the authority of the said Society in manner following, that is to say: In England or Wales, by plaint under the provisions of any Act in force for the more easy recovery of small debts and demands." Now, my lords, in the years 1867 and 1868 a great deal of excitement arose from the effect of the sale of poisons with fatal consequences in shops of persons incompetent, and Parliament passed an Act, the purpose of which is stated in most emphatic words in the very first words of the preamble. It is an Act to regulate the sale of poisons and to alter and amend the Pharmacy Act, 1852. "Whereas it is expedient for the safety of the public that persons keeping open shop for the retailing, dispensing or compounding of poisons, and persons known as chemists and druggists, should possess a competent practical knowledge of their business and to that end and from and after the day herein named all persons not already engaged in such business should before commencing such business be duly examined as to their practical knowledge, and that a register should be kept as herein provided, and also that the Act passed in the 15th and 16th years of the reign of Her present Majesty, intituled an Act for regulating the qualification of pharmaceutical chemists, hereinafter described as the Pharmacy Act, should be amended." Now, the first section is this: "From and after the 31st day of December, 1868, it shall be unlawful for any person to sell or keep open shop for retailing, dispensing or compounding poisons, or to assume or use the title 'chemist and druggist,' or chemist or druggist, or pharmaceutical or dispensing chemist or druggist, in any part of Great Britain, unless such person shall be a pharmaceutical chemist or a chemist and druggist within the meaning of this Act and be registered under this Act and conform to such regulations as to the keeping, dispensing and selling of such poisons as may from time to time be prescribed by the Pharmaceutical Society with the consent of the Privy Council." The Privy Council is made a party to this Act in a number of sections for the protection of the public.

The Lord Chancellor: Is there any clause in the Act providing for companies in one way or the other?

Mr. Benjamin: No, my lord, not in one way or the other.

The Lord Chancellor: Your argument is that no company can be a qualified person, and on the other hand they say that no company dealing in poisons is within the Act. Is not that so?

Mr. Benjamin: Yes, my lord.

Lord Blackburn: Before this Act there were companies of apothecaries. There was the Apothecaries' Company of Liverpool, who were a corporation, and the Apothecaries' Company of London. Was it intended to say that they should no longer sell drugs and medicines?

The Lord Chancellor: The Society of Apothecaries in London is incorporated.

Mr. Benjamin: I am going to call attention to these societies. For them there is a special Act, and I shall have to call your attention specifically to those Acts. There is no prohibition against any of these companies selling drugs and medicines. They may sell drugs and medicines.

The Lord Chancellor: Providing there is no ingredient of a poisonous character in them. Are there any medicines of which you can say that?

Mr. Benjamin: Yes, my lord; castor oil is not a poison. A list of poisons is given, and everything else is exempt.

Lord Blackburn: You say they may sell drugs and medicines, but they shall not sell them if they contain any of these drugs which have some poisons in them. If it is so, they will never be able to dispense their prescriptions.

Mr. Benjamin: I do not know, my lord, whether they would or not; but whether they would or not, the question is whether they are prohibited by this Act from selling poisons. What we contend is that there is absolutely nothing to prevent their going on with the ordinary business in drugs, only when any prescription is called for containing poison, they must say you must go to a pharmaceutical chemist.

Lord Watson: The schedule mentions a great many.

The Lord Chancellor: "Emetric tartar, opium, chloroform."

Mr. Benjamin: Yes, my lord, "corrosive sublimate, cantharides, cyanide of potassium, strychnine, arsenic and prussic acid." You must not deal in these things. Nobody is to deal in these things but a man who has been properly educated.

Lord Blackburn: Then unless there be some special legislation, the Society of Apothecaries or any other corporation would have that part of their trade taken away from them.

Mr. Benjamin: Your lordship, I think, is quite mistaken in assuming that. The Society of Apothecaries is composed exclusively of persons who have undergone this examination.

Lord Blackburn: They have undergone an examination, but the corporation has not. The person who occupies the open shop has not undergone the examination.

Mr. Benjamin: That is quite true; but the persons who keep the open shop, that is the corporation, is composed of persons exclusively who can. To go into that would take me away from following this Act, which is really the Act which is submitted for your lordships' interpretation. I have just read the 1st section. Then the 2nd section provides for a schedule of what are poisons within the meaning of the Act. Then the 3rd section says: "Chemists and druggists within the meaning of this Act shall consist of all persons who at any time before the passing of this Act have carried on, in Great Britain, the business of a chemist and druggist, in keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners, also of all assistants and associates who, before the passing of this Act shall have been duly registered under or according to the provisions of the Pharmacy Act, and also of all such persons as may be duly registered under this Act." You see the words "all persons." If persons mean corporations, as we say it does, a number of societies your lordship has spoken of are saved by the Act itself.

The Lord Chancellor: Because they kept a shop before?

Mr. Benjamin: Yes, my lord.

Lord Blackburn: I do not quite see that.

Mr. Benjamin: Chemists and druggists within the meaning of this Act shall mean persons. If "persons" means corporations, it means those carrying on business before the Act.

Lord Blackburn: No; the obvious meaning is the person who has been acting as a chemist shall without further examination be deemed to be qualified. But now people must go through a new examination. It never means anything so extremely eccentric as to say that a corporation such as the Pharmaceutical Society may be deemed a qualified chemist and druggist.

Lord Watson: It seems to include the several persons who are duly qualified under the Act of 1852.

The Lord Chancellor: I do not know. The preamble begins by saying that from the day named all persons not already engaged in business shall be examined, and so on. Then the first section says that nobody shall sell these things unless he, *inter alia*, is a chemist and druggist within the meaning of the Act. If that clause extends to corporations in existence before, I do not quite see why the persons in the 3rd section, where it says persons who at any time before the passing of this Act have carried on business as chemists and druggists, and so on, shall be chemists and druggists within the Act. Therefore it is not unlawful for them to sell poisons under the 1st section.

Mr. Benjamin: Those are merely collateral points, my lord, because the real question is whether it is now lawful for any company whatever, including all these supply associations, to have an establishment for the sale of poisons.

The Lord Chancellor: The sale to be effected by persons really qualified, selling by that person's agency. That seems to be the view in the respondents' case.

Mr Benjamin: That is the view in the respondents' case. What we contend is, that the Act does not apply to corporations, and therefore if it does not apply to corporations at all they could not have qualified persons.

Lord Blackburn: If they do not have qualified persons could you not proceed against the director who employed an unqualified person to sell?

Mr. Benjamin: I am not concerned to inquire whether the directors are liable. I dare say they are. But our contention is that a corporation keeps an open shop for the sale of poisons.

Lord Blackburn: I quite understand it. I quite follow it. I was only a little hesitating as to your statement, which seemed rather calculated to frighten the House, that the Act would be a dead letter.

Mr. Benjamin: It occurs to me that it would, my lord.

Lord Watson: You say that the offence of selling and the offence of keeping open shop are two distinct offences.

Mr. Benjamin: Quite so, my lord; they are quite distinct offences. It is most important to keep them separate, because I think there must be some ambiguity in relation to the person who is liable for selling, although it may possibly be contended that the individual who sold, and not the master for whom he sold, was the person selling. There can be no doubt or hesitation upon the question as to who it is who keeps the open shop. The servant does not keep the open shop. It is the master that keeps the open shop.

Lord Blackburn: Surely there is no ambiguity. The one selling is the master.

Mr. Benjamin: I am quite willing to accept that, although there is something in the 17th section which would seem to make that a little doubtful. You will find in the 17th section this statement: "It shall be unlawful to sell any poison either by wholesale or retail, unless the box, bottle, vessel, wrapper or cover in which such poison is contained be distinctly labelled with the name of the article and the word 'poison,' and with the name and address of the seller." And a little further down: "And for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller; but the provisions of this section, which are solely applicable to poisons in the first part of the schedule (A) to this Act, or which require that the label shall contain the name and address of the seller, shall not apply to articles to be exported." It has been argued, and your lordship will see that one of the arguments in the case is, that inasmuch as in the 17th section it is specially provided that for the purpose of that section the person on whose behalf the sale is made is to be deemed the seller, that therefore in the other sections of the Act—that is the argument—the seller means the servant who sells, not the master on whose behalf he sells. I do not think the argument is a good one, but I call attention to it as a reason why I speak of our contention. Our contention is this. Our contention is that keeping open shop for the sale of poison to the public, which is what has been done by the finding of this case by this company, is an offence. Have they a right to do that? because if they are not under the Act they can do it without a qualified person. Therefore, in that sense we say the whole protection of Her Majesty's subjects is gone, if the whole of the co-operative societies of all sorts which are springing up, as well as anybody who chooses, like this gentleman, who was a grocer, and chose to take in five or six persons with a small qualification, and convert himself into a limited company—anybody, under the decision as it stands, as we contend, could open a shop, and is not bound by the Act; therefore, all the precautions against the sale of poisons provided by the Act of Parliament become nugatory. Then, my lords, there is another section which provides that the Society may sue in the same way as the former Act provided. That being the condition of the legislation, I call your lordships' attention to the judgment of the county court judge. He made one or two mistakes in his judgment which he corrected afterwards in his statement of the case. The statement of the case, therefore, gives the facts; but the judgment of the learned judge is this: "Now the question is, whether a company of this sort, in which a shareholder is not a registered chemist and druggist, is at liberty to sell poisons without committing an offence under the Act of Parliament and incurring the penalty imposed by it." He then recites section 1 and sections 15 and 16: "In addition to that, my attention was also called to an earlier Act for the construction of statutes, in which it says that in certain cases the word 'person' shall include a corporate body. Upon that it was contended that this corporate body, including persons who are not duly qualified chemists and druggists, could not carry on such business without incurring the penalties imposed by the Act. Now, the first thing that strikes one is, that if Mr. Longmore had sold these things for himself alone he would not have committed any offence whatever." That is true. "He is a duly qualified man, and if he had kept an open shop and sold poisons he was duly qualified to do that, and it would be no offence whatever. However, it is said that it was committing an offence, because the business was so conducted that money is acquired, and the profit so made goes into the pockets of other people. That obviously is not within the mischief intended to be remedied by the Act. I have carefully considered it, and have availed myself of the very able argument of Mr. Flux on the part of the plaintiffs, but the result I have come to is that it is not an offence within the Act when done in the manner this has been done." He has entirely overlooked section 1 which makes it an offence to keep an open shop. "It does not become unlawful when done on behalf of the company, so long as the business is conducted by a duly qualified chemist and druggist, who, if carrying it on for his own benefit, would not be within the penalties of the Act. It is not within the mischief intended to be prevented, and I am of opinion that no offence within the Act, therefore, was committed." Therefore, my lords, he does not determine the second question, whether the Act applies to a corporation. He says what has been done has been done by a qualified man, overlooking the fact, that a qualified man although he sold did not keep open shop, and therefore keeping open shop was the offence for which the penalty was sought to be recovered. Your lordships will find the plaint with the particulars at page 5. The plaint is this: "Between the Council of the Pharmaceutical Society of Great Britain, by Elias Bremridge, the Registrar of the Society, by the authority of the Council, and the London and Provincial Supply Association, Limited. The following are the particulars of the plaintiffs' demand herein: To amount of penalty incurred by the defendants in selling or keeping an open shop for the retailing, dispensing or compounding poisons."

The Lord Chancellor: I do not know whether any technical rule applies to the construction of these plaints, but you will observe that the offence of selling is not alleged nor keeping open shop. It is selling, or keeping open shop.

Mr. Benjamin: It is using the language of the section.

The Lord Chancellor: There seems to be no averment on the face of the plaint that he did either one thing or the other.

Mr. Benjamin: It goes on, "to wit, red oxide of mercury."

The Lord Chancellor: There is no averment there. The plaint is—I do not know whether there is anything in it—but there is no statement that they are sued because they sold or a statement that they are sued because they kept an open shop, but it is for a penalty incurred in "selling or keeping an open shop."

Mr. Benjamin: Keeping open shop for the sale of.

The Lord Chancellor: The "or" is disjunctive, which makes it uncertain what they are charged with.

Mr. Benjamin: That is not one of the points which is submitted by the case. The case only submits two questions to the Court.

Lord Watson: They are not alternative, they are really a cumulative charge.

Lord Blackburn: The distinction between the act of selling which was done by a qualified servant and the act of keeping open shop does not seem to have occurred until after the county court judge had given his decision.

Mr. Benjamin: He says the two points were argued before him. He puts the question for the decision of the Court at page 17.

The Lord Chancellor: I should almost doubt. I do not know whether the question of keeping open the shop as distinct from selling was argued before him. At page 7 he says. "The question is whether a company of this sort in which a shareholder is not a registered chemist and druggist is at liberty to sell poisons."

Mr. Benjamin: At page 17, he says distinctly the point was before him, and he submits it to the Court—"The questions for the decision of the Court are: 1st. Whether or not a registered company comprising shareholders who are not duly registered pharmaceutical chemists or chemists and druggists keeping an open shop for the retailing, dispensing or compounding poisons—"

The Lord Chancellor: Is there no doubt?

Mr. Benjamin: "— and employing therein a duly registered pharmaceutical chemist or chemist and druggist, to conduct the business, is liable to a penalty under the 15th section of the Pharmacy Act, 1868. And 2nd. Whether an incorporated company is within the Pharmacy Act, 1868. Those are the two questions. Judgment is to be entered for the plaintiffs for £5, with costs, or for the defendants, with costs, according as the Court may answer these questions." Then there is the memorandum and articles of association, but I do not think anything turns on them beyond merely to point this out, that under the decision, if a company is not under the Act, then anybody can by the help of five or six servants or friends taking a share apiece keep open a shop for the sale of poisons, he himself not being qualified.

Lord Blackburn: Would there be any very great harm in that if he took care to have a qualified person to serve?

Mr. Benjamin: But if the Act does not apply to him he need not have a qualified man.

Lord Blackburn: If he had not a qualified manager I should apprehend he would be clearly liable to a penalty for selling.

Mr. Benjamin: My lord, if it is a company and that is not within the Act, how are they liable?

Lord Blackburn: The directors.

Mr. Benjamin: I am not speaking of the directors but of the company. It is the company that keep open shop. If it does, the question is whether the Act reaches a company. It has been held by the Court of Appeal that the Act does not reach a company. If that be the case, anybody who wants to sell may form just such an association as this man did with six or seven friends with a share apiece.

Lord Blackburn: What struck me was this, it is very probable they will not incur a penalty as a corporation, but I see no reason why every one of the unqualified men should not be liable to a penalty and therefore the Act would prevent them just as before. It would be only different in form.

Mr. Benjamin: It is possible when we came to sue a director he would say, I keep no open shop.

Lord Blackburn: But though he would not sell he might have kept an open shop. If this Mr. Mackness were not to employ a qualified person but an unqualified person to sell and you brought an action against him to recover a penalty for that he caused an unqualified person to sell, I do not see, at present, why you should not succeed.

Mr. Benjamin: Some of the judges think he would not be liable.

Lord Watson: I understand Mr. Benjamin's contention to be that no person or aggregate of persons can keep a shop although they conduct the business that is carried on in that shop by mean of a registered person.

Lord Blackburn: That is the contention.

Mr. Benjamin: Yes, my lord. Now, my lords, here is the judgment of the Divisional Court. The Lord Chief Justice and Mr. Justice Mellor were both of opinion that this penalty had been incurred, and was properly sued for.

[The Court adjourned for a short time.]

Mr. Benjamin: My lords, I was about to read the judgment of the Court of Queen's Bench. I need not read the first part, which is simply a re-statement of the facts which I have put before your lordships. The Lord Chief Justice says "Upon this state of facts the question presents itself whether the defendant company as such is amenable to the penal enactments of the statute. It was fully admitted on the argument, nor could it be contested, that, if this had been an ordinary partnership, the individual partners, at all events such of them as were *not* qualified under the statute, would have incurred the penalties it imposes. The intention of the Legislature appears clearly to have been to prevent any shop or establishment to exist for the sale of poisons, except under the immediate superintendence and control of a duly qualified proprietor. It is not enough that the proprietor employs a qualified person to manage the business. The master must himself be duly qualified. Two parties could not combine to carry on the joint business of grocer and chemist, though the one attending to the latter department of the business might be a qualified chemist. There would be nothing to insure in such a case that, in the absence of the qualified partner, the other might not take upon himself to act in his stead, and thus the security against fatal mistakes in the dispensation of medicines which the statute was intended to insure might be seriously compromised. The defendants are, therefore, within the scope of this legislation; the case comes within the evil against which the statute was intended to provide a remedy. But they are said not to be within the statute as being an incorporated company; the main ground on which this contention rests being that the Act in question, in its prohibitory as well as penal clauses, uses the term 'person,' a term which, it is contended, cannot be properly applied to a corporate body. The objection thus founded on the use of the word 'person' in the penal clauses of the Act would seem at first sight to present some difficulty, but when the scope and purpose of this legislation are taken into account the difficulty does not appear to be insuperable. Reliance was placed by the Attorney-General, in his argument in support of the appeal, on the enactment of the 14th section of the 7 and 8 Geo. IV., c. 28, that whenever any statute relating to any offence, whether punishable by indictment or summary conviction, in describing the offence or the offender, uses words importing the singular number or the masculine gender only, it shall be understood to include several matters as well as one matter, several persons as well as one person, males as well as females and bodies corporate as well as individuals, unless it be otherwise specially provided, or there be something in the subject or context repugnant to such construction. But that Act is expressly confined to proceedings on indictment or summary conviction, and, therefore, cannot apply here, where the proceeding is by civil action. It shows, no doubt, the disposition of the Legislature to include corporations under the general designation of person or individual in penal statutes, but the terms of the Act will not admit of its application to the present case. To solve the question, we must therefore confine our attention to the statute itself, on which this action is brought."

The Lord Chancellor: You have said nothing on this subject of the General Act for the Interpretation of Statutes.

Mr. Benjamin: That is Lord Brougham's Act.

The Lord Chancellor: Yes.

Mr. Benjamin: Lord Brougham's Act has nothing on this particular point. I will call your lordships' attention to what that has presently. "That an incorporated company is within the mischief against which this legislation was directed is, I cannot help thinking, quite obvious. If a company, by reason of its being incorporated, is not within the provisions of the Act and amenable to its penalties, and effect is to be given to the argument of Mr. Wills, it necessarily follows that such a company might openly carry on the business of chemists and druggists and sell poisons without a single member of the company, or even the person employed to conduct this portion of their business, being qualified. The person actually selling the poisons might be amenable, and it was probably with a view to avoid this that, in the present instance, a qualified person was employed to manage this department of the defendants' business; but the company employing him would enjoy complete immunity. A person desiring to combine the business of a chemist and druggist with that of a grocer would have only to get one or two persons to join him, providing them with a share or two, as appears to have been done in the formation of this company, and so forming an incorporated company, to set the statute at defiance. It cannot be supposed that the Legislature can have contemplated a result so entirely at variance with the policy and purpose of the Act."

Lord Blackburn: Was the purpose of the Act to secure the monopoly of all dealings and transactions in these things to apothecaries, or to secure that there should be skilled persons concerned in the sale of drugs? because they are two very opposite purposes.

Mr. Benjamin: My lord, I protest very submissively against the use of the word "drugs." The Act speaks of poisons.

Lord Blackburn: Poisons, if you prefer it.

Lord Watson: Poisonous drugs.

Mr. Benjamin: Yes, my lord.

Lord Blackburn: The greater portion of the reasoning of the Lord Chief Justice goes to this, that inasmuch as in order to secure that qualified persons shall attend to these matters, the Legislature thought fit to say, perhaps from intention or perhaps by oversight, that no one shall keep open shop except a qualified person; it, therefore, follows that the object of the Act was to prevent anyone carrying on that business. The Legislature has accidentally said probably, that if a man dies, leaving the goodwill of his business to his wife, that she shall not carry it on, which is rather hard, but that is an accident from what they were intending. The Lord Chief Justice reasons as if the principal object of the Act was to give a monopoly to the qualified chemist.

Mr. Benjamin: That is the odium or prejudice attempted to be cast against this prosecution no doubt. We submit it is not even matter of prejudice, that the prosecution has nothing to do with the general business of a druggist, that there are a thousand things which a druggist may sell, but it is only certain poisons which the Legislature deemed dangerous to the public, and the sale of which, or probably even keeping open a shop for the sale of which it has laid down certain precautions. The one question is whether in that Act, which is plain enough in its words, the word "person" includes corporations. I apprehend, my lords, that no one will doubt that if I were to hire a shop in Oxford Street and keep a qualified person there to sell poisonous drugs, coming with the purview of this Act I should be liable.

Lord Blackburn: You would be brought within the letter of the Act.

Mr. Benjamin: I should be within the Act.

Lord Blackburn: Whether you would be brought within the spirit of it, so that the words should be stretched to include the case of a body corporate when carrying on such a business, which is what the Lord Chief Justice seemed to think, is not, to my mind, quite so clear.

Mr. Benjamin: I will come back to that presently; I do not think it will require any stretching. I shall give well-established decisions that the word "person" must mean corporations.

The Lord Chancellor: There is only one difficulty which has occurred to me, Mr. Benjamin, and I shall be glad if you will meet it; that is this: the 1st section says it shall be unlawful to do these things unless such person shall be a pharmaceutical chemist or chemist and druggist within the meaning of this Act, and registered as such. I suppose that a corporation cannot be a pharmaceutical chemist or a chemist and druggist within the meaning of this Act, unless you would say that the 3rd section might include corporations which before the Act were carrying on business as chemists and druggists.

Mr. Benjamin: My lord, I have not yet called your attention to the 15th section: "From and after the 31st day of December, 1868, any person who shall sell or keep open shop for the retailing, dispensing, or compounding poisons, or who shall take, use, or exhibit the name or title of chemist and druggist, or chemist or druggist, not being a duly registered pharmaceutical chemist or chemist and druggist" (leaving out other things), "shall for every such offence be liable to pay a penalty or sum of £5."

The Lord Chancellor: That so far would be equal to the same thing. What has been passing through my mind is this, and I will put it in the form of a question. Can the word "person" in this clause include the word "corporation," if it is impossible for the corporation to do the thing which the clauses seem to assume that the person may, if he pleases, do?

Mr. Benjamin: Yes, my lord, that is another part of my argument. That is the question before your lordships. We say that the true meaning of the clauses is, no shops shall be kept open for the sale of poisons to the public except by a person duly registered as a pharmaceutical chemist or chemist and druggist.

The Lord Chancellor: In other words, it shall be impossible for any joint stock company to deal with these things.

Mr. Benjamin: It is to be impossible for anybody but a pharmaceutical chemist or chemist and druggist.

The Lord Chancellor: As a joint stock company cannot be, although anybody in the world may be, a pharmaceutical chemist, there is, whether intended or not, an exclusion of all joint stock companies from this business.

Mr. Benjamin: Yes, my lord, as there is an exclusion of every other subject of Her Majesty except that one.

Lord Watson: The other subjects of Her Majesty can qualify; a corporation cannot.

The Lord Chancellor: A partnership might be formed, we will suppose, exclusively of pharmaceutical chemists, yet, according to your argument, it would be equally impossible for it to carry on this business.

Mr. Benjamin: A partnership?

The Lord Chancellor: Yes; assume it a part of the memorandum or articles of association that no one should hold shares who was not qualified.

Mr. Benjamin: Your lordship is speaking of a company. I was thinking of a partnership.

The Lord Chancellor: A company, that no one should hold shares who was not qualified under this Act, and, as a matter of fact, every shareholder might be so qualified, and yet your argument still is that such a corporation is excluded from carrying on business.

Mr. Benjamin: I say the Act means this, and nothing else: no one shall keep an open shop for the sale of poisons except a registered pharmaceutical chemist—that that is the whole meaning of the Act.

The Lord Chancellor: You may be quite right.

Mr. Benjamin: I think when you come to compare the provisions of the Act your lordship will come to that conclusion; at least, I hope so. At all events, there are two eminent judges who came to that conclusion, although other eminent judges have come to the contrary. I will now go on with the judgment of the Lord Chief Justice: "A person desiring to combine the business of a chemist and druggist with that of a grocer would have only to get one or two persons to join him, providing them with a share or two, as appears to have been done in the formation of this company, and so forming an incorporated company, to set the statute at defiance. It cannot be supposed that the Legislature can have contemplated a result so entirely at variance with the policy and purpose of the Act, or intended to place incorporated companies on a different footing in this respect from that of ordinary partnerships or individuals. It is, no doubt, possible that, although joint stock companies existed at the time this statute was passed, the formation of such companies for the purpose of combining trades hitherto carried on singly, and among other things for that of superadding the business of the chemist to that of the grocer or provision merchant, may not have been present to the minds of those who framed and passed this statute. Still, if the case, though unforeseen, is within the mischief which the Legislature had in view, and the enactment is large enough to embrace it without any forced or strained construction being put on the language of the Act, it is our duty to advance the remedy intended to be afforded. It is true that the term used in the 1st section of the Act is 'persons,' and that, ordinarily speaking, this word would not be applicable to a corporation." The Lord Chief Justice puts the case lower than I should contend for. I say, ordinarily speaking "person" is applicable to a corporation. "But when the meaning and effect of the enactment is looked at without too close an adherence to its precise phraseology, it amounts to no less than a general prohibition to everyone not qualified according to the Act from dealing in poisons or carrying on the business of a chemist and druggist."

Lord Watson: He means retail dealing, of course, in using that term.

Mr. Benjamin: Yes, my lord; he means what the Act points out, retailing the poisons to the public. "The fallacy of the argument urged on behalf of the defendants is that it assumes that the prohibition is addressed to individual persons; but the provision being universal, must extend to all persons, whether acting in an individual or corporate capacity. The defendants, it is true, in thus infringing the law are not acting in their individual capacity, and may not (but on this it is unnecessary to pronounce any opinion) be liable individually. But in their aggregate or corporate capacity they are breaking the law, and being in the latter capacity, as well as individually, within the prohibition they must, if capable of being sued for it, be also amenable to the penalty, and must for this purpose be taken to be sufficiently persons within the meaning of the statute. The fact so strenuously insisted on by Mr. Wills, that, in other sections of the Act, the word 'person' is applicable to individual persons only, and not to a corporate body, only tends to show that the adoption of the business of chemists and druggists by incorporated companies like the present was not contemplated when the Act was passed. It by no means shows that the prohibition being general and the mischief being clearly within the statute, the company, though as such they may be incapable of complying with some of its requirements—as, for instance, to undergo examination under section 6—ought not to be held to be within the penal clauses of the Act, or should be allowed openly to break the law under the belief that they are beyond its reach. In the present case, it so happens that a member of the company, and who manages the chemical department of its business, Mr. Henry Edward Longmore, is a qualified chemist. But it is not as a member of the company that he so acts, but as the paid servant of the company. It is clear, therefore, that his being qualified will not exonerate the other members of the company who are not so. Nor would it be otherwise even if it were as a member of the company that he so acted. So long as any of the company are disqualified, the body is disqualified; and the one who, though himself qualified, acts for the body becomes a party to their offence, and becomes liable conjointly with them. The qualified chemist who, in partnership with a grocer, carried on the business of grocer and chemist, would be as liable to the statutory penalty as his unqualified partner." The learned judge here is speaking of an apothecary who takes a partner.

Lord Blackburn: Is there anything in the Act which says that if a qualified person is carrying on business he shall be subject to a penalty for carrying on a business with an open shop because he has an unqualified partner? It does not seem to me very reasonable. I do not know why it is to be assumed that is intended.

Lord Watson: There is no provision for the separation of the trade of selling drugs, or poisons.

Mr. Benjamin: No, the prohibition is to the open shop to sell poisons.

Lord Blackburn: Exactly so, and it has been worded to the extent that, as far as I can see, if A. dies leaving the goodwill of his business to his widow that destroys it. The widow cannot carry on the business.

Mr. Benjamin: There is a special provision for that.

Lord Blackburn: Where is that? It may throw some light on the point.

Mr. Benjamin: In section 16: "Nothing hereinbefore contained shall extend to or interfere with the business of any legally qualified apothecary or of any member of the Royal College of Veterinary Surgeons of Great Britain, nor with the making or dealing in patent medicines, nor with the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing, and upon the decease of any pharmaceutical chemist or chemist and druggist actually in business at the time of his death, it shall be lawful for any executor, administrator or trustee of the estate of such pharmaceutical chemist or chemist and druggist to continue such business if and so long only as such business shall be *bonâ fide* conducted by a duly qualified assistant, and a duly qualified assistant within the meaning of this clause, shall be a pharmaceutical chemist or a chemist and druggist registered by the registrar under the Pharmacy Act or this Act: Provided always, that registration under this Act shall not entitle any person so registered to practise medicine or surgery, or any branch of medicine or surgery." That is, on the decease of course the widow would have to sell out the business in the ordinary way, but the business is not to be destroyed. That hardship is provided against.

Lord Blackburn: It is provided for in her case that she shall carry it on with a qualified assistant.

Mr. Benjamin: That is one of the grounds on which we rest. We contend that this special exception in favour of a widow, who is not qualified, carrying on with a qualified assistant, is strongly in our favour.

The Lord Chancellor: The widow who remains executor or administrator.

Mr. Benjamin: "Any executor, administrator, or trustee."

Lord Blackburn: It is to meet the hardship of that particular case.

Mr. Benjamin: It is the solitary case provided in the Act in which a person not qualified may carry on the business, and that is only on certain specified terms. It must be *bonâ fide* conducted by a duly qualified assistant, and the duly qualified assistant is a pharmaceutical chemist or chemist and druggist registered under the provisions of this Act.

The Lord Chancellor: It is not material whether the Lord Chief Justice was authorized or not in saying that a qualified chemist who, in partnership with a grocer, carried on the business of a grocer and chemist, would be held liable to the statutory penalty. I fail in finding any words in the Act which justify it, but probably it is not very important.

Mr. Benjamin: It may perhaps be doubtful, because the industry of my learned friend has picked out an old case, a curious case, the very first case ever decided by Lord Mansfield, in which Reynard sued Chase. It is a case of Reynard *v.* Chase, reported in first Burrows. In that case it was for infringing the statute for carrying on the business of a brewer. One of the two partners was a brewer and the other was not, but it was expressly found in the case that the business of brewing was carried on by the qualified brewer, who was paid for it by the partnership as a paid servant, and after he had carried on the business of brewing then the profits were divided between the partners. Under the special circumstances Lord Mansfield held that the unqualified partner was not liable to be sued.

The Lord Chancellor: Not the unqualified partner?

Mr. Benjamin: Because he took no part in the brewing whatever.

Lord Blackburn: I was not aware there was any Act with regard to a qualified brewer. Perhaps it turned on the words of the Act.

Mr. Benjamin: It did not require a qualified brewer. It was one of the old Acts of the city of London which prohibited anyone carrying on a trade without having gone through a proper apprenticeship. One of the men had gone through an apprenticeship, and become a brewer in that sense, and the Court, consisting of Lord Mansfield and his associates, held that the other partner was really not doing business as a brewer.

The Lord Chancellor: As I understand, it was held that in a case in which one of two partners was legally qualified, the benefit of his qualification enured to the other.

Mr. Benjamin: It did not go quite to that extent. I will show your lordship exactly what it was. It was found that the one who was not qualified was not breaking the statute if he took no part in brewing.

The Lord Chancellor: It is certain that the corporation takes no part in selling the poison, except in the sense in which the partner would.

Mr. Benjamin: I always go back to this, the corporation keep the shop open.

Lord Watson: In that case the business of brewing was in this sense carried on by the partners, that they drew the profits. It seems to have been held to satisfy the statute that they carried on business exclusively by means of a qualified person to whom they delegated the practical part of the business.

Mr. Benjamin: The statute was simply this, it prohibited any person not having passed his apprenticeship, from pursuing a particular trade.

The Lord Chancellor: It is the prohibition of anyone not answering a certain description from pursuing a particular trade.

Lord Watson: A retail brewing business. What they have done here is a retail trade in poisons, according to your contention.

Mr. Benjamin: Yes, my lord.

Lord Watson: You say no man shall carry it on although he delegates the whole conduct of the business to a qualified man.

Mr. Benjamin: Yes, my lord, that is what the statute says. But here there is no qualified partner.

The Lord Chancellor: You may draw a distinction between a partnership and a corporation, no doubt.

Lord Blackburn: The Lord Chief Justice's indignation is against a man carrying on the trade of a chemist and a grocer in one and the same partnership. I confess I do not myself see it.

Mr. Benjamin: The indignation there of the Legislature is against the sale of poisons to the public. That is what he was dealing with in the particular case. The illustration may not be as applicable as it might have been otherwise. The Lord Chief Justice goes on:—"Being thus of opinion that a company, though incorporated, is none the less within the prohibition of the statute, I come to the remaining question, whether such a company is capable of being sued for the penalty provided by the 15th section. Upon this point the authorities referred to by the Attorney-General in his argument appear to me to afford a satisfactory answer. Although it is true that a corporation cannot be indicted for treason or felony, it was established by the case of Reg. *v.* The Birmingham and Gloucester Railway Company that an incorporated company might be indicted for nonfeasance, in omitting to perform a duty imposed by statute—such as that of making arches to connect lands severed by the defendants' railway. It was further held, in Reg. *v.* The Great Northern of England Railway Company, that an incorporated company could be indicted for misfeasance—as in cutting through and obstructing a highway—though they could not be indicted for treason or felony or offences against the person. In the present instance we are dealing, not with an indictment or information, but with an action in a civil court. Though the sum to be recovered is no doubt a penalty for the infraction of the statute, the means to be resorted to for its recovery are of a purely civil character. If a corporation can be indicted for misfeasance, I am wholly at a loss to see why it may not be proceeded against in a civil suit for the recovery of a penalty which it has incurred by disobedience to a statutory prohibition." Then, my lord, came the judgment of Mr. Justice Mellor. He says:—"I have come, with considerable hesitation, to the conclusion that our judgment should be for the plaintiffs, and that both questions submitted to us must be answered in their favour. I was for some time inclined to think that the circumstances of the defendants' case were not within the contemplation of Parliament when the Pharmacy Act, 1868, was passed, and that although clearly within the mischief intended to be provided against, words sufficiently comprehensive had not been used in framing the Act to include the acts of the defendants, and that, consequently, it became a *casus omissus.* A fuller consideration of the provisions of the Act 31 and 32 Vic., cap. 121, has, however, brought me to the same conclusion as that expressed by my Lord Chief Justice in his judgment in this case. I think that the great object of the Legislature was to prevent the sale of poisonous or dangerous drugs by persons not qualified by skill or experience to deal in such commodities. It, therefore, proposed to form into one association all persons who for the future should alone be deemed to deal in the same, and who should be registered under the provisions of the Act which we are now considering. It accordingly provided for the interests of all chemists and druggists who had been in business as such previously to the passing of the Act, but with regard to the future it made careful provision for the examination and registration of all persons who should in future form the only qualified body of persons who should be permitted to keep open shop for the retailing or compounding of poisons, and I now think that the sections which mainly embarrassed me as to the extent of the prohibitive sections are really, when carefully considered, only the provisions regulating the steps which in future are to be taken by all persons who desire to obtain the privilege of keeping open shop and retailing, dispensing or compounding the poisonous drugs in question, and who, upon being registered as pharmaceutical chemists, or chemists and druggists, within the provisions of the Act, will become qualified so to do. To incorporate such a society, to whose members in future the sole privilege of keeping open shop as chemists, or chemists and druggists, for the sale, or dispensing or compounding poisons should be intrusted, rendered it necessary to prohibit all other persons, not so registered or qualified, from keeping open shop or retailing, dispensing or compounding such drugs for sale, and from assuming the title of pharmaceutical chemist, or chemist and druggist, and, therefore, whilst one set of sections are qualifying and intended to regulate for the future the mode in which persons should become qualified as members of the association, and to provide for the government of the body incorporated, the sections 1 and 15 of the Act which contain the prohibitory words, upon the meaning of which we have to decide, have an entirely distinct effect. The object of those sections is absolutely to prevent the danger assumed to be likely to arise to the public by the keeping open shop for the retailing, dispensing or compounding poisons, by any persons not being qualified pharmaceutical chemists, or chemists and druggists, and the intention and scope of those sections and the general object of the Act is absolutely to exclude, from the time of the passing of the Act, all persons other than the registered members of the Pharmaceutical Society from keeping open shop or retailing, dispensing or compounding of poisons. Now, before the passing of the Act, 1868, all persons, whether 'natural persons' or 'artificial persons' constituted by incorporation for trading purposes, might either as individuals or as corporations have kept open shops and retailed, dispensed or compounded poisons. It was essential, therefore, to the effectuating the objects of the Act, that all persons, whether natural or artificial, should for the future be prevented from dealing as before in the prohibited matters; and the cases cited by the Attorney-General in his argument show that an incorporated company may commit an offence either of nonfeasance or misfeasance, and may be punished by indictment for the same as if the act had been done by a natural person. We may well, therefore, interpret the word 'person' in the 1st and 15th sections so as to include not only any natural persons, but any artificial person created by the law, which would be capable of committing the offence referred to in the 15th section, as having committed it by the course of proceeding actually adopted by the defendants; and we are authorized upon the principle of decided cases to say not only the 'offence' has been committed by the defendants, but that they are liable to be punished for it under the provisions of the 15th section." Then my friend Mr. Wills asked for leave to appeal, and the Lord Chief Justice says: "I think, looking to the importance of the question involved, you ought to have leave to appeal. I confess I give it to you with reluctance, because no one can doubt for a single moment that if the law is to be established by that Act of Parliament, your company are just as much within the mischief of it as an ordinary partnership; at the same time, the matter is not so free from doubt as that I think you ought to have leave to appeal." Now, my lords, on appeal from that came the judgments of the Lords Justices in the Court of Appeal. Lord Justice Bramwell says: "I am of opinion that this appeal must be allowed. I think the word 'person' in section 15 of the Pharmacy Act, 1868, does not include a corporation. That the word 'person' may include corporation I will not deny, though at the same time, considering the way in which statutes are now drawn, that when 'corporation' is meant it is always named, at least that there is no modern instance to the contrary, and that when the Legislature made a general interpretation clause that 'person' should be male and female, plural and singular, etc., it did not include 'corporation,' I should be reluctant to hold that in any particular statute 'person' included 'corporation,' unless there was strong reason so to do. In this case there is, in my opinion, no such reason, but the contrary. Sections 1 and 15 of the Act create an 'offence' and provide for its punishment. But for section 15, section 1 would create a misdemeanor punishable by indictment, fine and imprisonment. But offences, certainly offences of commission, are the offences of individuals, not of corporations. A corporation cannot have the *mens rea*." The whole of that I venture to say is contrary to authority and contrary to the common law. "I do not say that a corporation cannot be guilty of an offence of nonfeasance—it certainly can be; and it has been so held as to a misfeasance; but though if the Legislature pleased it might enact that a corporation should in a certain event be taken to have committed an offence, the presumption is that in speaking of 'offenders' it speaks of individuals. If a statute were to say that any person publishing a libel should be guilty of an offence, or that no person should publish a libel, a corporate printing company publishing a libel would not be guilty in its corporate capacity." My lords, I venture to say that that is unsound law on the authorities. "But the individuals publishing would be the offenders. So for instance as to the sale of beer and spirits." Just take that illustration, suppose a corporation should undertake to sell beer or spirits on the ground that because the Beer and Spirit Act said "persons" they were not within it.

The Lord Chancellor: Suppose a newspaper published a libel, and it was carried on, as many newspapers are, by a joint stock company, would there be an action for libel against the paper?

Mr. Benjamin: Most unquestionably, my lord. I think the case books are full of such cases. I think I shall call your lordships' attention to specific authorities on the subject. I think throughout this judgment Lord Justice Bramwell has started with a wrong basis, that the law is sustained by authorizing that the word "persons" always includes "corporations" when by the context it is not evident that corporation was intended to be excluded.

Lord Blackburn: I confess I, like you, rather think the reasoning of the Lord Justice is a little beside the question and not quite accurate. I always myself thought that the law was that a corporation could commit an offence as much as an individual.

Mr. Benjamin: Take this very example, for instance, of the sale of beer and spirits: "No doubt, if there was strong reason for saying 'person' in this statute meant 'corporation,' one ought so to hold. As, for example, if the mischief to be prevented could not be otherwise. But that is not so here. For the individual offender may be got at." With all submission, that is no reason at all. "If the servant or shopman of a corporation sells poison, not being a pharmaceutical chemist and registered under the Act, it will be no answer to an action for the penalty to say that he did it as servant, whether of an individual or a corporation not qualified. If the act is in itself unlawful, it is not the less so because done as servant. If it would be lawful because the servant was qualified, though his employer was not, I think the statute is shown to be all the more reasonable, as in that case a corporation is on the same footing as a partnership, and there is no reason why it should not be. It may be asked, how is the 'keeping open shop' to be reached; the servants do not keep it open?" His lordship's answer is, "No, but the directors or managers do; they are the offenders in that case." That is not, as I submit, an answer to the charge found in the special case, "That this corporation kept open shop." "I cannot see how they could deny that they kept open this shop. They do—they do it in fact." Then it is the directors who are keeping open the shop, not the corporation, according to his lordship. How about a director who is not present?

Lord Blackburn: I do not quite follow the Lord Justice Bramwell's decision when he seems to think that if it were shown that the directors or manager commit an offence it follows that the corporation do not. I confess I should have thought that as to a body corporate committing a nuisance, if you could indict the individuals I do not see that it would follow that the corporation would not be indictable.

Mr. Benjamin: If you look at the next sentence it is a direct denial of a whole series of authorities. "If they committed a public nuisance by smells, vapours or otherwise in the preparation, or (if supposable) in the sale of theirs drugs, they and not the corporation would be indictable."

Lord Blackburn: My impression certainly is that they and the corporation too would be liable.

Mr. Benjamin: My lord, indictments of corporations for nuisances is one of the commonest things in the practice of the law. Then his lordship goes on:—"I see no reason then for including 'corporation' in the word 'person.' I see many the other way. It is remarkable that in this particular statute 'person' never includes 'corporation' in any other section." Mr. Justice Mellor had pointed out that there are a series of the sections, providing for the future examination and admission of individuals into the Society. Of course those sections have no reference to corporations; they are not going to submit to examination or qualifications.

Lord Blackburn: No, but the great thing that strikes me about it is, that in every other instance, I think, but the 1st section, where the word "person" is used, it always is implied that the person is a man who can go through the examination and can become a chemist.

Mr. Benjamin: My lord, my answer to that is, that I submit that is conclusive in our favour, because the Act assumes that the offence is to be committed by a person who could go through the examination. It is clear then that the corporation is a person that could not go through the examination, and is not intended by the Act to be one of the persons who is to keep the open shop. I will call your attention presently to the authorities as well as to the passages in the Act itself, which I have not yet called critical attention to. Then his lordship says:—"It is manifest that 'persons' in the preamble keeping open shops, and 'persons' known as chemists and druggists, means individuals; for they are 'persons' who it is expedient should possess a competent practical knowledge of their business. A corporation as such cannot possess a competent practical knowledge." Of course, the conclusion then drawn is that it may keep an open shop. I should draw the opposite conclusion. "Then such 'persons' are to be examined, It is manifest 'persons' there does not include corporations; why should it in section 1? So 'persons' in section 3 who have been assistants cannot include corporations nor the 'person' in section 4 who is to be of full age, nor the 'persons' in section 5 who had been admitted pharmaceutical chemists, for no corporation had been, nor the 'person' in section 6, for a corporation never could have a certificate of competent skill, nor the 'person' in section 10, who is a person that may die. In short, 'person,' in no other section of this Act included corporation. Further than this, I am by no means certain that the statute is not levelled at the individual acting, and not (at least in all cases) his employer. Who would be liable under section 15 for compounding medicines of the British Pharmacopœia otherwise than according to its formularies? Surely the actual person compounding. Section 16 supposes there may be a qualified assistant, and not a qualified master. Again, section 17, which especially provides that for certain matters the master is liable, seems to suppose that otherwise he would not be." That is the passage to which I called attention.

Lord Blackburn: Is that the real effect of section 17?

Mr. Benjamin: I do not think it is so at all, my lord. Perhaps it will be as well to look at section 17 now, just in this connection. What section 17 says, is this: "It shall be unlawful to sell any poison of those which are in the first part of schedule A to this Act, or may hereafter be added thereto under section 2 of this Act, to any person unknown to the seller." You see there it becomes absolutely necessary to know who is meant by the seller; it is a man who has not put on the wrapper, or cover, or label? Is he the person meant as the one who is to know the person applying, or is it the master? The Act says: "To any person unknown to the seller unless introduced by some person known to the seller, and on every sale of any such article the seller shall before delivery make, or cause to be made, an entry in a book to be kept for that purpose, stating in the form set forth in schedule F to this Act, the date of the sale, the name and address of the purchaser, the name and quantity of the article sold, and the purpose for which it is stated by the purchaser to be required, to which entry the signature of the purchaser and of the person, if any, who introduced him shall be affixed; and any person selling poison otherwise than is herein provided shall upon a summary conviction before two justices of the peace in England, or the sheriff in Scotland, be liable to a penalty not exceeding £5, for the first offence, and to a penalty not exceeding £10, for the second or any subsequent offence; and for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller." Therefore that is proceeding no doubt on the assumption that the sale would be made on all occasions by the master; but as this is in relation to a particular procedure to be adopted in the sale, that is to say wrapping up the box or bottle with the particular wrapper and cover and marking it poison, and that the person shall be known to the seller, it was thought necessary, perhaps from excess of caution, to say that when we are speaking of this section we mean the master; we do not mean it is enough that the person shall be known to the apprentice who sells it; we do not mean it is enough that the apprentice knows him; we mean that the master shall be responsible, even if the apprentice does not put the proper label on.

Lord Watson: How does a man come to be known to a corporation.

Mr. Benjamin: He cannot be known to a corporation.

Lord Blackburn: It is not a very good specimen of legislation. Does it mean when it says the seller shall be deemed to be the person on whose behalf the sale is made more than that when the label is put on you are not to put the name of the apprentice, but to put the name of the master?

Mr. Benjamin: You see just above, it says you shall not sell to anybody you do not know.

Lord Blackburn: Exactly.

Mr. Benjamin: Then they say, when we say you shall not sell to any person you do not know or who is not introduced by somebody you know, we mean the master, not the apprentice.

Lord Blackburn: That I have some little doubt about. A statement that the seller shall mean the master, the employer, not the employed, is very much more germane to the requirement that the name of the seller shall be on the label.

Mr. Benjamin: It says "shall not sell to any person unknown to the seller unless introduced by some person known to the seller." That clearly implies that the precautions used for the public against the sale of poisons are not simply that the man who keeps the open shop for the sale must be qualified; but he shall not, even although qualified, sell to the public at large, except under certain precautions, and the first thing is, before he sells to anybody, he must know the person to whom he is selling.

Lord Watson: Or know that his master knows him.

Mr. Benjamin: Yes, my lord; or if the person is unknown to the master, then the unknown person cannot get poison unless introduced by somebody that is known.

Lord Blackburn: I confess —I do not know that it is very material—but I should have a difficulty in construing section 17 to say that if you have a qualified assistant who sells, and a person comes in and asks for a pennyworth of oxalic acid and that qualified assistant knows him perfectly well, he is obliged to say I cannot sell it unless you know the master.

Lord Watson: Strictly, I rather think it would be so according to the terms of it. This clause of the statute seems to contemplate sales by a qualified person.

Mr. Benjamin: Then, my lord, there are two things that the Act is prohibiting. We are not here on the open shop question; we are supposing a man keeping an open shop who is really qualified, but that is not enough to protect the public. He shall not sell to anybody that comes in.

Lord Blackburn: We are assuming here that the right people keep open the shop and that the right person is selling. I suggested, but that is a good deal beside the present question, I believe, that this referred to the label.

Lord Watson: It comes very much to this, that the clause cannot well apply to a corporation selling.

Mr. Benjamin: Quite so, my lord, and that therefore if what is required to keep open a shop and to sell poisons is that which this section says must be done in the sale of poisons, then the corporation cannot sell, because it cannot comply with the provisions of the Act which point out what is to be done when a person, one of the public, comes into the shop and asks for poison.

Lord Watson: You may found an argument either way. You may say the Legislature intended to exclude corporations dealing in these articles by retail or that it had not these corporations in view in framing the law.

Mr. Benjamin: It is possible to take that view; but then I should say we see by the preamble what is intended—to restrict and check the public sale of poisons to any customer that may come in. It goes very far in support of the opinion of the Lord Chief Justice and Mr. Justice Mellor, who think there is no doubt that the whole purview of the Act was to prevent the public going into a shop to buy poison from being poisoned by the incompetency of the proprietors or assistants.

The Lord Chancellor: Suppose there is a corporation carrying on this kind of business; it seems material that the words "known to the seller" may be capable of a sensible interpretation. A regular customer certainly would be known to the seller, although the seller could only act by his agents. Supposing in any other Act of Parliament the same words were used, where there was no question about the right of a corporation to carry on a business, the person with whom they had regular dealings, to whom they delivered goods, paid for his goods, and knew in any sense in which a corporation can know anything, would not he be a person known to the seller?

Mr. Benjamin: I think he would, my lord, I am bound to say; but at the same time, I think when you look at the 17th section it contemplates an individual person—the person who is selling, the individual who is selling, and the public who is going to buy the poison.

Lord Blackburn: It probably does. Surely you would not say that in the case of a man who has carried on a business and died, and it was carried on by his executor or through a qualified assistant, and a person going in known to that qualified assistant, that it was a breach of the Act because he did not know the executor, who might be thirty miles away.

Mr. Benjamin: No, my lord. I should say in the question as to the executor, it would be there considered that inasmuch as that particular case had been provided for, this particular requisition in section 17 could not be enforced.

The Lord Chancellor: The corporation might know a customer with whom it had regular dealings. It could not have any other sort of knowledge.

Mr. Benjamin: No, it could not.

Lord Watson: I anticipate on both sides you will agree that it does not extend to corporations; but you each found upon it a different conclusion.

Mr. Benjamin: Yes, my lord. I say that inasmuch as the provisions of the Act contain things which do not apply to a corporation, it is plain that corporations were not intended to sell.

Lord Watson: Your adversaries say it is one of many illustrations which show that corporations were left out altogether.

Lord Blackburn: One argument is, that as corporations cannot do these various things, therefore it is meant to say they shall not carry on the trade at all. The other says, inasmuch as the persons are restrained from trading only to prevent unqualified persons doing the act, and that as we should not extend it to sales in restraint of trade, we ought not to prevent a corporation carrying on business by qualified assistants. There are two opposite conclusions drawn from the same premises.

Mr. Benjamin: Yes, my lord. Then the judgment proceeds: "Then section 18 and the following when they use the word 'person' clearly do not mean 'corporation.' There is this advantage, as I have said, in this construction, that it does not exclude a corporation from the benefit of carrying on this business, nor the public from dealing with them." It is a benefit in his lordship's view for the public to deal with a corporation in poisons. "It is not needlessly in restraint of trade as it otherwise would be, at least not directly. If it does indirectly operate to preclude a corporation carrying on this trade, however qualified all its members may be; it is to be regretted; but then there is no need for making 'person' include 'corporation,' nor for creating the novelty of a corporate offence." That novelty has been known since the time of Lord Coke certainly. "It only would operate against a corporation as it would against a partnership. Further, how is this the act of the corporation if it is unlawful? For if it is, it is *ultra vires* of the directors." That is a singular result.

Lord Blackburn: I think that argument has been used before; but without success. If I remember rightly when someone brought an action of trespass or false imprisonment against the South Eastern Railway Company, they said it could not possibly be; that if their servants were doing wrong they must have been acting *ultra vires*; but somehow or other the only effect of that ingenious argument was that the jury gave about double the damages they would otherwise have done, That was Chilton *v.* The South Eastern Railway Company.

Mr. Benjamin: Then his lordship says: "In the result, considering the way in which modern statutes are drawn, that corporations are specified where corporations are meant, that offences are wilful breaches of law or inattention to its commands and so the act of the individual offending, that there is no reason for holding corporations to be within the Act, that there are reasons to the contrary, and that in no other section of this Act does 'persons' mean 'corporation,' I am of opinion it does not in these sections. I am aware that the penalty is recoverable by plaint in the County Court, 15 and 16 Vic. c. 62; but the sum recovered is at the disposition of the Crown, section 14, and it is a 'penalty,' and the act an 'offence,' and the person an 'offender.' I am aware also that there is ground for saying that under section 15 all of several partners keeping a shop must be qualified, though none attend, and the shopman need not be qualified. If so it may be said, so must all the shareholders and directors of a corporation. I do not know. The Act may have a more limited meaning, and be more reasonable. If not, still this furnishes no argument in favour of 'person' meaning corporation." Now, my lord, Lord Justice Baggallay adopted the argument which my learned friend lays great stress upon, and which appears to me absolutely to have no bearing on the case. But I may be unable to appreciate it, because my friend laid great stress upon it. He said, "I will show you a large number of modern statutes in which, in the interpretation clause 'person' is said to mean 'corporation.' It is not in this Act, and therefore in this Act, 'person' does not mean 'corporation.' I cannot see the force of that argument. It may be that one hundred persons may take precaution to say that person means corporation, which is simply a restatement of the common law, whilst in other cases persons may be satisfied in drafting statutes to rely upon the common law. But why the superabundant caution of some persons should operate against the confidence of others in relying upon the common law I do not see in the statutes relating to these offences in which very plainly corporations are intended to be included. Lord Justice Baggallay says: "I agree in the opinion that this appeal should be allowed. In modern times when the Legislature has intended that the word 'person' or any other word primarily importing an individual in any particular statute shall include a corporation, it has been usual to introduce an interpretation clause, declaring that the word shall have such extended meaning. In the year 1868, the year in which the Act now under consideration was passed, at least four other Acts were passed into which such a clause was introduced; namely, the Sea Fisheries Act, the Fair of Kildare Act, the Regulation of Railways Act, and the Artizans and Labourers Dwellings Act; and in another, the Irish Fairs Act, the word 'owner' was declared to have the same meaning. Now the omission from Lord Brougham's Act of any general declaration that the word 'person' when used in subsequent statutes should include a corporation, and the absence from the Act now under consideration of any such interpretation clause, to my mind strongly supports the view that the Legislature had no intention that the word 'person' when used in the Act should include a corporation. It probably is the fact, as was suggested in argument, that at the time when the Act passed it was not in the contemplation of the Legislature that a corporate body would embark in the business of selling or of dispensing or compounding poisons, and that consequently it had no intention of either including or of excluding a corporation when using the word 'person.'

Lord Watson: In Lord Brougham's Act what is the definition of the word "person?"

Mr. Benjamin: It is cited in the Chief Justice's judgment. All it says is that "person" in the singular shall mean "persons" in the plural, and that "persons" in the plural shall mean "person" in the singular, and that "males" shall mean "females" and "females" "males," and so on with a number of things. There is nothing said there whether "person" means "corporations." Still, really the argument is drawn from the fact that in a statute defining the meaning of certain expressions, the question whether "person" includes "corporations," is not dealt with. This is the 4th section of the Act. In all cases words importing the masculine gender shall be taken to include the feminine, the singular to include the plural, and the plural the singular, unless the contrary as to gender or number is expressly provided.

Lord Watson: The word "person" is not defined?

Mr. Benjamin: It is not defined at all. And how an argument can be drawn from the fact that an Act gives an interpretation of certain words but does not give an interpretation of this word, and that therefore "person" does not mean "corporation," I am unable to appreciate.

The Lord Chancellor: A corporation beyond doubt by the common law is a legal person, is it not?

Mr. Benjamin: Unquestionably, my lord.

The Lord Chancellor: So that although the context might settle it one way or the other, yet if there be nothing repugnant in the context, why should it not be a legal as well as a natural person?

Mr. Benjamin: It is certainly determined by Lord Coke; and it is not only so determined by a considered decision of the Court of Common Pleas, but by the House of Lords, as I shall show your lordship presently.

Lord Blackburn: I do not understand it is questioned that "person" is wide enough to include "corporation." The argument against you is that the person in this statute is capable of going through an examination.

The Lord Chancellor: That is another matter.

Mr. Benjamin: When your lordships hear the other side you will find that I am not beating the air, that they do contend positively that the word "person" does not include "corporation."

Lord Blackburn: In these Acts. But I have not heard anybody say that "person" never could include "corporation."

Mr. Benjamin: When Lord Coke was quoted in the Court below Lord Justice Bramwell said he did not pay any attention to it; that it was only a dictum.

Lord Watson: Certainly Lord Justice Baggallay's opinion is founded on this that the Legislature not having said expressly in this Act that "person" should include "corporation," it must be assumed that they did not intend that it should be included.

Mr. Benjamin: That is his view. It probably is the fact, as was suggested in the argument, that at the time the Act was passed it was not in the contemplation of the Legislature that a corporate body would embark in the business of selling or dispensing or compounding poisons.

Lord Blackburn: But if the fact was that there were such bodies as the Apothecaries' Hall in Liverpool, or the Apothecaries' Company in London, where corporations did carry on that business, it is a bold assumption that the Legislature did not provide for them.

Mr. Benjamin: Lord Justice Baggallay goes on:—'However, this may be, it must I think be admitted that although an Act may not contain a declaration that the word 'person' shall include a corporation, and although it may be clear that the Legislature could not be reasonably presumed to have any intention in the matter; yet, if it be clear from the general scope and purport of the Act that the selling, dispensing, or compounding of poisons by a corporation was or might be within the mischief intended to be guarded against, and if extending the meaning of the word 'person' so as to include corporation would enable the necessary protection to be given, such an interpretation might and ought to be adopted. But when I turn to the Act itself I can and nothing to lead me to such a conclusion." To what conclusion? That the sale, dispensing and compounding of poisons by corporations ought to be within the mischief of the Act. I cannot follow that.

Lord Blackburn: If you read the few next lines you will see what he means.

Mr. Benjamin: I am going to read them. "The object of the Act is to prevent the selling, dispensing or compounding of poisons by unqualified persons. A corporation cannot of itself sell, dispense, or compound; it can only do so by the aid of a servant or assistant, and if that servant or assistant is duly qualified in the manner required by the Act—as is admittedly the case with regard to the dispenser employed by the defendants—the object of the Act is obtained." His lordship forgets that an individual, even with these precautions, is subject to the Act. He overlooked the fact that the offence is to keep open shop when you are not a qualified person.

Lord Blackburn: Lord Justice Baggallay says this:—The object was to prevent the sale by unqualified persons, with a view to that, as ancillary to that, it was enacted, perhaps overlooking that it might be a hardship, that a person should incur a penalty if he kept an open shop. Then he says you have no occasion to extend that to corporations, because the main object of the Act was not to prevent people keeping shops open, but to prevent unqualified persons from selling.

Mr. Benjamin: With all submission, my lord, I contest the whole of that. I say that the purpose of the Act was to prevent the sale by unqualified persons. First, no one unqualified shall open a shop at all. Then the next thing comes as to the selling. In order to carry out the purposes of the Act no one unqualified shall have a shop to sell to the public anything that will poison the public at all. Then if he is qualified he may have a qualified assistant; and the Act provides that the assistant may be qualified, and the bottles and boxes and so on shall be properly labelled; for all of which the proprietor of the establishment is responsible. Who is the proprietor of this establishment? The proprietor of this establishment is this company, which is Mr. Mackness under the name of a company; he is keeping open shop; he is doing this, or the company if you please—for it is legally constituted and I would rather it be considered that it is legally constituted—for the purpose of the prosecution is to have it established whether or not the Poisons Act is utterly non-existent as regards a company or corporation. If it is, of course Parliament must be applied to; but if it is not, if the Act is fairly and clearly an Act prohibiting keeping open shop for the sale of poisons by anybody but a qualified person, then the exclusion operates as much against a corporation as against an individual.

Lord Watson: Lord Justice Baggallay says, as I understand his judgment, that an individual can obtain a licence—he may qualify. An individual who conducts his business through a qualified assistant may comply, but a corporation cannot. That is his view. A corporation must conduct the business through someone; and if it does not conduct it through a qualified person, that person would be liable.

Mr. Benjamin: No doubt the person would be liable; but, inasmuch as the Legislature has said the proprietor must be qualified as well as the assistant ——

Lord Blackburn: It may have accidentally done that. You seem to have overlooked the curious way in which you are now arguing what the main object of the Act was. Keeping open shop was forbidden certainly, because it says:—"It shall not be lawful for any person to sell or keep open shop for retailing, dispensing, or compounding poisons, or to assume or use the title chemist and druggist or chemist or druggist or pharmacist," and so forth, unless such person is qualified. The main object of the Legislature is to prevent selling by an unqualified person. It is merely stuck in accidentally, "shall not keep open shop." You argue as if it were the mere object to give a monopoly to chemists and druggists.

Mr. Benjamin: The line of the preamble, "Whereas it is expedient for the safety of the public that persons keeping open shop for the retailing, dispensing, or compounding of poisons," should be competent men. Those are the very first words of the preamble.

The Lord Chancellor: It does not seem as if the idea of keeping open shop was separate in the mind of the Legislature from the act of selling, dispensing, or compounding poisons. It is not sticking up a sign or announcing a business they had in view; it is actually business done.

Mr. Benjamin: No doubt, my lord, the actual business done is that which the statute pointed to.

Lord Watson: The preamble is very curious when it says:—"Whereas it is expedient for the safety of the public that persons keeping open shop for the retailing, dispensing, or compounding of poisons, and persons known as chemists and druggists, should possess competent practical knowledge."

Mr. Benjamin: I do not think it will be contended, nor has it been suggested by anybody, that the effect of keeping a shop open to the public for the sale of poisons is not an offence within the Act.

Lord Watson: It is quite clear that "person" in the preamble, where it says, "To that end all persons," does not include corporations.

Mr. Benjamin: His lordship goes on to say this: "And in the view I take of the Act, the protection intended to be given to the public is sufficiently secured in the case of a corporation keeping open a shop for selling, dispensing, or compounding of poisons, for in my opinion the seller referred to in the first section is the actual seller, and not the individual or corporation on whose behalf he may act, and this view is supported by the language of the 17th section, which when dealing, not with the simple sale of poisons, but with selling particular poisons without the adoption of special precautions, imposes a comparatively small penalty on the seller, but declares that for the purposes of that section the person on whose behalf the sale is made shall be deemed to be the seller, thus implying, that except for the purpose of that section the person referred to in the Act as selling, means the person actually selling, and not the person by whom he is employed." I think, my lord, that inference is quite untenable. "I need not refer to many sections of the Act which are quite inapplicable to the case of a corporation, as they had been pointed out in detail by Lord Justice Bramwell. In the absence, then, of any declaration in the Act that the word 'person' is to include a corporation, and not gathering from the general scope and purport of the Act that there is any necessity in the interest of the public that any such interpretation should be given to the word, I have arrived at the conclusion that such an interpretation ought not to be put upon it, and that this appeal should be allowed." Then, my lord, the Lord Justice Thesiger's judgment is one which I have read very carefully, because it looked to me for a long time, reading his reasons, that he was going to decide in our favour.

Lord Watson: He expresses a doubt.

Mr. Benjamin: He is very doubtful. He says: "I also am of opinion, not without doubt, that this appeal should be allowed. The question for determination is whether an incorporated company is subject to the prohibition contained in section 1, and liable to pay the penalty imposed in section 15 of the Pharmacy Act, 1868, or in other words, whether the term 'person,' used in these sections, includes such a company. In dealing with this question, I start with the axiom that the term 'person' is, in legal phraseology, wide enough to include not merely natural persons, that is, individuals, but, artificial persons, such as corporations, aggregate as well as sole. I start at the same time with the undisputed fact that the practice in modern statutes where corporations are intended to be affected is either to expressly name them or to use in reference to them the term 'person,' with an interpretation clause expressly providing that corporations are intended to be included in the term." I beg your lordships to note that I dispute the fact which is there stated to be undisputed. I say there are a great many cases in which people put that in; but there are hundreds of statutes in which it is not in. "As a proper resultant of the apposition between the axiom and the practice, it appears to me that the term 'person' when contained in a modern Act of Parliament should never be construed to include corporations, except where, first, the term is expressly interpreted as including them; or, secondly, the context of the Act clearly shows that they are so included; or, thirdly, the object and scope of the Act peremptorily require them to be so included, and the context does not clearly negative a construction to that effect." I venture to say, my lords, this is the first time that that mode of construing the word 'person" has ever appeared in a decision; on the contrary I challenge my learned friends to find a case in which the word "person" is not held to include corporations unless by the context it must naturally be excluded.

Lord Blackburn: I suppose really the argument of the appellants used against you here is that you are always to look to the nature of the Act. They always go upon that, that they are excluded here because of various things which no corporation could do. I do not know that there is much cause to inquire into it.

Lord Watson: The proposition you have to meet is that stated by his lordship, not any of these questions whether the terms of this statute did not exclude corporations.

Mr. Benjamin: "Neither the first nor the second condition exists in the particular Act under consideration; but for a long time I have doubted whether the judgment of the Court below might not be supported upon the third. The object of the Act is that of providing for the safety of the public in the matter of the sale of poisons. The means by which that object is proposed to be attained is, *inter alia*, that of subjecting those who keep open shop for the retailing, dispensing or compounding of poisons to certain conditions and restrictions. Corporations may keep open shop, their doing so without proper safeguards may expose the public to the mischief against which the Act is intended to guard. There is, therefore, a strong presumption *à priori* that they would be made subject to the same conditions and restrictions as those to which individuals would be subjected, or at least, to some conditions and restrictions that would serve to the same end. Proceeding a step further it may be said that a statutory provision under which a particular thing is made unlawful for any individual to do, except under certain conditions, contains an indication that the thing itself is intended to be entirely prohibited except under those conditions," (there we have exactly our contention) "and consequently cannot be done by a corporation even though the conditions are in their nature such as cannot under any circumstances be complied with by them." That is a very fair statement of our contention. "Lastly, a penalty, by which the prohibition is to be enforced, recoverable by civil suit, is as applicable to corporations, who may, even under certain circumstances, be the subject of indictment, as it is to individuals. Notwithstanding, however, the force of these considerations, which still press themselves upon me, I have come to the conclusion that the whole contents of the Act too clearly point to individuals alone being intended by the term 'person' to allow of that term being held to include corporations in the 1st and 15th sections. I do not propose to repeat what has already been said by Lord Justice Bramwell upon this point. He has shown conclusively that the preamble and every section of the Act, putting aside for the moment the two sections whose meaning is in dispute, when using the term 'person' or 'persons' refer to individuals alone. But in addition to what he has pointed out I find in the first section itself evidence that the words 'any person' in the earlier part of that section are limited to individuals and cannot be extended to corporations, for in a subsequent part of the same section the word 'person' is again used with such a context as absolutely forbids its application to a corporation, and yet in such a relation to the same word contained in the earlier part of the section as to grammatically require that it should receive the same construction. I do not think that under such circumstances the Court ought to strain the language of the Act so as to make it include corporations, even if it were clear that the mischief intended to be provided against would otherwise in the case of companies keeping open shop for the sale of poisons be remediless. But I feel bound to add that I am by no means satisfied, that although a corporation as a separate entity be not liable to the penalty which is sought to be recovered, in this case the individual members of the corporation, whether directors of a company or otherwise, may not be liable, and thus the mischief be remedied. I prefer, however, to give no definite opinion upon this point, for it involves the question whether the Legislature intended or not to practically put an absolute veto upon the keeping open shop for the sale of drugs by trading companies, and the absence from the Act of any express reference to such companies is almost equally difficult to be accounted for upon the notion that the Legislature had that intention as upon the notion that the Legislature did not think of the matter at all, and thereby a *casus omissus* has occurred." Your lordships are now in possession of the views of the several judges on the point, and it becomes my duty to call attention particularly to the language of the Acts, and to the authorities in relation to the meaning of the word "person" as including corporations. Now, my lord, the authority produced in relation to persons, including corporations, was this: in the second Coke's Institute, p.

720, is the exposition of the statutes 39 Elizabeth and the 21st James I. concerning the erection of hospitals, and the Act begins in this way: "Be it enacted by the authority of this present Parliament that all and every person and persons seised of an estate in fee simple, their heirs, executors, administrators," and so forth, "may set up a hospital," and Lord Coke, to the words "every person or persons" has a note at the foot of page 721:—"All and every person and persons." These words regularly do extend to any body politic or corporate, but not to such as are restrained by Acts of Parliament to alien; but doth extend to such bodies politic or corporate as may alien, as mayors, commonalties, burgesses, and the like, and to all other persons whatsoever." These words regularly do extend to any body politic or corporate. Now upon that being cited it was said to be simply an *obiter dictum*, so to say. It was in this house so argued by a learned counsel, Mr. Kindersley, to be of no authority, a mere *obiter dictum*, and your lordships will find that in the case of the Corporation of Newcastle *v.* The Attorney-General and others, in 12 Clarke and Finnelley, p. 402, Mr. Kindersley in argument, at p. 411, said: "There is no decided case putting a construction on this part of the Act. Lord Coke commenting on the Act says," and then he quotes Lord Coke's note, and he says: "This is the opinion of a great authority no doubt; but it is an opinion in the closet, not arrived at in discussion, a mere dictum, not formed by any decision of the court, and the opposite construction is put on the words in the statute of cases by Lord Brougham. When the decision came to be given, the Lord Chancellor, who was Lord Lyndhurst, said "that comment of Lord Coke, which may be said to be a contemporaneous exposition of the Act has never been questioned; it has been accepted by everybody since his time, and no doubt numerous charitable corporations depend upon it. The Act itself enumerates the classes who were excepted as being incapable of creating an instrument, and it is said that such a construction is to be put on the Act as should be beneficial. I do not think this House will feel justified in putting a construction upon the Act, inconsistent with that commentary of Lord Coke." Lord Cottenham said: "I agree in that view. We are not likely to overlook Lord Coke on this subject, but that does not relieve the respondents," etc.

Lord Lyndhurst referred to the terms of the statute and said there were exceptions.

The Lord Chancellor: He does not say that "persons" in every statute includes corporation.

Mr. Benjamin: No, my lord, he does not, but he says: "These words regularly do extend to any body politic." Of course you may find it excluded in the statute.

Lord Watson: The argument proceeded on that same statute of Elizabeth, I understand, in that case.

Mr. Benjamin: Quite so, my lord.

Lord Blackburn: Is not a body politic a person at law?

Mr. Benjamin: Not only that, but unquestionably Mr. Justice Blackstone in his commentaries says that persons are either natural or artificial.

Lord Blackburn: But still that comes very far indeed from grappling with the real question. If a person is to be duly qualified who passes an examination, then it cannot mean corporation.

Lord Watson: If this Act contained a provision that certain corporations should be exempted from clause 16, that would be a strong indication that all other corporation were included.

Mr. Benjamin: Taking my authorities and arguments in the logical order in which I have placed them, I will now call your lordships' attention to the case of the Mayor of Hereford *v.* Martin in the 15th Law Times, N.S. 187. The statute said this. It was an Act for the supplying with gas the city of Hereford, and it said: "If any person or persons shall carelessly or negligently break, destroy, throw down, break or injure any lamp or lamps owned, or to be set up or belonging to said company"—(That is one clause)—"or by any person or persons at his or their private expense"; then there was a penalty to be recovered. The defendant was sued for having broken by accident a lamp-post set up by the Corporation of Hereford; and the defence was, "I am only liable to action under this penal statute if I break a lamp owned by a person who has set up at his private expense a lamp. You are not a person or persons; you are a corporation." It was a very strong Court, composed of Chief Justice Erle, Mr. Justice Williams, Mr. Justice Byles, and Mr. Justice Keating. Erle, Chief Justice, said, "I am of opinion the case must be sent back to the magistrates. The information was founded upon an accidental breaking of a lamp pillar within the city of Hereford. The question for us is whether the 5th Geo. IV. gives the corporation a right to recover damages under such circumstances under the words 'person or persons.' I think it does. The words upon which the matter turns are: 'Set up at his or their private expense.' The lamps belonging to the appellants were set up by funds belonging to them in their corporate capacity. The statute could not have been intended to give less protection to the corporation than to private individuals."

Lord Blackburn: The case seems to have been defended, not on the ground that a corporation was not a person, but that the words "private expense" cut down the meaning and prevented it applying to a public body, which is intelligible.

Mr. Benjamin: One of the judges said that. Mr. Justice Byles concurred.

Lord Blackburn: That is an intelligible argument. I confess I was thoroughly astonished to think that the justices could have said, "You may break with impunity a lamp belonging to the corporation."

Mr. Benjamin: Not that you could break it with impunity, but that you could not proceed under this special Act for a penalty.

Lord Blackburn: It must be the same thing nearly. But if they were arguing that the special Act gave a penalty in favour of those who put it up at private expense it was an arguable point that the corporation who put it up at the public expense were not within it.

Mr. Benjamin: Mr. Justice Byles said:—"I am of the same opinion. This case falls within the very words of the Act. Persons are by Blackstone divided into natural and artificial, and the latter includes corporations. The enactment is one under which a party is to obtain recompense, and therefore the words 'private expense' should be interpreted broadly." Keating, Justice, says:—"I am of the same opinion. The object of the Act is clear—to protect the lamps belonging to the corporation as well as those of any other person. The question is whether, then, is anything in the words 'private expense' to prevent this object being carried out. I think the magistrates ought to have convicted." There appear to have been two arguments. One is, that "persons" does not include "corporations;" secondly, that "at the expense of the corporation" is not "private expense." Those seem to have been the two arguments. Erle, Justice, repelled the second argument, and Keating, Justice, referred to both, as well as Byles, Justice. The case, therefore, decides this at all events. This was a case in which a penalty was imposed on those who should do certain damage to lamp-posts set up by a person or persons at their private expense, and it was held that that included corporations. Now, my Lord Blackburn, will probably remember the case of Terry *v.* The Brighton Aquarium, Law Reports, 10 Queen's Bench, 306.

Lord Blackburn: I remember the case, but I do not remember that it had anything to do with this point.

Mr. Benjamin: The first thing I have to observe on that is, that it never was intended that a corporation could not be made liable for a penalty and could not be made liable for just such a thing as was done in the present case. The case is a short one: "The defendants are the owners of the Brighton Aquarium, a building which consists of chambers below the level of the ground," and so forth. An action was brought against the defendants to recover a penalty under the 21 Geo. III. cap. 49, for keeping open—the same language as this—a place of entertainment, or amusement, on the Lord's day, or Sunday. It was held that the Aquarium was a place of entertainment or amusement within the statute, but nobody contended that the defendants were not liable.

Lord Blackburn: If I remember Bishop Porteus' Act, there is a string of words including "corporation" amongst those who are made liable. The thing which I reluctantly felt myself bound to say was that it was within the Act, but as far as I can remember, it was suggested that "corporation" was not within the Act. I think there were words which included everything.

Mr. Benjamin: The Act is here, my lord, I was going to call attention to it. These are the words: "Whereas certain houses, rooms or places within the cities of London and Westminster or in the neighbourhood thereof have of late frequently been opened for public entertainment or amusement upon the evening of the Lord's day commonly called Sunday; and at other houses, rooms, or places within the said cities or in the neighbourhood thereof under pretence of inquiring into religious doctrines and explaining texts of Holy Scripture, debates have frequently been held on the evening of the Lord's day concerning divers texts of Holy Scripture, by persons unlearned and incompetent to explain the same, to the corruption of good morals, and to the encouragement of irreligion and profaneness. Be it enacted, that from and after the passing of this present Act any house, room, or other place which shall be opened or used for public entertainment, or amusement, or for publicly debating on any subject whatever, upon any part of the Lord's day called Sunday, and to which persons shall be admitted by the payment of money or by tickets sold for money, shall be deemed a disorderly house or place; and the keeper of such house, room, or place shall forfeit the sum of £200 for every day that such house, room, or place shall be opened or used as aforesaid on the Lord's day." Not a word said about "person" or "corporations." The word was "keeper."

Lord Blackburn: You are right in saying that no point then was raised about it being kept by a corporation.

Mr. Benjamin: What I was going to say with reference to it was this: "The keeper of such house, room or place, shall forfeit the sum of £200 for every day such house or room is opened or used." Now, the turn of words is undoubtedly different in the two Acts. In the Pharmacy Act it is that no person shall keep open shop. This Act says, places of entertainment on Sunday evening shall not be kept open, and the keeper shall be liable. The two Acts, and the mischief they intend to meet, are exactly analogous. The language was in the one case, the person who keeps open the shop, and in the other the keeper of an open place of amusement.

Lord Blackburn: I can always allow a great deal of latitude to argument; but when you say that the object of Bishop Porteous, who said that where people who held a debating society that was wrong, and that therefore anybody who on Sunday opened a public house of entertainment should be deemed to keep a disorderly house, that this is the same as this Pharmacy Act of 1868, I do not understand it.

Mr. Benjamin: I do not say the same, I say analogous. The Act of 1868 provides against the keeping of an open shop to sell poisons. That is, the physical poisons. The other Act was an Act against keeping open an establishment of amusement on Sunday evenings where they were spreading moral poison. The difference in the language of the two Acts has not in the least degree reference to the fact whether the keeping open of the place was by an individual or by a corporation. In either case it was those who kept open the shop.

Lord Blackburn: If Bishop Porteus' Act had said that keeping open a place on Sunday, unless it was by a person duly qualified as being a clergyman, it would be blasphemy, then I think you would be right in saying they are analogous; but the words are not at all the same.

Mr. Benjamin: In Terry *v.* The Brighton Aquarium it was a corporation and there was no attempt on the part of the very able counsel, Mr. Manisty, who was for the defendants, to say that a corporation could not be guilty of an offence—it goes at all events to that extent—and punishable by penalty which was recoverable in the way pointed out by the Act. To that extent the decision is absolutely in point, and that is one of the points raised in this case. Now, my lord, on the question as to liability of a corporation. I do not know whether that is intended to be raised afresh here, but I call attention to two decisions which appear to us conclusive on the point. They are both mentioned in the judgments, but where they are found is not mentioned. The first is the case of the Queen *v.* The Birmingham and Gloucester Railway Company, 3 Queen's Bench, 223. I will only read the marginal note of this in order to curtail the discussion. "A corporation aggregate may be indicted by their corporate name for disobedience to an order of justices requiring such corporation to execute works pursuant to a statute, and if such indictment be ordered by the assizes or sessions where parties cannot appear by attorney, the proper course is to remove it into this Court by *certiorari*, to compel appearance by the justices." That was for nonfeasance. The question of nonfeasance not being that which an Act of Parliament required, the point came up again in the case of the Queen *v.* The Great Northern of England Railway, 9 Queen's Bench, 315. This was a case which involved misfeasance by a corporation. It was argued that although a corporation might be liable to indictment for nonfeasance, a corporation could not be guilty of misfeasance because it could not have, as Lord Justice Bramwell says, the *mens rea.* The considered judgment of the Court was delivered by Chief Justice Lord Denman: "The question is whether an indictment will lie at common law against a corporation for a misfeasance, it being admitted in conformity with undisputed decisions that an indictment may be maintained against a corporation for nonfeasance. All the preliminary difficulties as to the service and execution of process, the mode of appearing, and pleading, and enforcing judgment are by this admission swept away. But the argument is that for a wrongful act a corporation is not amenable to an indictment, though for a wrongful omission it undoubtedly is; assuming in the first place that there is a plain obvious distinction between the two species of offence. No assumption can be more unfounded. Many occurrences may be easily conceived full of annoyance and danger to the public and involving blame in some individual or some corporation of which the most acute person could not clearly define the causes or ascribe them with more correctness to mere negligence in providing safeguards or to an act rendered improper by nothing but want of safeguards. If A. is authorized to make a bridge with parapets, but makes it without them, does the offence consist in the construction of the unsecured bridge, or in the neglect to secure it? But if the distinction were always easily discoverable, why should a corporation be liable for the one species of offence and not for the other? The startling incongruity of allowing the exemption is one strong argument against it. The law is often entangled in technical embarrassments, but there is none here. It is as easy to charge one person or a body corporate with erecting a bar across a public road as with the non-repair of it, and they may as well be compelled to pay a fine for the act as for the omission. Some dicta occur in old cases, 'a corporation cannot be guilty of treason or of felony.' It might be added 'of perjury or offences against the person.' The Court of Common Pleas lately held that a corporation might be sued in trespass; but nobody has sought to fix them with acts of immorality. These plainly derive their character from the corrupted mind of the person committing them, and are violations of the social duties that belong to men and subjects. A corporation which as such has no such duties cannot be guilty in these cases; but they may be guilty as a body corporate of commanding acts to be done to the nuisance of the community at large. The late case of Regina *v.* Birmingham and Gloucester Railway Company was confined to the state of things then before the Court which amounted to nonfeasance only; but was by no means intended to deny the liability of a corporation for a misfeasance." Then the Court holds indictment is perfectly maintainable. So that the considered judgment of the Court in two cases is that a corporation may be guilty of an offence. There are some offences which of necessity it cannot be guilty of. A corporation *quâ* corporation cannot commit a rape, or commit a murder; the persons who are members of a corporation may be guilty of one thing or the other. But a corporation may commit a fraud, and the records of your lordships' House are full of cases in which frauds committed by corporations are inquired into. In all these matters, therefore, it is necessary to refer to the particular statute under consideration in order to apply the authority. Now, assuming as I have, that a corporation may be guilty of an offence, I ought to call your lordships' attention to 7 and 8 George IV. cap. 28, section 14. It appears that the statute is not, as cited by one of their lordships, inapplicable to the case before your lordships. This is the language of the statute. The statute is entitled, an Act for further improving the Administration of Justice in Criminal Cases in England. section 14 is this: "That wherever this or any other statute relating to any offence, whether punishable upon indictment or summary conviction, in describing or referring to the offence, or the subject matter on or with respect to which it shall be committed, or the offender or the party affected or intended to be affected by the offence, hath used or shall use words importing the singular number or the masculine gender only, yet the statute shall be understood to include several matters as well as one matter, and several persons as well as one person, and females as well as males, and bodies corporate as well as individuals, unless it be otherwise specially provided or there be something in the subject or context repugnant to such construction; and wherever any forfeiture or penalty is payable to a party aggrieved, it shall be payable to a body corporate in every case where such body shall be the party aggrieved." So that "person" includes the plaintiff or defendant, and it includes a corporation, whether the party aggrieved or the party that has committed the offence—it is to be within the statute. It is true that this is said: "Wherever this or any other statute relating to any offence, whether punishable upon indictment or summary conviction," but our argument, if upon the attention which Parliament bestows on an offence by a corporation, it is held that even in grave offences the word "person" shall include a corporation, when the enactment is directed against an offence punishable by indictment or summary conviction, *a fortiori*, is the corporation included in the word "person," when it is an offence of a much minor consequence, and which is simply punishable by an offence by civil process. I do not say that the Act directly covers it in exact language, but I say it shows the view which Parliament takes of statutes using the word "person" alone, and in reference to corporations. Now, my lords, there is a statute, which it is but just to my learned friends and to the learned Court to say, was not quoted in the Court below, on the very subject of the apothecaries and pharmaceutical chemists. It is a public Act. It is the 15th Geo. III. cap. 194. Now, my lord, in that Act there is a series of provisions exactly in conformity with the provisions in this Act, regulating the practice of apothecaries, and from the ginning of that Act it uses the word "persons" oughout, and in section 3 the masters and wardens are empowered to enter the shop of any person or persons whatsoever, using or exercising the art and mystery of an apothecary, and to fine such persons. The principal clause, my lord, is this 20th section, "and be it enacted that if any person, except such as are actually practising as such, shall after the 1st day of August, 1815, act or practise as an apothecary in any part of England and Wales without having obtained such certificate as aforesaid, every person so offending shall for every offence forfeit the sum of £20." Throughout the Act there are various provisions, all of which relate to persons. Then, my lord, the 30th section of the Act says this: "Provided always, and be it further enacted that no action or suit shall be brought or prosecuted against any person or persons, body or bodies politic, or corporate, for anything done in pursuance of this Act after six calendar months next after the act committed." Now, the Act had not said a word about corporations being guilty of anything wrong; it had hitherto spoken of persons being wrong.

Lord Blackburn: That is to protect them against actions.

Mr. Benjamin: Section 29 provides for that.

The Lord Chancellor: No, no. That is merely saving their general rights. Then section 30 says there shall be a limit of the time within which such actions or suits may be brought against persons or bodies politic or corporate, for anything done in pursuance of the Act. Consequently, as I understand it, it does not mean a thing done against the Act; but if in consequence of the Act the Society of Apothecaries were to do something in respect of which an action was brought against them, it might be said you are too late, the time is limited.

Mr. Benjamin: What I am pointing out is that this section 30 deals with bodies corporate as being included in the Act, whereas throughout the Act you have nothing except persons dealt with up to that period.

Lord Watson: It does not clearly show—at least as you read it—that it meant to refer to the penalty clause of the Act. If it had been a limitation of the time for bringing the action for penalties, it would have been very strong in your favour.

Lord Blackburn: If any person or body politic do what this Act contemplated, they might be liable to have an action brought against them for it, which action shall be brought within six months. That does not at all show that the word "person" means body corporate.

Mr. Benjamin: No, my lord, but the Act had before that not spoken of corporations, or of anything but persons as liable under the Act.

Lord Blackburn: It is not liable under the Act; it is protected, because they do something under the Act.

The Lord Chancellor: I should be strongly inclined to think that it relates to actions that might be brought against the Society of Apothecaries for acts done; for example, under the 3rd section of the Act it gives them power to enter into other people's shops, to search, certify, and determine whether the medicines, and so on, are wholesome, and if they find anything false, unlawful, deceitful, corrupt or hurtful, they may burn, or otherwise destroy, and so on. A man may say that what you have destroyed is not deceitful, or any other of these epithets.

Lord Watson: There are a great many police and other statutes constituting offences, which contain that clause, but that was, I thought, always understood to be for the protection of those putting the Act in force.

The Lord Chancellor: It is for anything done in pursuance of the Act.

Mr. Benjamin: It is possible the Act may be framed in that way, although certainly up to that part of the Act, there had been nothing to be done by any corporation. Now, my lords, I wish to take this Act itself, the Act of 1868, and call your attention to its provisions.

The further hearing was adjourned until Thursday.

In consequence of the length to which the legal report has extended, notice of several communications is unavoidably postponed.

The Pharmaceutical Journal.

SATURDAY, JULY 31, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE APPEAL CASE IN THE HOUSE OF LORDS.

THOUGH it is only by increasing the usual size of the Journal, by adding to it an eight page supplement, that we are able to place before our readers this week the remainder of the arguments in this case and the judgment of the House of Lords, we have deemed it desirable not to delay the publication any longer, and for that reason are compelled to defer "The Month," as well as other matter, until next week,

Hitherto, if we may judge from the absence of any critical reference to the case in most of the daily papers, it would not seem to have attracted much attention outside the circle of those especially interested. The only paper in which we have as yet seen any comments upon the case is the *Daily News*, and there it is dealt with more as furnishing an illustration of the curious and wholly artificial difficulties caused by the technical rules which have been established by the judges for the construction of statutes, than as involving questions affecting the safety of the public. The only way in which this latter aspect of the case is referred to is by the expression of an opinion that the ultimate decision of the House of Lords is no doubt in accordance with common sense. The consideration that has mainly led to this opinion would appear to be the circumstance that in the particular case in question the sale of poisons was actually conducted by a manager who was a qualified chemist, and for this reason our contemporary considers that the Pharmacy Act was practically obeyed.

This, we take it, is the extent to which the decision of the House of Lords can be regarded, as the *Daily News* thinks, as being in accordance with common sense unless, the decision is to have the effect of imposing upon other associations or limited liability companies carrying on the business of a chemist and druggist the obligation to employ qualified chemists as the persons actually engaged in selling and dispensing drugs and medicines. That, however, is an obligation which is not imposed upon such companies by the Pharmacy Act according to either the view of the respondents or that of the appellants in this case. According to the latter view a company is excluded from the possibility of carrying on the business of a chemist and druggist because it cannot possibly become qualified as the Act provides, according to the other a company is outside the provisions of the Act and in so far is not required in the interests of the public to take any cognizance of qualification either on the part of its members or of the assistants actually engaged in carrying on the selling and dispensing of drugs and medicines. Certainly the Pharmacy Act does not contain any specific provision requiring that in such cases assistants should be qualified. However, Lord BLACKBURN expressed himself as being strongly inclined to think that a corporation would be liable to penalties under the 15th section of the Pharmacy Act if it caused an unqualified person to conduct sales and it could be brought home to the corporation that it did deliberately cause the person to infringe the Act. On the principle *qui facit per alium facit per se*, therefore, he held that corporations were not wholly outside the Act.

A company carrying on the business of a chemist and druggist with unqualified assistants might, it is true, be held responsible for the breach of law committed by its servants, but we fail to perceive why that should make companies exempt from the provisions to which individuals are subject in carrying on the same business and we equally fail to believe that in the interest of the public it would be a sufficient guarantee for the employment of qualified assistants by such companies.

It was from such a view of the case that the Council of the Pharmaceutical Society determined to continue the prosecution of the London and Provincial Supply Association beyond that stage, when it was in fact simply a prosecution of an individual carrying on his business under that designation. It was from such a view that the determination to take that course is to be regarded—as the President of the Society has pointed out in his letter to the *Daily News*—as the result of reading the duty of the Society by the light of common sense, and that in that light the Society was justified in expecting a verdict in its favour.

Moreover, in considering the position of the Society in this litigation, the history of the case should not be overlooked. The drug business of the London and Provincial Supply Association, now conducted as that of a limited liability company, was up to the beginning of 1878 conducted by one individual, who not being on the register of chemists and druggists was forbidden by law to practise as a chemist and druggist. The Pharmaceutical Society in exercise of the duty assigned exclusively to it by the Pharmacy Act of 1868 commenced proceedings against him for infringing that Act and as a matter of course obtained from him the penalty appertaining to the offence. At the same time he tendered through his legal representative an assurance that he "was engaged on arrangements to terminate any violation of the law." It turned out eventually that his process for arriving at this result was not the discontinuance of the business that he had been unlawfully carrying on; but simply the association with himself of six other persons and the constitution of a company under the Limited Liability Act for the purpose of continuing to carry on the business otherwise exactly as it had been carried on before.

When that was found to be the case it was by the light of "common sense" that the Council of the Pharmaceutical Society formed the opinion that since the Legislature had declared, in the interests of the public, that no person not being on the register of chemists and druggists should keep open shop for the sale of drugs and dispensing of medicines, it was intended that no company or association of such unqualified persons should do so. And equally by the light of "common sense" the Council came to the conclusion that its duty was to have recourse to the power conferred upon it by the Pharmacy Acts for the repression of practices declared to be unlawful, and, therefore, to repeat against the seven persons constituting the London and Provincial Supply Association Limited the prosecution which had been successfully conducted against one of that number when the business was carried on by him alone.

It is with considerable reason, therefore, that the President of the Pharmaceutical Society has, in his letter to the *Daily News*, taken objection to the remark that the decision of the House of Lords was plainly in accordance with "common sense," in so far as that remark may suggest the inference that the course adopted by the Council of the Pharmaceutical Society exhibited a deficiency of common sense. That the action of the Society's executive is not to be thus regarded is moreover shown by the judgments given by the Lord Chief Justice COCKBURN and by Mr. Justice MELLOR when the case was heard in the Court of Queen's Bench. In their view the object of the Pharmacy Act was to protect the public against the possible consequences of unqualified persons carrying on the business of a chemist and druggist, and they held that as it was unlawful for any individual persons to sell and dispense poisons, unless duly registered in accordance with the Act, it could not be the intention of the law that any association of such persons should do what they were individually prohibited from doing. Certainly this view appears to bear the impress of common sense, and to be one that ought to receive general acquiescence, unless we are to disregard the obvious meaning of the term common sense, and look upon the faculty it represents as being equally many sided with other forms of opinion.

But notwithstanding the decision of the question from another point of view, and the fact that the judgment of the House of Lords has not literally endorsed the opinion of the Society's executive respecting the inability of an association of unregistered persons to carry on the business of a chemist and druggist, it is satisfactory to note that in some degree the spirit of the Pharmacy Act has been upheld and recognized as appropriate to the conditions it has to deal with. Throughout the hearing of the appeal the remarks of their lordships gave abundant indication that they perceived the necessity for proper qualification on the part of those engaged in the sale of drugs and in dispensing medicine. Whether it be lawful or unlawful for associations of unregistered persons to carry on this business, whether or not they can be compelled in carrying on such business to employ only qualified men to conduct it, there is at least some assurance that the moral effect of their lordships' remarks on this point will be felt and appreciated almost as forcibly as if they constituted an exposition of the actual law. In so far the Pharmaceutical Society has good reason to be satisfied that it has been successful in upholding the fundamental principle of its existence and that both as regards its duty to the public and to the trade it represents it has rendered some service by carrying out to the end the litigation upon which it was deemed fitting to devote so much time and money.

In our own body widely different opinions have been entertained as to the propriety of entering upon this litigation. As will be seen from some of the letters published this week the decision of the House of Lords has not been altogether a surprise. Only one of the letters received as yet objects to the decision, and that does so by the assumption that the statute requires a qualified master. This, however, is precisely the question that was at issue. The House of Lords has decided that the statute does not require a qualified master except when the master is an individual, and in the case of an association constituting the master, it accepts the qualification of the servant by whom the business is actually conducted as sufficient reason for regarding such a master as being exempt from the provisions of the Pharmacy Act as to keeping open shop, examination and registration.

THE CONFERENCE TESTIMONIAL TO PROFESSOR ATTFIELD.

AT a meeting of the Executive Committee, held on the 16th instant, it was resolved to close the subscription list at the meeting of the Conference at Swansea in August. The Committee decided that the testimonial should take the form of a collection of works in general literature for the Professor's library, accompanied by a suitable address. The address will be presented at Swansea by the Chairman of the Committee. Members who have not yet paid their subscriptions and intending subscribers will oblige by remitting the amount without delay to Mr. M. CARTEIGHE, 180, New Bond Street, W., the Hon. Secretary and Treasurer.

Parliamentary and Law Proceedings.

THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* THE LONDON AND PROVINCIAL SUPPLY ASSOCIATION.

The argument in this case was resumed on Thursday, July 22, 1880.

Mr. Benjamin: When your lordships adjourned I was going into an examination of the two Acts—not going to the authorities, but looking to the Acts themselves for their meaning. Your lordships observe that the Pharmacy Act of 1852 was an Act for regulating the qualifications of pharmaceutical chemists. It is confined entirely to that, and it confirms the charter, provides for the formation of a Council, the manner of voting, and the registration of members, and for examinations of different kinds. Now between that Act and the Act of 1868 public alarm was created by several cases of poisoning by mistakes in chemists' and apothecaries' shops, and the Act of 1868 was passed on its title for two distinct purposes. It is an Act to regulate the sale of poisons, and also to amend the Pharmacy Act of 1852. Therefore, you must expect to find in this Act of 1868 a series of sections, upon which great reliance has been placed by my learned friends on the other side, which referred to the Pharmacy Act of 1852, which Act was confined to regulating the qualification of pharmaceutical chemists; consequently there are ten or twelve sections, I do not know how many exactly, which, according to the title of the Act, are directed to a further Act for regulating the qualifications of chemists. But the Act, by its very title, put at the head of its purpose, is an Act to regulate the sale of poisons, and no Act for regulating the sale of poisons had ever existed before. I say, therefore, with all confidence, that I can ask your lordships to say that you would expect to find in this Act new legislation on the subject of the sale of poisons and legislation directed to the amendment of the former Act; and it is no objection to the proper construction of those sections which regulate the sale of poisons that there are a number of other sections which have nothing to do with that, but which are applied, and intended to apply, solely to the alteration and amendment of the pre-existing law.

The Lord Chancellor: You must observe that the preamble speaks of two objects: the first relates to poisons and the other to all persons known as chemists and druggists, who have to pass an examination, if not already engaged in business, when provision is made.

Mr. Benjamin: I am much obliged to your lordship.

The Lord Chancellor: And any construction of the word "persons" which is applicable to poisons would *primâ facie* be applicable to the other purpose also.

Mr. Benjamin: Yes, my lord, it would be applicable to the other also, but not exclusively. That is what I submit to your lordships. When the Act of 1862 was passed, the thing which is put at the head and front of the Act is to regulate the sale of poisons. The preamble says that it is expedient for the safety of the public that persons keeping open shop for retailing, dispensing and compounding poisons should have a proper qualification. Then the Act begins, and in its 1st section carrying out the primary object begins by a prohibition of the sale of poisons.

The Lord Chancellor: Carrying out both objects, because it goes on to say, "or to assume or use the title of chemist and druggist, or chemist or druggist."

Mr. Benjamin: Yes, my lord, but the very first sentence is as to the sale of poisons.

Lord Blackburn: To take the preamble alone it seems as if "person" there meant a natural person, because it says: "Whereas it is expedient for the safety of the public that persons keeping open shop for the purpose of retailing and dispensing poisons," that is one thing, and that "persons known as chemists and druggists," that is another, should possess a competent practical knowledge of their business. To that end, from and after a particular date, every person shall be examined. You would hardly say that a corporation or person artificial could possess a competent practical knowledge of chemistry. It certainly could not so duly examined.

Mr. Benjamin: Quite so, my lord. Our argument from that is for what it is worth—and it seems to us conclusive—that inasmuch as a corporation cannot possess these qualifications, it is a person that cannot sell poison.

The Lord Chancellor: What I wish you to notice is that you cannot stop short of contending, prospectively at all events, that the Act would prevent any company from carrying on the business of chemists and druggists, not merely from selling poisons, but from carrying on business as chemists and druggists.

Mr. Benjamin: Prospectively, my lord, yes; that was the intention of the Act I quite admit.

The Lord Chancellor: If you established that——

Mr. Benjamin: Yes, my lord. By amending the Pharmacy Act, it provides for such a registration of persons carrying on the trade as shall prevent anyone carrying on the trade who has not passed the proper examination. Then you have the 1st section, "From and after the 31st day of December, 1868, it shall be unlawful for any person to sell or keep open shop for retailing dispensing, or compounding poisons, or to assume or use the title 'chemist and druggist,' or chemist or druggist, or pharmacist, or dispensing chemist or druggist in any part of Great Britain, unless such person shall be a pharmaceutical chemist, or a chemist and druggist within the meaning of this Act, and be registered under this Act, and conform to such regulations as to the keeping, dispensing, and selling of such poisons as may from time to time be prescribed by the Pharmaceutical Society with the consent of the Privy Council." There then, my lords, taking that section alone, is it not plain that this Act was intended for the safety of the public, not only as regards the sale of poisons, but as regards the practice of an apothecary, that he shall be a person who has been examined and registered? Observe, my lords, "it shall be unlawful for any person to sell or keep open shop for retail." Those words "to sell" would be superfluous, because it would be quite sufficient to prohibit "keeping open shop for retailing, dispensing, or compounding poisons," if it were not that poisons are known to be habitually bought by private persons, by persons who are practising as apothecaries or druggists, and in the fen country, as I am informed, and I am told it appears by the blue books, the whole population were in the habit of being supplied with such drugs as opium and compounds of opium by travelling pedlars. They were persons who did not act as apothecaries and druggists; but they were private individuals who would hawk about the country poisonous drugs, and the intention, therefore, of the Act was not simply to aim at persons who keep a shop, but to aim at persons who went about the country not practising as pharmaceutical chemists or druggists, but simply as retailers and pedlars of poisonous drugs; therefore it was made an offence not only to keep open shop for the sale to the public, but for anybody to sell. In that way the public were protected against the sale of poisons; and the second purpose of the Act to alter and amend the Pharmacy Act by requiring a proper examination and registration was also observed. Then, my lords, the 2nd section simply gives a list of poisons by reference to the schedule.

Lord Blackburn: It would be important to show that the mischief is not the less affected by a corporation keeping open shop if they have a qualified assistant. You may say that a corporation is brought within the words; but what harm does it do if the body corporate, such as Apothecaries' Hall, continues to sell by qualified assistants?

Mr. Benjamin: My lord, that question about Apothecaries' Hall has been used at every stage of the argument in this case, and I have only to answer that the Apothecaries' Hall is a private partnership. It is not a company, it is not a corporation. We have the deed of partnership in Court, if it is necessary to look at it.

Lord Blackburn: It may be; but whether it was a corporation or not I do not know. I believe there were some bodies corporate engaged in this business; but supposing there were not, there may have been such, and how would the fact that the shop was kept by a corporation in the slightest degree bring the case within the mischief if the people who actually dealt with the poisons were qualified?

Mr. Benjamin: If a corporation is not under the Act, then a corporation is not obliged to have a qualified assistant.

Lord Blackburn: But if they do sell, I should say that a corporation, if it sells by an unqualified assistant, certainly the unqualified assistant would be under the Act.

Mr. Benjamin: The question is whether the corporation can escape the provisions of the Act. If they are not under the Act there is a complete absence of any protection such as the Act requires in keeping a shop for the sale of poisons.

The Lord Chancellor: Let me ask you this, Mr. Benjamin. In what manner do you suppose the Apothecaries' Company, which certainly did some time ago and probably does so still, carry on the business of chemists and druggists and deal in medicines and drugs, dispensing them and so on, are saved from the Act according to your construction?

Mr. Benjamin: They are a private partnership composed exclusively of apothecaries.

The Lord Chancellor: No, they are a corporation—at least I fully believe they are.

Mr. Benjamin: We have the deed here, my lord, dated in 1822, and it is a private partnership.

The Lord Chancellor: The Apothecaries' Company?

Mr. Benjamin: It is not a company.

Lord Blackburn: In 1822, a body who had got more than seven persons, who tried to carry on business, would have found themselves in an enormous difficulty. Are you sure they are not a corporation?

Mr. Benjamin: Here is the deed.

The Lord Chancellor: Those who carry on business at Apothecaries' Hall.

Mr. Benjamin: They were a private partnership—those who sell. Here is the deed, and by the deed nobody but a qualified apothecary can be a member of that body.

Lord Blackburn: What I should like to know is, whether they are not incorporated besides; because in 1822, a large body would have found enormous difficulty in carrying on business. Are you quite sure they are not a corporation?

Mr. Benjamin: I am so instructed, my lord, and the deed is brought here. I am told there is no such thing.

Mr. Wills: The charter is cited in the Act 55 Geo. III. establishing them as a corporation by the name of "The Master, Warden and Society of the Art and Mystery of Apothecaries." That is the charter of 15 James I.

The Lord Chancellor: It is so by an old Act of Parliament in my hand. It is clear they are treated as a corporation there. They are a very old corporation. One of the medical Acts refers to them. I rather think, I am not sure, that they are as old as the earliest medical Act, which if I am not mistaken is as old as Henry VIII.

Mr. Benjamin: Your lordship is quite correct in that; but it does not derogate from what I said that the company consists of those who keep a shop for the sale of medicines, and a private partnership composed of members of that corporation is a company who by a private deed amongst themselves carry on the business; the corporate company does not carry on the business, but there is a sub-partnership, so to speak, composed of members of the corporate company whose deed is before me.

Lord Blackburn: Is it registered under the Joint Stock Companies Act?

Mr. Benjamin: No, my lord.

Lord Blackburn: I do not understand how it has contrived to carry on business. It seems very strange.

Mr. Benjamin: Here it is, my lord. If it is necessary, and if your lordships desire it I will read what the provisions are.

The Lord Chancellor: Strictly speaking we have no right to attend to any such deed, which, I presume, is not in evidence.

Mr. Benjamin: No, my lord, it is not.

The Lord Chancellor: But I do not suppose there will be any objection on the other side to its being read by way of illustration of your argument. What is the date of it?

Mr. Benjamin: 1822, my lord. It is an "Indenture made on the 9th November in the 3rd year of George IV. in the year of our Lord 1822, between the Masters, Wardens and Society of the Art and Mystery of Apothecaries"—that is the incorporated company—"of the first part, the several persons whose names are set forth in the column marked A at the foot of the second part, the other persons in column B of the third part, the several persons mentioned in column C, being members of the company in the new partnership formed by these presents, of the fourth part, and the several persons whose names are subscribed in the column marked D, being members only of the second class in the new partnership formed by these presents, of the fifth part. Whereas the persons who are or who are intended to be parties hereto of the second part have for many years past carried on a trade or business in co-partnership in drugs and medicines in the name of the said Master, Wardens and Society with a certain capital stock called the Navy Stock, upon certain terms and regulations."

Lord Blackburn: That would seem as if the trade was carried on in the name of the corporation. That removes the difficulty which I thought of. The corporation would bring an action for a contract made on their behalf, and nobody could set up a defence.

The Lord Chancellor: One suspects from what you have already read, that the nature of the deed is this, that the corporation carries on the business; but inasmuch as it is desirable that the persons who are practically employed in it, or contribute money with which it is carried on, should have certain rights *inter se* distinct from those of the corporation, the deed is intended to provide for and regulate that.

Mr. Benjamin: No, my lord, it is not that. It is a new partnership. I have just read one sentence in the preamble. "And whereas the several persons who are or are intended to be parties hereto of the third part have for some time past carried on in co-partnership in the name of the said Master, Wardens," and so on, "the trade in medicines, and making and vending chemical medicines, with a capital or stock commonly called the Laboratory Stock. This indenture witnesseth and it is hereby agreed that the said co-partnership, or trade, or business as aforesaid, exercised or carried on by the parties of the second part, shall be determined and dissolved as on the 31st December in this year, and that all the estate, property, stock in trade and so forth, shall by the committee for managing the said co-partnership be sold and disposed of at valuation by auditors in the usual manner." Then the co-partnership is formed and the operative part is this: "First, that the persons the parties hereto of the fourth and fifth part respectively shall and will as on the 1st day of January, 1823, carry on and exercise in co-partnership the same trades or businesses as now are or hitherto have been carried on."

The Lord Chancellor: Just read the introductory words of that sentence once more.

Mr. Benjamin: "The parties hereto of the fourth and fifth part shall and will as and from the 1st January, 1823, carry on and exercise in co-partnership the same trades or businesses as are now or have been carried on by the persons interested in the capital or stock called the

Navy Stock, and the persons interested in the capital and stock called the Laboratory Stock. The said new partnership shall be carried on in the name of the Master, Wardens and Society of the Art and Mystery of Apothecaries of the City of London, but for the benefit of the members or proprietors of such new partnership, and the said Master, Wardens and Society do consent."

Lord Blackburn: You see the business was carried on, as I thought was absolutely necessary from the fact that it could not otherwise have been carried on, by the corporation.

The Lord Chancellor: If it is carried on in the name of the corporation, and if it is illegal for the corporation to keep an open shop, it is at least a very serious question whether they were not keeping an open shop under that deed.

Mr. Benjamin: That may be true; but it would also be true that the rights of this corporation and those who may carry it on have been saved by the statute.

The Lord Chancellor: That I have been looking at, and it was purely with that view that I refer to that case. It seems to me, however, difficult so to argue because the only rights saved are the rights of persons registered under the Act, and by the 5th clause with respect to persons at that time carrying on business, it is necessary that they should claim to be registered by notice in writing, "signed by him," as the expression is, and how can the corporation sign notice in writing?

Mr. Benjamin: One word, my lord, a little further. I wish your lordship to be in possession of what this deed is. The 53rd clause is, that no person shall be qualified to be a proprietor of the first class, that is, a partner, unless he shall be a liveryman of the said society; and nobody shall be qualified to be a proprietor of the second class unless he be an apothecary in actual practice for his own benefit and on his own account.

The Lord Chancellor: I do not perceive that either of these expressions brings him within this Act of 1868.

Mr. Benjamin: The 57th.

Lord Watson: Schedules C and D, referred to in section 5, would seem to apply exclusively to individuals.

Mr. Benjamin: What I did intend to argue was that it is perfectly immaterial to us whether the Apothecaries' Company was or was not within the Act.

The Lord Chancellor: It may be immaterial to you, but it may not be immaterial entirely for the consideration of the question before us; if this company, which has existed since the time of Henry VIII., which is by law entrusted with the regulation of the sale in general, would be an illegal company as to the business of chemists and druggists by this Act. That is not a very immaterial consideration.

Mr. Benjamin: I will go on with the consideration of the Act, my lord, if you please, leaving out this Apothecaries' Company for a moment, and supposing the Court to be in ignorance of its existence.

The Lord Chancellor: It may not be in ignorance of its existence, because of the Acts of Parliament which relate to it, which are public Acts. Whether it may be in ignorance of its carrying on business as Apothecaries' Hall is another question.

Mr. Benjamin: Or keeping a shop for the sale of poisons to the public. It may be it is not authorized to keep open shop for the sale of poisons to the public. I do not know how that may be. I have not investigated that point. But what I am looking at is the face of this Act, and seeing what the Act says. I have called your attention only to the 1st section, and the section is· "Nobody shall sell or keep open shop for the sale of poisons, except he be a druggist registered within the meaning of this Act and registered under the Act."

Lord Blackburn: I am not sure but you have slightly altered the words and made them rather more favourable. It does not say nobody shall sell, but it shall be unlawful for any person to sell. If it had said nobody shall sell, you may very well say that means that a corporation shall not do it, but if it simply says, "it shall be unlawful for any person to sell or keep open shop unless," so and so, it does not follow if "person" is by the context confined to natural persons that it refers to a corporation. I mean you should stick to the very words.

Mr. Benjamin: Well, my lord, in the course of argument one is not always reading the particular passage, but giving one's idea of the meaning of it. My idea of the meaning of the first section, and one which I hope to win your lordships' approval of, is that nobody shall have an open shop for the sale of poisons, except a duly registered chemist. That is our interpretation of the 1st section, and we say that it includes corporations. Although it is said that it may be unlawful for any person to sell unless he be registered under this Act. If a corporation cannot be registered under this Act a corporation is a person, and it is unlawful for the corporation. It is unlawful for any person. My friend says that does not mean it shall be unlawful for a corporation. It is on them to show that that language does not apply to a corporation. The language is, it shall be unlawful for any person unless he is registered under this Act. A corporation cannot be registered under the Act. Of course, those portions of the Act which amend the former Pharmacy Act do not permit of the registration of a corporation. We infer from that and we say the fair meaning of that is this, inasmuch as a corporation cannot be a registered chemist under the provisions of the Act, and inasmuch as it is unlawful for any person but a registered chemist to keep open a shop to sell poisons, a corporation cannot; it is in direct violation of the Acts, and there is nothing in the Act which confines it to an individual.

The Lord Chancellor: According to your argument, although a partnership consisting of six or seven registered persons qualified under the Act would be perfectly legal, yet if it consisted of seven or more persons who were registered under the Joint Stock Companies Act, it would be illegal, although as I have said every member must be duly qualified.

Mr. Benjamin: Yes, my lord, that would be the result.

The Lord Chancellor: In other words the chemists and druggists are excluded from the benefits of the law of limited liability.

Mr. Benjamin: For the carrying on business of chemists and druggists, yes, my lord. That is to say not excluded from the benefit, but they must not deal in poisons; that is all.

The Lord Chancellor: I cannot at present see that there is any possibility of us limiting the operation of the Act to the dealing in poisons. It goes on to the assuming or using the title of chemists and druggists and so on, and as it seems to me whatever construction is right as to poisons, is right as to carrying on the business of chemists and druggists.

Mr. Benjamin: Now, my lord, the 2nd section of the Act gives us a schedule, in which the poisons are enumerated within the meaning of this Act. "The Council of the Pharmaceutical Society of Great Britain (hereinafter referred to as the Pharmaceutical Society) may from time to time, by resolution, declare that any article in such resolution named ought to be deemed a poison within the meaning of this Act, and thereupon the said Society shall submit the same for the approval of the Privy Council, and if such approval shall be given, then such resolution and approval shall be advertized in the *London Gazette*, and on the expiration of one month from such advertisement, the article named in such resolution shall be deemed to be a poison." Then the 3rd is, "Chemists and druggists within the meaning of this Act shall consist of all persons who, at any time before the passing of this Act, have carried on, in Great Britain, the business of a chemist and druggist." We say that includes a corporation, and that the Apothecaries' Company, to which your lordship has referred, is there saved.

The Lord Chancellor: No, that is not a saving clause, that is a definition clause, the saving clause is later.

Mr. Benjamin: This 3rd section saves them; it says "chemists and druggists shall consist of persons who before the passing of this Act carried on the business of chemists and druggists."

The Lord Chancellor: And of certain other persons. That by itself is not a saving, but a definition clause. The saving clause is found elsewhere.

Mr. Benjamin: What is the effect of this, my lord? Is it not that chemists and druggists within the meaning of this Act include all persons who heretofore have carried on the business of chemists and druggists?

The Lord Chancellor: Certainly, whatever be the meaning of the word "druggist."

Mr. Benjamin: Yes, my lord.

Lord Watson: But they cannot dispense poisons until they comply with the provisions of section 5, namely, registration.

Lord Blackburn: A corporation can hardly be registered under section 5.

The Lord Chancellor: Certainly not, I should think.

Mr. Benjamin: "And also of all such persons as may be duly registered under this Act." "The new register shall comprise all persons who have heretofore carried on business and all who are registered under this Act."

Lord Blackburn: I think you will find, if you look at section 5, there is some difficulty in construing that in that way.

Lord Watson: How can a company declare in the terms of schedule D that it is a duly qualified medical practitioner, residing at a particular place?

Mr. Benjamin: It cannot, my lord, because it is not a medical practitioner,—Apothecaries' Hall is not a medical practitioner at all, and of course it could not. Section 4 is that assistants are to be registered. That plainly is an amendment to the previous Act. Then section 5: "The persons who at the time of the passing of this Act shall have been duly admitted pharmaceutical chemists or shall be chemists and druggists within the meaning of the Act shall be entitled to be registered."

Lord Watson: Section 4 is an amendment to section 6 of the previous Act.

Lord Blackburn: Section 5 says, "Who are entitled to be registered."

Mr. Benjamin: "Provided, however, as regards any such chemist and druggist, that his claim to be registered must be by notice in writing, signed by him and given to the Registrar with certificates according to the schedules C and D to this Act; and provided also, that for any such registration of a chemist and druggist, unless it be duly claimed by him on or before the 31st day of December, 1868."

Lord Blackburn: Stopping there for a moment, how could a corporation become registered under section 5? A corporation cannot possibly send "a notice in writing signed by him;" it is a straining of the words to say so.

Mr. Benjamin: Let us see schedule C. It is a declaration of a person in business as a chemist and druggist before the Pharmacy Act of 1868, to the Registrar of the Pharmaceutical Society of Great Britain. "I —— hereby declare that I was in business as a chemist and druggist in the keeping open shop for the compounding of the prescriptions of duly qualified medical practitioners at ——, in the county of ——, on or before the —— day of ——."

The Lord Chancellor: And signed his name.

Lord Blackburn: Who is to sign that? How is the corporation to sign that?

Mr. Benjamin: A corporation signs by its seal.

Lord Blackburn: Is not that doing violence to the language? Which of the two is the greatest straining of the words, to say that "person" means a natural person, or to say that signing means sealing?

Mr. Benjamin: Whichever of those constructions may be preferred, my lord, we have not yet come to the section which covers the present case. It may be conceded for the purpose of the argument that we are taking our contention too high in saying that in section 3 the word "person" includes a corporation. Let us for a moment admit that. Then, of course, that being inapplicable, it is a continuation of the former Act in relation to Apothecaries' Hall. Then the 6th is undoubtedly an amendment of the former Act about examinations. Seven is undoubtedly an amendment of the former Act. It is about the examination and registering. Eight is an amendment of the former Act. Nine is an amendment of the former Act. Ten is an amendment of the former Act. Eleven is an amendment of the former Act. Twelve is an amendment of the former Act. Thirteen is an amendment of the former Act. Fourteen is an amendment of the former Act; the whole of those sections being applicable to registration.

The Lord Chancellor: And every one of them, as far as one can see, only applicable to the registration of natural persons.

Mr. Benjamin: Quite so, my lord, because the former Act was only applicable to natural persons. The Act of 1852 is clearly only for natural persons, and the main clauses of this Act are solely for natural persons. I submit that we must keep in view all the time that there are two classes of provisions in the Act of 1868, and stated to be so; one having reference to the registration and the other having reference to the sale of poisons, the section relative to the sale of poisons being entirely new, the other sections being simply amendments of the former Act. The former Act provided only for regulating the qualification of pharmaceutical chemists, that was entirely a personal Act and the sections which amend it are personal sections.

The Lord Chancellor: Fourteen is the clause of penalties, which it would be very difficult to apply to a corporation.

Mr. Benjamin: I say that, my lord, section 14 is an amendment of a former Act.

The Lord Chancellor: It goes beyond that; it says: "Any person who shall wilfully procure or attempt to procure himself to be registered under the Pharmacy Act, or under this Act, by making or producing or causing to be made or produced any false or fraudulent representation or declaration," which would plainly include the declaration by persons then carrying on business as chemists and druggists under the 5th section, "shall be deemed guilty of a misdemeanor and shall on conviction be sentenced to imprisonment for any term not exceeding twelve months."

Lord Blackburn: It does not relate to the former Act only, but to this Act. It is manifest that a person making a false declaration under the 5th section in order to get himself registered as a person who before the passing of the Act was carrying on in Great Britain a business of a chemist and druggist would be liable to imprisonment under that clause. Therefore it is clear that corporations cannot be contemplated.

Mr. Benjamin: It seems to me, my lord, with all submission, that it is really in force of what I am endeavouring to maintain rather than in derogation of it.

The Lord Chancellor: If you say that corporations are prohibited, of course it is quite consistent that these clauses do not contemplate or provide for them.

Mr. Benjamin: What I mean is this, my lord, that this clause, like the other clauses having reference to the registration of pharmaceutical chemists, is a code of legislations for persons—that I quite admit.

Lord Blackburn: Of course it is quite competent to argue that if in section 1 it was meant to enlarge the sense of the word to include persons natural and artificial that in the thirteen following sections "person" is used in a restrict sense.

Mr. Benjamin: That is for registration.

Lord Blackburn: But when you find, without any obvious reason, the word person is used in one sense in section 1, and is used in a different sense in thirteen following sections, *primâ facie* one would say if "person" is used in one sense to begin with, it would mean the same throughout.

Mr. Benjamin: Unless the Act had said it had two objects, and the Act says it has two objects.

Lord Blackburn: If the Act had anywhere said, as Mr. Justice Mellor seems to have thought in his judgment, that to encourage apothecaries to qualify themselves they should have a monopoly of the profits arising from vending poisonous drugs—if that object were there, I should say there was a great deal of force in your argument; but I don't find that.

Mr. Benjamin: My lord, so far as the question of monopoly is concerned, monopoly of course is a difficult word, it creates prejudice; but your lordship is perfectly justified in making use of it.

Lord Blackburn: Take a different word. What I wish to express is, the sole right of vending, or the profits arising from the sole right of vending—if there was anything in this Act—a recital so clear, or a statement that for the purpose of inducing men to undergo education and become able chemists and understand their business, we will give such people as become pharmaceutical chemists the sole right of obtaining profits from vending poisonous drugs. A recital or any enactment to that effect would go a great way towards showing that you are right. But that is what I cannot find.

Mr. Benjamin: My lord, I think that the Act specifies a distinct purpose, a much higher purpose, than that. It specifies a desire to protect the public against being poisoned, and that is quite as high an object and a separate object.

Lord Blackburn: Only that the legislation is not necessarily connected with that chief idea. That is what made me ask some time ago if you could point out to me—the object being to save the public from being poisoned by a duly qualified man and in a shop regulated to sell poisons—why the public should be in more danger because, instead of keeping the profits for his own use, he handed them over to a corporation.

Mr. Benjamin: Because it is admitted under the language of the Act. I suppose nobody questions that, that no private individual could do what this company has done and not be within the Act.

Lord Blackburn: But what I want to know is this. One object of the Act was to say that no one but a qualified person shall superintend the selling of poisons, and it forbids to keep open shop. That is because a person may keep open shop and have a duly qualified assistant, but then the master may perhaps interfere, and therefore, to simplify proof, if he is an unqualified person who keeps the open shop he is within the Act; but a corporation cannot control its qualified manager.

Mr. Benjamin: And therefore it cannot carry out the purpose of the Act.

Lord Blackburn: No; therefore its keeping an open shop does not produce the mischief the Act is intended to prevent.

Mr. Benjamin: A corporation with an open shop for the sale of drugs has assistants, but it sends abroad for things, cheap, if you please, drugs and medicines of different kinds. The corporation itself is not qualified to judge of what it is buying. The man who is in the shop, who is a duly qualified assistant, has nothing to do with the purchase. It is perfectly well known that it is a matter of extreme importance that the quality of drugs, poisons or whatever they are, that are kept in the shop should be pure, and it is also known that in very many drugs there are certain amounts of impurity which a qualified person would know and would be able to appreciate, and so whether it was too much or too little to make the drugs of a particular strength.

Lord Watson: That is carrying it very far.

Lord Blackburn: That is an excellent argument for extending the Act to the wholesale purchase and sale of drugs.

Lord Watson: Is not a company within the Adulteration Act?

Mr. Benjamin: I was answering an observation of my Lord Blackburn, whether or not there was any necessity for the person who kept the shop to be qualified, for a proprietor to be qualified. The Act says the proprietor must be qualified. I am asked whether there is any, and what danger to be apprehended if the proprietor be a company? I answer yes, because the proprietor being a company, a company may get a stock of the most impure description.

The Lord Chancellor: So may persons properly qualified under the Act. There is not a word in the Act to provide against their making purchases by agents, of any sort or kind, abroad, whether qualified or unqualified. There is nothing in the Act to require the quality of drugs which they bring into stock to be tested; nothing to deal with the subject of adulteration.

Mr. Benjamin: Now, the Act having said that the person who keeps the shop must be duly qualified, there must be a motive for the requirements.

The Lord Chancellor: It does not follow he must be a chemist.

Mr. Benjamin: Yes, my lord, the Act requires the proprietor to be a qualified chemist, who keeps open the shop; the proprietor must be a qualified chemist.

The Lord Chancellor: What I meant was this. I do not suppose that the qualification for a registered chemist of that sort requires that he should analyse all his drugs.

Mr. Benjamin: No, my lord; but I am asked for the motive for the lawgiver saying, we are not satisfied that the assistant shall be qualified, we want the proprietor to be qualified. And it is suggested what motive is there for that. I answer, the motive is that a duly qualified proprietor furnishes his shop with the drugs and poisons which are to be sold, and it may be that the Legislature thought that it was necessary that the proprietor should be duly qualified as additional security for the quality of the drugs and poisons sold in his shop.

Lord Watson: Should it not be, as was suggested by one of their lordships in the Court below, that it is from apprehension that the principal may interfere with his assistant and sell instead of him.

Mr. Benjamin: For that also, in which case as the assistant is under his orders, the qualified servant is under the orders of the unqualified master. That again, as suggested by the judges below, may be a reason for requiring the master to be qualified.

Lord Blackburn: But how does that apply to a corporation, if the corporation, as in this case, has a qualified managing director? The body corporate cannot interfere.

Mr. Benjamin: I do not quite understand. This man here, who keeps the little portion of the establishment called the druggist's shop, is a paid servant.

Lord Blackburn: He may be a paid servant, I do not recollect exactly how it stands now; but, however, that would be more as to this particular case.

The Lord Chancellor: It is obvious, Mr. Benjamin, you may have a man who was qualified carrying on business, and he might have as the general manager of his business a person who was not qualified, but as for the particular purpose of vending these drugs, a person who was qualified. There would be no illegality in the general manager being an unqualified person under those circumstances.

Mr. Benjamin: The proprietor must be qualified.

The Lord Chancellor: I am putting the case of a qualified proprietor selling by a qualified assistant, but leaving the general management of his business, as a tradesman, in the hands of such a person as the gentleman whose name I forget—

Mr. Benjamin: Longmore?

The Lord Chancellor: No, not Longmore.

Mr. Benjamin: Mackness?

The Lord Chancellor: Yes, Mackness. He, I understand, is not qualified to sell drugs.

Mr. Benjamin: No, my lord, he is substantially the proprietor.

The Lord Chancellor: The company is the proprietor. It is undeniable that it is a company; Mackness is the general manager, and Longmore is the person to whom this department is confided. The position of Mackness will not make it illegal, or would not have made it illegal, supposing that instead of a company the business had belonged to a qualified person under the Act.

Mr. Benjamin: Well, my lord, we come back to this, here is a business in which there is no qualified proprietor.

Lord Blackburn: If you could establish your first point, that "person" necessarily includes a corporation—it certainly may—and consequently a corporation is forbidden, there is no more to be said.

Lord Watson: Your argument leads to this, that under section 1, corporations and individuals are included in the word "person" for two different purposes, one is intended for the purpose of being subjected to the regulations of the statute, the other is introduced for the purpose of being excluded from the sale of poisons altogether.

Mr. Benjamin: Well, my lord, I do not see why that should not be. But now the 15th section comes in, which is important.

Lord Watson: That seems to me to be it.

Mr. Benjamin: It is a distinct offence committed under the Act: "From and after the 31st day of December, 1868, any person who shall sell, or keep an open shop for the retailing, dispensing or compounding poisons, or who shall take, use, or exhibit the name or title of chemist and druggist, or chemist or druggist, not being a duly registered pharmaceutical chemist or chemist and druggist, or who shall take, use, or exhibit the name or title of pharmaceutical chemist, pharmaceutist, or pharmacist, not being a pharmaceutical chemist, or shall fail to conform with any regulation as to keeping or selling of poisons, made in pursuance of this Act, or who shall compound any medicines of the British Pharmacopœia, except according to the formularies of the Pharmacopœia, shall, for every such offence, be liable to pay a penalty or sum of £5, and the same may be sued for, recovered, and dealt with in the manner provided by the Pharmacy Act for the recovery of penalties under that Act; but nothing in this Act contained shall prevent any person from being liable to any other penalty, damages or punishment, to which he would have been subject if this Act had not passed." Now, you have here this, any person who shall after the 31st day of December, sell, or keep open shop for the retailing of poisons commits an offence. Surely, my lord, that is as broad language as one ever finds in an Act of Parliament.

The Lord Chancellor: But still the question is the meaning of the word "person" as used in this Act.

Mr. Benjamin: Is there any reason for excluding the corporation from committing that offence?

Lord Blackburn: There is a strong reason, as it seems to me, in the very 15th section, which puts penalties on persons. They say the word "person" is limited to the same extent as in section 1. Once establish that in section 1 a corporation is included, and the other would follow.

Lord Watson: It is not presumable that the Legislature intended to include under the penalties section anyone except those referred to in the former section. I think the question of the 15th section, unless you can point out any difference in the language, is precisely the same as the question which arises on the first.

Mr. Benjamin: No doubt, sections 1 and 15 are to be read together.

The Lord Chancellor: It is very important to observe that this section and others clearly struck at assistants, as well as the principal to whom the business belongs. The word "sell" and the word "compound" in that clause clearly relate to the person actually selling and actually compounding. Therefore, except for those words on which you rely, "keeping open shop," there is nothing in the section in which the objects would not be fully met, although a corporation carrying on business were not within it; and in the 17th section that is made still clearer by the words which say, that for the purpose of this section, a person on whose behalf a sale is made shall be deemed to be the seller, and, by necessary implication one would say, showing that is not to be the universal rule throughout the Act.

Mr. Benjamin: That is the argument used against us. I did endeavour to answer that argument by showing that there were certain peculiar provisions in section 17 which might have given rise to doubt. It is a peculiar section, and I will come to that in a moment. I will first pass over section 16 and arrive at section 17 at once. Section 16 is the saving clause which enacts that "nothing hereinbefore contained shall extend to or interfere with the business of any legally qualified apothecary, or of any member of the Royal College of Veterinary Surgeons of Great Britain, nor with the making or dealing in patent medicines, nor with the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing." Then comes this, upon the decease of anyone actually in business it shall be lawful for his executors to continue the business if and so long only as such business shall be conducted by a duly qualified assistant. Here we have the case, and the one case only, in which a business can be conducted where the proprietor is not duly qualified.

The Lord Chancellor: That, also, I think you may assume contains a very strong intention that the word "sale" and the word "compound," and so on, are applicable to a person actually making the sale, although not the owner of the business: otherwise, under that section, everything would be thrown at large and poisons might be sold by persons who were carrying on the business. The Legislature provided against that by saying that the business may be carried on by a duly qualified assistant.

Mr. Benjamin: But further, I call that in aid of my general proposition, that there is a single case provided by the Act in which the business can be carried on by a duly qualified assistant without a duly qualified proprietor. This is a case in which there may be no duly qualified proprietor, and yet the party does not come under the censure of the Act, if in this stringent emergency, temporary in its nature, there be a duly qualified assistant.

Lord Watson: That is so far in favour of your argument that this clause does not appear to deal with keeping open shop. It deals exclusively with actual selling.

Mr. Benjamin: Yes, my lord.

Lord Watson: I think the Arsenic Act of 1851 has at the end a clause which deals only with the seller.

Lord Blackburn: I think section 16, which authorizes an executor to continue such business, must mean to continue it as before, that is to keep open shop.

Mr. Benjamin: Quite so. I quite agree that is the meaning of that, and I call in aid the fact that the Legislature had in view circumstances where it might be proper to excuse an absence of a qualified proprietor, and there is but one case in which carrying on the business without a qualified proprietor is made lawful by the Act.

Lord Blackburn: This section 16, if you are right in your argument that a corporation is within it, does not conflict with it, it is quite clear.

Mr. Benjamin: With regard to what the Lord Chancellor said about section 17, I endeavoured before to point out the necessity of that particular clause in this section only. When you read the section itself you will see why it was necessary particularly to introduce that clause into it; "that it shall be unlawful to sell any poison, either by wholesale or retail, unless the box, bottle, vessel, wrapper or cover in which such poison is contained be distinctly labelled with the name of the article and the word poison, and with the name and address of the seller of the poison." Now, clearly, it might have been contended that the person who sold was the assistant—that it was the assistant—that it was the assistant who was selling without having the box, bottle, vessel, wrapper or cover with the proper label, and with the proper address; and that inasmuch as this is a penal section that the proprietor could not be held responsible for his assistant failing to wrap up the box, bottle, or vessel with the proper paper, and putting on the proper address.

Lord Watson: This is a much wider enactment, it comprises wholesale dealing as well.

Mr. Benjamin: Yes, my lord; therefore taking that alone it became necessary to say inasmuch as this is now made a penal offence, whom do we mean by the seller who fails to wrap the box, or wrap the bottle, and put the proper label upon it? Well then, what we mean, says the Legislature, is that what is mentioned in this section as the seller shall not be the assistant who wraps up, but shall be the proprietor.

The Lord Chancellor: That is exactly what I pointed out. The 15th section is a penal section also. There is also a provision as to the seller in that section.

Lord Watson: This section applies to wholesale dealings, and would certainly include a corporation also, which you would not say is illegal.

Mr. Benjamin: Yes, my lord, that is so. Then this is a criminal act. It is not a penalty of £5 for an offence to be sued for, but "any person selling poisons otherwise than as herein provided, shall, upon summary conviction, be liable to a penalty not exceeding £5 for the first offence, and for the purpose of this section the person on whose behalf any sale is made shall be deemed to be the seller."

Lord Watson: It is difficult to maintain that the word "person" in what you have just read does not include corporation.

The Lord Chancellor: Because the previous part of the section begins differently, it says, "it shall be unlawful."

Mr. Benjamin: This is a regulation for the sale of poisons. It shall be unlawful to do this thing, and if it is done it is the proprietor who is liable. Now, supposing in this very case this registered apothecary do what is here forbidden, and he sells a box or bottle without being wrapped up with a label with the proper address and so forth, who is to be hit? The very words of the section say it is the owner, the proprietor. If a corporation can be a proprietor it is clear.

Lord Blackburn: I should say at present you have made out your point on this section 17, that the word person is used in the sense to include, not only a natural person, but an artificial one, and that consequently if in this business anyone does sell poisons without labelling them, whether wholesale or not, that the corporation would be liable. It weakens the argument against you that in every instance in the Act "person" means a natural person, because it appears there is one where it does not.

Mr. Benjamin: But then I beg your lordships to remember this, you have the view of the Legislature in relation to offences in general, although in a particular Act speaking of convictions and indictments that the word "person" under the Act, defining the offence, does include corporations, because section 14 of the Act of George IV., to which I called attention, says, "wherever this or any other statute relating to any offences, whether punishable upon indictment or summary conviction, I say that those words "whether punishable upon indictment or summary conviction" are not words of limitation.

Lord Blackburn: What are they? It looks uncommonly like it. No doubt it would apply to section 17.

Mr. Benjamin: "That wherever this or any other statute relating to any offence, whether punishable upon indictment or summary conviction, in describing or referring to the offence, or the subject matter on or with respect to which it shall be committed, or the offender or the party affected or intended to be affected by the offence, hath used or shall use words importing the singular number or the masculine gender only, yet the statute shall be understood to include several matters as well as one matter, and several persons as well as one person, and females as well as males, and bodies corporate as well as individuals."

Lord Blackburn: Surely that is an offence. Section 17 does, to my mind, constitute an offence, and consequently the person there would come within that Act. I think the context would show that.

Mr. Benjamin: The 15th section constitutes an offence.

The Lord Chancellor: No, its says, "such penalty may be recovered by the Registrar to be appointed under this Act in the name and by the authority of the said Society in manner following, that is to say: In England or Wales, by plaint under the provisions of any Act in force for the more easy recovery of small debts and demands."

Lord Blackburn: No doubt it uses the word offence. It speaks of an offence, but it is not an offence in the same way as those referred to in the Act of George IV. That is a thing in the nature of a claim, this is a thing for which you are to sue for penalties.

Mr. Benjamin: It is true the Act of George IV. says, wherever we as the Legislature speak of an offence, whether that offence be punishable by indictment or summary conviction, when we use the word "person" we mean corporate body also.

Lord Watson: It is, in fact, a criminal penalty in the one case and a civil duty in the other; that is the distinction.

Mr. Benjamin: I should say so, my lord; it is a very strong indication of the view of the Legislature. One cannot see the reason why a general body should be included when you speak of the offence, and there is an indictment, and not included if it is a penalty.

The Lord Chancellor: I think there is a very good reason, because, of course, a criminal offence is something which is *malum prohibitum* by law, and any person, legal or natural, may be guilty of it who violates the law.

Mr. Benjamin: You will observe this, my lord, that the penalty in this case is in the nature of a fine. It goes to the Crown; it does not go to the informer.

The Lord Chancellor: That seems to be of no importance at all, if it is a criminal offence punishable by summary conviction, although by fine.

Lord Blackburn: Do the fines sued for in the county court go to the Crown?

Mr. Benjamin: Yes, my lord. Section 14 says: "All and every sums and sum of money which shall arise from any conviction and recovery of penalties for offences incurred under this Act shall be paid as the Commissioners of Her Majesty's Treasury shall direct."

Lord Watson: There is nothing said that the application of the penalties is to the Government.

Mr. Benjamin: No, my lord, but they are under the control of the Government.

Lord Blackburn: The object of the statute of George IV. was this. We all know the old decisions had given very strange notions about some offences. There is a definition of forgery where it said forgery was with intent to defraud any person, and there has been a doubt expressed whether the Bank of England was a person. There was an express enactment passed as soon as the doubt was raised to say that the Bank of England, or any other corporation, should be a person within the meaning of the Act. That showed how far people went in their views of criminal acts. There was a doubt raised, and consequently the Legislature very sensibly said, we will settle it.

Mr. Benjamin: In other words, it seems that the decision of the Court given that the Bank of England was not a person ——

Lord Blackburn: There never was a decision that I am aware of, but there was a doubt.

Mr. Benjamin: There was, I believe, a decision; my learned friends have found out a decision.

Lord Blackburn: It may be, but I thought it had never gone further than a doubt, and a doubt which I can only explain as arising from the extraordinary reluctance which existed to hang a man for forgery.

Mr. Benjamin: I trust that this £5 penalty will not raise in your lordship's mind that extreme reluctance.

Lord Blackburn: It is not on that ground. It is not because a corporation is not liable and cannot be imprisoned or hanged, therefore it should not comply with the law.

Mr. Benjamin: Then, my lord, sections 18, 19, 20, 21 and 22, are all for the organization of the Council, and of course have no reference to corporations.

The Lord Chancellor: We may look at them as an illustration of the meaning of the word "person." For example, the 20th and 21st sections provide for the eligibility of all persons registered as chemists and druggists under the Act to be members of the Council, and so on, plainly inapplicable to any but natural persons.

Mr. Benjamin: It still comes back to my point, whatever it may be worth,—it seems to me to be really a very good one,—that this Act is based, as its title indicated, on two classes of sections, one of them having reference to the person——

The Lord Chancellor: I do not think they have very much bearing on it.

Mr. Benjamin: And the other having reference to the offence. All those which have reference to the person have reference to the Pharmacy Act of 1852, which provided a mode of establishing the qualification, registration and examination, and this Act carries it further, and says that it is intended as an amendment of the other Act. But it says also that it is an Act on an entirely new subject, to prevent the sale of poisons to the public. So far as that is concerned, I apprehend that upon the true principles of construction you will take those sections, which have reference to the sale of poisons to the public, as originally independent legislation upon the subject, and entirely disconnect them from all other sections of the Act, which have reference to the qualification of individuals to their examination, and being brought into the Council and registered, and entered in the register.

The Lord Chancellor: It would be a singular thing if, before the passing of this Act, there had been no single instance of a joint stock company of chemists and druggists formed under the Limited Liability Act, and then it would be a very singular thing if, having such companies, they were certainly made illegal by the operation of general words, without any provision for rendering them legal.

Mr. Benjamin: I think you will find in the Act of 1862 a provision, which makes it legal to form a body of any persons over twenty; but a regulation that there is a saving of existing companies.

The Lord Chancellor: I was thinking of the provision of the Joint Stock Companies Acts which you know was many years earlier than this Act in question.

Mr. Benjamin: I have looked over them and I should imagine it would be always found that existing companies were saved.

Lord Blackburn: That is not the point. In 1862 any number of persons could associate themselves for any trade. Apothecaries were certainly not excepted from the Act of 1862. I think, although I do not know whether the fact was that there were any corporations between 1862 and 1868 which were formed for the purpose of carrying on the business of chemists and druggists, it is quite clear it might have been so.

Mr. Benjamin: If that had been so, after all is there anything in this Act which would authorize such companies to go on selling poisons?

The Lord Chancellor: As far as I can see, they could not go on assuming the name, or professing the business of chemists and druggists if you are right, and it would be a singular thing if, by operation of mere general words, without any reference to their case, and without any special provision for it, such as you have for the executors of a deceased person in the 16th section, such companies were certainly made illegal, and all their business stopped.

Mr. Benjamin: I do not know, my lord.

The Lord Chancellor: It may be there was no such company, but at the same time—and we know how largely the Joint Stock Companies Act was taken advantage of—one thinks it would be a very unlikely thing for the Legislature to assume there were no such companies.

Mr. Benjamin: We can discover whether there were any. I rather think there were none.

The Lord Chancellor: If there were not, the Legislature might not have thought of them.

Mr. Benjamin: I do not think I can usefully keep up this discussion further. I have submitted to your lordships everything that occurs to me in support of the judgments of the Court of Queen's Bench; and, looking at the whole of it, I cannot help thinking that Mr. Justice Mellor's judgment is a most satisfactory one.

Mr. Lumley Smith: If your lordship pleases, I am with my friend, Mr. Benjamin, in this case, and I shall occupy but a very short time.

Mr. Benjamin: My lord, I have in my hand that which I ought to have called your attention to for one moment, for what it may be worth, an Act passed in the year 1875, I think it is, a similar Act which was passed for Ireland by the Legislature. It is the 38 and 39 Vic. c. 57, and in the 30th section of that Act the prohibition against keeping open shop has been enlarged, instead of diminished, and in Ireland it is by legislation in 1875 provided that so much of the Act of 1795 as prohibited keeping open shop within the meaning of the said Act by any person, other than a licentiate of Apothecaries' Hall, shall be repealed. Provided always that it shall be unlawful for any person to keep open shop for retailing, dispensing, or compounding poisons within the meaning of the Act of the 33rd and 34th of the reign of Victoria, or dispensing medical prescriptions, unless such persons be registered. So that in Ireland the prohibition goes even to the compounding of ordinary prescriptions.

Lord Blackburn: It does not touch the question whether a corporation be within the Act.

Mr. Benjamin: No; I merely point out to your lordship that the view of the Legislature with regard to prohibition seems to be rather to extension than to restriction.

Mr. Lumley Smith: The general propositions which I ask your lordships to adopt before coming to the particular words of the Act of Parliament seem to be simple, and as far as I know there will be no difference between the counsel on the two sides. It is first of all this: That the word "person" may include the word "corporation." I think that we have already heard from your lordships and probably will be conceded at once. Then I should ask your lordships to say further that "person" does include the word "corporation," in cases where there is nothing in the context which shows a contrary intention. I do not know that that would be disputed. Then I should press on your lordships this, that it does not follow because there are sections in an Act of Parliament in which the word "person" must necessarily be construed to apply only to natural persons that in other sections in which the word "person" may include "corporation," that it must necessarily be so interpreted as always throughout the whole Act to have the same meaning. It may very well be that in some sections the word "person" could from the context only mean a natural person; whereas there are other sections in which, having regard to the mischief which was to be dealt with or the remedy which was to be applied, that the word "persons" could include both corporations and natural persons. And, my lords, there are one or two cases in which the consideration of that question has arisen, and I will shortly bring them before your lordships. There is the case of Boyd *v.* The Croydon Railway Company, in 4 Bingham, New Cases, p. 669. I cannot say that the cases I am about to quote, or arising out of Act of Parliament, are at all resembling this; but there are cases in which the word "person" has been discussed. That was a case of an Act which incorporated a railway company, and there was a provision which is very usual in such Acts of Parliament, that no action was to be brought against any person for anything done in pursuance of this Act without twenty-one days' notice given to the defendant, and the decision of the Court of Common Pleas there was that the word person included company, and that they were entitled to notice on being sued for obstructing the way in carrying the Act into effect.

The Lord Chancellor: It is very obvious that in such an Act as that that the company was the person primarily dealt with. The powers are all given to the company.

Lord Blackburn: If "person" can include a corporation, and it is not disputed that it can, I should think that it ought to have included it in that Act.

Mr. Lumley Smith: In that case there was this point on which great stress was laid, that there was an interpretation of the word corporation. The word corporation frequently occurred in the Act, and in the interpretation clause there was an interpretation of the word "corporation," and the argument was that as throughout the Act of Parliament wherever "company" or "corporation" was meant there had been an interpretation clause, that the word "person" must mean something else; but Chief Justice Tyndall there says this: "On a proper construction of the 109th section I think the company are within this protection in many parts of the Act; it is true that the word 'person' cannot include company, as where it is put in opposition to the word company, or is expressly confined to directors. The question is whether in section 109 it is used in such a qualified or restrictive sense. Looking at the whole section it seems clearly to embrace every description of person who shall have proceeded *bonâ fide* to carry the Act into effect," and so on. Mr. Justice Parkes says this: "In a statute which contains nearly 200 sections, there may be several in which the word 'person' does not include the word 'company.'" It does not follow that there may not be others in which that word does not clearly comprehend them. I am only using that to show that it does not follow that the word person must necessarily have the same meaning throughout the Act of Parliament. There is one other case to which I will also draw attention in which the same rule is laid down. That is the case of Cortis *v.* The Kent Water Company, 7 Barnwell and Cresswell, p. 314. That is a case in which by an old Act of Parliament for lighting and paving Woolwich, and for the relief of the poor, certain persons, commissioners, were entitled to levy a rate upon every person or persons who held, occupied or possessed land in the parish. There the argument was that "person" did not include "corporation" and that the rate as made against them was bad. It was held after discussion that the corporation were included and that they were liable to be rated. There was considerable stress laid upon this that the mode of appeal given to the persons rated and who were aggrieved was by appeal to the quarter sessions in which the appellant was bound to enter into a recognizance, and it was argued that inasmuch as a corporation could not enter into a recognizance that therefore it did not come within the provision of the Act. Mr. Justice Bailey upon that, after drawing attention to the fact that under the old Poor Law Acts, occupiers and corporations had always been rated and that there was nothing in this Act which showed an intention to relieve corporations from a liability which previously existed, goes on to discuss the question as to the word "person," and he says the first objection to the plaintiff's right of action was that a body corporate does not come within the meaning of the 16th section of the 47 Geo. III. c. 111; and he says there does not appear to be any intention to exonerate any person who was liable before that time to contribute to the poor rates. Then he goes on: "The word 'person' may be confined to individuals in their natural capacity, and it may extend to bodies politic. By the statute 43 Elizabeth, which was a statute *in pari materia*, every competent person, or vicar, or keeper of any land or tenement was liable to contribute to the relief of the poor. Now, these words do not of necessity extend to a corporation, but they have been construed to include the corporation. The statute also gives a right of appeal to any person or persons aggrieved by any rate. It is said in this case that it must be collected from a consideration of the clauses of this Act that corporations were not intended to be included, inasmuch as the person or persons appealing against the rate are required to enter into a recognizance, and that a corporation cannot do so. If it were necessary to decide that point I should pause before I decided that a corporation were not competent to enter into a recognizance. I am aware there is a dictum to say they cannot do so; but they may appoint an attorney," and so on. Then Mr. Justice Littledale in the same case, speaking of that portion of the argument which was addressed to entering into recognizances, said: "It has been said that as the 106th section gives an appeal to every person aggrieved, but he has to enter into recognizances with two sureties, and as a corporation cannot enter into recognizances, those provisions show clearly that a corporation was not intended to be included by the Legislature in this Act of Parliament, because it could not be intended to compel a corporation to do an act which is impossible. But where an Act of Parliament directs a thing to be done which it was impossible for a corporation to do, but which other persons may do; and another act, which a corporation as well as others can do, then the corporation will be excused from doing the thing which it cannot do, and will be compelled to do the act which it is capable of doing. Assuming therefore, that a corporation cannot of itself enter into a recognizance, still its sureties may, and I think, therefore, that a corporation might satisfy this clause with regard to sureties. I would remark with regard to the reasoning of Mr. Justice Littledale, where certain acts have to be done which a corporation cannot do, that it may be excused from doing it. I think if the case had arisen, before the passing of this Act, of a company carrying on the business of a chemist and druggist, such as it has been suggested the Society of Apothecaries were doing, that they would not be prevented from registering by the form in the schedule. If there were some words used in the schedule which were inapplicable to a corporation, but nevertheless the Act of Parliament showed an intention that corporations might be registered, or rather the Act of Parliament gave the power of being registered to all persons who had carried on the business, probably some other form of application would have been held sufficient, and would have entitled them to be registered.

The Lord Chancellor: Do you say, in addition to that, that under the 18th section a corporation may be eligible to be elected, and to be a member of the Pharmaceutical Society?

Mr. Lumley Smith: No, my lord, certainly not, because the power of being a member of the Pharmaceutical Society is confined to persons who could register as chemists and druggists, and must be personal. Ordinarily a pharmaceutical chemist must have been examined.

The Lord Chancellor: It says, "Every person who, at the time of the passing of the Act, is or has been in business on his own account as a chemist and druggist as aforesaid, and who shall be registered as a chemist and druggist, shall be eligible to be elected, and continue to be a member of the Pharmaceutical Society according to the bye-laws thereof." Those words, "every person," seem to include anyone who may be so eligible.

Mr. Lumley Smith: I have not got the bye-laws here before me, but no doubt the bye-laws would prevent a company coming in.

The Lord Chancellor: Supposing they do, that would diminish the force of the observation, that every person was required to be registered who is expressly declared to be capable of being elected a member of the Society, and therefore no person can be required to be registered who, either by the bye-laws or otherwise, could not possibly be a member of that Society.

Mr. Lumley Smith: I do not, of course, willingly admit the latter part of your lordship's proposition that, because they may be registered and yet were not eligible to be members of the Pharmaceutical Society, that it follows that they could not be registered unless they could be members. It may be. It may be it does state it in terms; but there is no doubt that those enabling sections were intended to apply to individuals and not to corporations.

The Lord Chancellor: It seems strong evidence that the Legislature thought it required registration only of persons who could be admitted to the privilege.

Mr. Lumley Smith: On that I think there is no doubt it may be taken as a fact that at the time this Act of Parliament was passed, there was no company in existence which was carrying on any business of this kind.

The Lord Chancellor: If that could be shown in any way that we are at liberty to take notice of it would be at least useful for us to know it.

Mr. Lumley Smith: In the year 1868 there were, of course, a good many companies, but they were all registered and the registry would speak for itself. It is a public document.

Lord Blackburn: Have you looked at the registry to see?

Mr. Lumley Smith: I am told, as a fact, there are none. I do not know that it has been searched.

Mr. Wills: I believe there were several already in existence dispensing their own drugs.

Mr. Lumley Smith: At the time this Act was passed, there are the blue books, and the select committee, and so on, and the facts seem to be these: There were no companies formed at all for the purpose of carrying on the business of chemists and druggists. There were certain co-operative stores coming into existence. I believe the Civil Service Stores was begun the year before this, about 1867, but at that time none of them had commenced the business of dealing in drugs.

The Lord Chancellor: If they were not registered as chemists and druggists I should not think it would very much affect the question.

Mr. Lumley Smith: As far as we have been able to trace back the first and only connection of the stores with chemists and druggists arose in this way: that certain chemists were willing to give advantages to customers who were members of the stores, and it was not until some years after the passing of this Act of 1868 that any of them began the system of selling drugs. I may say a word about the stores. The ordinary stores are not companies, such as this which is now before your lordships, because the theory of the large co-operative stores, such as the Civil Service and the Army and Navy, is that they supply only members. The privilege may be abused and goods may be purchased by or for other persons who are not actually members, but the theory of the stores is, that it is an agglomeration of persons buying wholesale and therefore at a cheap rate for division amongst their own private personal members, and it is very much in that respect like the supplying of wines to members of a club.

Lord Blackburn: A great many co-operative stores, as they are called, now have shareholders.

Mr. Lumley Smith: It is confined to shareholders.

Lord Watson: I think they have both shareholders and members.

Mr. Lumley Smith: I am not sure about members.

Lord Watson: They have shareholders who participate in the profits, and a number of persons only members who are not shareholders, but who have leave to buy. They do not sell to the whole of the public.

Lord Blackburn: It is not because it is a store that this body would be excluded, but because it is a corporation.

Mr. Lumley Smith: It does not at all follow, if their case came before the Courts on the legality of selling drugs to a member by the Army and Navy Stores, or the Civil Service, that it would be found on that case that it was an open shop. Here it is found as a fact in the case that it was an open shop, established for sale to the public and it is an open shop.

Lord Blackburn: The mischief would be obviously quite as great; the chance of a member of the co-operative stores being poisoned if the stores left it to women or children to administer their drugs, which I do not think they would do, is quite as great as anybody else.

Mr. Lumley Smith: If he is a member he is a consenting party; there will be no *injuria.* I think, my lord, those are all the general remarks I have to make; but there is one other case which Lord Coleridge considered recently, a case of the Guardians of Shoreditch against Franklin. The only remark of Lord Coleridge that I should quote in favour of my view is one which, I think, would hardly be disputed—that "person" included corporation, and the Act must be considered *secundum subjectam materiam.*

Lord Blackburn: This decision then, I think, was not a "person" within the meaning of the statute, where the person aggrieved sued for the penalty.

Mr. Lumley Smith: On this ground, that a common informer had to make an affidavit, and a corporation could not.

Lord Blackburn: The common informer used to have to make an affidavit. If I recollect right they never could be informers so long as common informers were required to make personal affidavits; but then when the making of the affidavit had been taken away, the argument was that the incapacity of corporations remained.

The Lord Chancellor: Where is that case?

Mr. Lumley Smith: It is in the 3rd C. P. Division, 337. He no doubt said that they never had been common informers. His words are, I think it undesirable that corporations should be common informers. The general doctrine of the text-books is against it, and there is no doubt under the earlier statute corporations could not be informers, because they could not make affidavits, and I think they cannot in this case. He seems rather to have gone on grounds of public policy. The proposition I should cull from it is this: "Undoubtedly the word 'person' may in one sense include a corporation, but the Act must be construed *secundum subjectam materiam,* and we must ascertain whether a corporation is within the words."

Lord Blackburn: That principle I should think your opponents would quote, as well as yourself; it is the application of it.

Mr. Lumley Smith: It shows that it is not because it means the natural person in one case, therefore it cannot mean a corporation in another. Now, my lords, broadly on the statute—I do not intend to go particularly through it, but I should suggest this, that there were two things which the Legislature had to look at, that poisons might be sold, and that persons might keep a shop for the sale of poisons. There is no doubt that in ordinary cases where poisons were sold, there would be very great difficulty in tracing the actual hand that sold the poison. There might be large establishments; there might be several assistants, and it would be very difficult indeed to say who actually sold the poison, but it would be very easy to find out who kept the shop. The man's name would be up over the door; he would pay rent, and therefore the difficulty of proof, which Lord Blackburn spoke of lately, seems to have been very much intended to be met by imposing the penalty on the person who kept the shop.

Lord Blackburn: It ought to have said the person who keeps open shop, in which there are not qualified sellers, because the object was not, as far as the protection of the public goes, to punish a man for drawing profit from the sale of drugs; it was to prevent the actual sale by an unqualified person.

Mr. Lumley Smith: I must take the liberty of limiting your lordship's words to the selling of poisonous drugs.

Lord Blackburn: I am not at all sure of that.

Mr. Lumley Smith: Under this Act of Parliament, a man must not call himself a chemist and druggist. The public are entitled to know this; if a man write it on his door that he is a chemist and druggist, they are entitled to know that he has passed his examination.

Lord Blackburn: They mixed the two together, keeping open shop and selling poisons.

Mr. Lumley Smith: No doubt poisons do enter into a large number of things.

Lord Blackburn: He might put up, I am not a chemist and druggist, I am a man who sells various drugs and various medicines which are not poisonous.

Mr. Lumley Smith: Anybody can do that.

Lord Blackburn: But I think anybody who set that up would find his custom fall off.

The Lord Chancellor: It would certainly be a curious thing. The Act prohibits the assumption of the title of chemist and druggist and so on, but it does not anywhere that I see prohibit persons carrying on the business of a chemist and druggist.

Mr. Lumley Smith: Oh, no. I think the history of that is clear when you come to look at the earlier Act. There were before 1852 various classes of chemists—there were a certain number of them who chose to pass an examination, and thereby became pharmaceutical chemists. I dare say your lordship may have seen in chemists' shops very often a very handsome diploma displayed in the shop window with the arms of the Pharmaceutical Society. Therefore at that time a man who voluntarily joined this body had a certain grade, because he was known to be a person of instruction. Then they found that other chemists who kept shops called themselves pharmaceutical chemists, and therefore the Act of 1852 was passed, and the only restriction in that laid on the trade was this, that nobody shall call himself a pharmaceutical chemist unless he is registered as a member of that Society. That is the only restriction.

Lord Blackburn: Is it now settled that pharmaçeutical is right? I remember there was a great controversy when Lord Campbell called it pharmaçeutical or pharmakeutical, I forget which, and it went into the Court of Error, and it seemed to me that the Court of Appeal were more anxious to prove that he was wrong in the way he pronounced the word than in the way he laid down the law.

Mr. Lumley Smith: The Court of Exchequer Chamber thought it was pharmakeutical. I do not know whether the Judicature Act has altered that.

The Lord Chancellor: At all events what you say is that the thing prohibited by the 12th section of that Act was the assumption or use of the title of pharmaceutical or pharmakeutical chemists or pharmacists.

Mr. Lumley Smith: Yes, my lord, that is all.

The Lord Chancellor: That is enlarged by this Act. He must not assume the title of chemist and druggist.

Mr. Lumley Smith: That is so. It goes by steps. It shows the necessity the Legislature felt for making the Act more stringent; but they thought proper to save the rights of those already established. Of course, this Act of Parliament says "you shall not call yourself a pharmaceutical chemist or chemist and druggist, but carry on the trade you may; you may call yourself a herbalist or a wholesale druggist, you may do what you like as to that, but you must not assume either of those titles." Then it gives further bye-laws on the question of poisons. There is this remark suggested as to this prohibition that you are not bound to wait until a man has made a sale. It may be, if a man has a shop open with poisons exhibited in the window, you are not bound to wait until he has actually poisoned somebody or sold poisons; but you can at once proceed for the penalty, and so there is a certain facility of proof given and of preventing poisons being sold by enabling a penalty to be recovered from those who are keeping open shop. For facility of proof it seems to have been considered that the person who was at the head of the shop should be the responsible person. Your lordships see that not only is it considered expedient for the safety of the public that the persons selling poisons and so on should be qualified; but the Legislature is rather desirous that all persons who are keeping the shop should have a competent practical knowledge. My lords, this is not the sole instance of a limit to the capacity of carrying on a business. I may take the case of an ordinary solicitor. It is not everyone who is entitled to carry on the business of a solicitor; it is limited to certain persons. There have been a great number of cases in which it has been held that a qualified solicitor, being in partnership with an unqualified solicitor, subjects himself to penalties. I never heard yet of a joint stock company being formed for the purpose of distributing law.

Lord Blackburn: In the case of solicitors they are officers of the Court. It is a very different position. Any person, not being qualified, who sells, I suppose that must mean the person who superintends the sale. It could hardly be said that if a qualified assistant was there and directs the apprentice boy, who knew nothing about it, to tie up a parcel and hand to the gentleman who was there, that the boy was selling; it would be the head man who was selling.

Mr. Lumley Smith: My lord, I should think that with regard to the sale of poison the actual person who sold would be liable. There is nothing to limit his liability. The more difficult point, if I may put it, is this. Supposing you have a qualified chemist; supposing he has a manager who directs the boy to make the sale; and supposing the boy sells a packet without a proper label.

Lord Blackburn: Do not take the label case, because that is a special section; but take it that I go into a shop and I ask for a pennyworth of strychnine, and that they know me well enough, and that the man who actually sells, the qualified assistant, has gone upstairs and the non-qualified apprentice sells. I take it he would be the person selling and who would be liable to a penalty.

Mr. Lumley Smith: He would seem to come within the Act. Then comes the necessity of making liable the man who keeps the shop.

Lord Blackburn: I do not see that that is a case of necessity. I can understand that the manager of the shop, being himself qualified, might sell by a non-qualified person and so become liable; but I do not see the necessity so long as the qualified person superintends the sale.

Mr. Lumley Smith: You get all these difficulties which have come in, which arise with regard to the proprietors of newspapers when they say, we were not aware that a certain article was inserted, and so on. The Legislature has thought difficulties might arise, because there might be a question whether the master had authorized it. Suppose the master said, "I told the boy always to put the label on."

Lord Blackburn: That would not do. It would be like the old analogy, which explains it very well, the under-sheriff or the bailiff must be present in an arrest. The man who has got the warrant may arrest and the assistants whom he has got with him; but if the assistant arrests, and the man who has got the warrant is not present, it is illegal.

Mr. Lumley Smith: Inasmuch as these penalties were to be recovered before county court judges sitting all over England, who might take different views of the law, and might not have the case argued and the authorities before them, they might have felt a doubt as to whether or not the master was responsible for the act of the boy; therefore, whatever the reason may have been, the Legislature has thought it necessary to make both these matters of offence, either the selling of poison, or the keeping an open shop for the sale of poison; and it seems to have intended that there should be at the head of the business, a man who had a competent practical knowledge. It may be, as your lordships said, that a corporation is not likely to come in and interfere with carrying on the trade; but the Legislature wished to have somebody at the head responsible for having a competent practical knowledge. There is no doubt, if you have a manager who looks after the business, he may be a qualified man, but the interest in the success of a trade which is felt by a paid manager is very different to that felt by a person who is actual proprietor of the business. It certainly seems to have been contemplated that, wherever there was an open shop kept, there should be at the head of it a responsible man, a man who had a competent practical knowledge. When we look at section 1. If it stopped halfway, I apprehend there could be no doubt in the world, that a corporation would be intended—if it stopped at the words "Great Britain." The words are: "From and after the 31st December, 1868, it shall be unlawful for any person to sell or keep open shop for retailing, dispensing, or compounding poisons, or to assume or use the title of 'chemist and druggist,' or 'chemist,' or 'druggist,' or pharmacist,' or 'dispensing chemist' or 'druggist,' in any part of Great Britain." If it stopped there, I apprehend there could not be any doubt in the world.

Lord Blackburn: One would be perfectly incapable of understanding what it meant. Of course "person" there must have included everybody.

Mr. Lumley Smith: Suppose it has entirely prohibited the sale of poisons, as it might prohibit the sale of any particular drug. I will not say it is illegal to sell any drug, but they might have said, "We prohibit the sale of poisons." Then it is clear that would have included corporations. Very well, but it makes an exception. Practically it comes to this:—No person shall keep a shop, unless such person be a chemist.

The Lord Chancellor: It is very probable those words are as important as any in the whole Act for the determination of the matter; but do not they say that such person is contemplated as is within the exception?

Mr. Lumley Smith: That of course is the whole point. I ask your lordship to adopt the proposition that the word "person" in the same Act of Parliament may mean in some cases a natural person, and in others artificial persons, and I ask your lordship to go further and say, that in the same section there is no reason why the word "person" should not mean different things. The whole distinction is this:—in one case you have a prohibitive enactment, and then comes the enabling enactment; and the distinction that runs through that section runs through the whole Act of Parliament.

The Lord Chancellor: Suppose there were an Act of this sort, that no person shall carry on the business of bankers unless he be thirty years of age, would not you say the rule would receive light from the exception?

Mr. Lumley Smith: In that case, perhaps.

Lord Blackburn: Especially if the Bank of England had been carrying on business as Apothecaries' Hall had.

Mr. Lumley Smith: Would your lordships draw the conclusion from that, that a corporation could be bankers nevertheless?

The Lord Chancellor: The words "unless he be thirty years of age" plainly show what sort of person the Legislature had in mind, namely, persons who might be above or below that age. So here persons who may have this class of qualification.

Mr. Lumley Smith: May I put the hypothetical enactment in a different form? Suppose it said "no bank shall be kept in England except by a person of thirty years of age." Then clearly a corporation could not keep it.

Lord Blackburn: That is what Mr. Benjamin put; unwittingly he changed the frame of the words. That is not exactly it.

Mr. Lumley Smith: I am putting it wittingly here.

The Lord Chancellor: There you would have a general prohibition independent of any question of personality and an exception of that provision in favour of persons of a certain age.

Mr. Lumley Smith: That is how I ask you to read this section. I say that is what the Legislature meant.

Lord Blackburn: If I could see that the Legislature meant that, I quite agree it would not be too great a strain; but I have not been able to see that that is what the Legislature meant.

Mr. Lumley Smith: That is the view the Court of Queen's Bench took, that it was intended to be a general prohibition with this exempting power to certain persons.

Lord Blackburn: I am not quite sure that the Chief Justice took that view. It was certainly the view that Mr. Justice Mellor took, and if it were clear that the Legislature meant that there would be a great deal of force in it.

Mr. Lumley Smith: That is really the whole substance of the thing, whether or not, this is a general prohibition, and you get that from the preamble which states that it is advisable for the safety of the public that persons keeping open shop should have a practical knowledge. How can a company have a practical knowledge?

Lord Blackburn: I do not see that the Legislature implies that a corporation may not keep an open shop if their manager has a practical knowledge.

Mr. Lumley Smith: We go by steps. It does desire there should be a competent knowledge, and on this your lordships say you fail to see how far there is a broad prohibition; but when you come to the 17th section it really does contain a broad prohibition. "It shall be unlawful to sell any poison."

Lord Blackburn: But that is not only by retail, but in the earlier part of it, wholesale.

Mr. Lumley Smith: In the 17th section the wholesale is exempted.

Lord Blackburn: No, they are within it.

Lord Watson: They are brought into it expressly.

Lord Blackburn: They are exempted from the rest of the Act; in the 17th they are brought in.

Lord Watson: Therefore it necessarily covers many persons.

Mr. Lumley Smith: Is that so about the wholesale dealers? It says "For the purposes of this section——

Lord Blackburn: Look at the beginning of it: "It shall be unlawful to sell any poison either by wholesale or retail."

Mr. Lumley Smith: There is a special limitation of that lower down in the section: "For the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller, but the provisions of this section, which are solely applicable to poisons in the first part of the schedule (A) to this Act, or which require that the label shall contain the name and address of the seller, shall not apply to articles to be exported from Great Britain by wholesale dealers, nor to wholesale dealing."

Lord Blackburn: I do not quite know how a wholesale person would sell at all, except it is in the ordinary course of wholesale dealing.

Mr. Lumley Smith: It was probably intended to apply to the sale of large quantities by an ordinary chemist and druggist. At any rate, I submit, that really takes all the sting out of the first part of the section. Then I ask your lordships to consider this. What your lordships are pressed with is that no mischief is done by the case of an unqualified person having a qualified assistant. The mischief that would result from a decision upholding the decision of the Appeal Court would be this, that there is nothing in the Act of Parliament that makes it necessary to have a qualified assistant. If it is held that corporations do not come within this Act of Parliament, this company may go on in Tottenham Court Road without any qualified assistant upon it, and yet penalties for keeping an open shop may be impossible.

Lord Blackburn: The penalty for keeping an open shop, but not the penalty for selling.

Mr. Lumley Smith: But, my lord, is that so? because if corporations are not within this Act at all, there is no penalty for selling.

Lord Blackburn: Yes, there is.

Mr. Lumley Smith: If a corporation is not included in this Act of Parliament, then it only comes in by a side wind; because it says that a corporation is included in the case where there is summary conviction. Then it may be so; but if, broadly, corporations are not within scope of this Act of Parliament, then, although there was not a qualified person on the premises, the corporation would go scot free. That would be a most dangerous doctrine to lay down. There is no privilege given to assistants. Whether an assistant is qualified or unqualified is a matter which the Legislature has entirely passed by. The very fact that, in a certain case, power to carry on a business by a qualified assistant is given to executors by section 16, shows that in every other case the mere fact that an assistant is qualified does not entitle a person to carry on business. If corporations are not within the Act at all, they are not bound to have a qualified assistant at all. Now, my lords, one word more as to whether a company could be formed for the purpose of carrying on this business.

The Lord Chancellor: I have sent for Mr. Wilcocks' book on the laws relating to the medical profession, and I find there a charter of King James I. to the Apothecaries' Company, in which they are constituted a corporation by the name of the "Master, the Wardens, and Society of the Art and Mystery of Pharmacopists." Besides various powers of regulation, I think it is pretty clear that they are contemplated not only from that name, but otherwise, as actually selling medicines; because they have been obviously one with the grocers' company, and in another charter under the same name. Then there is this clause "That the master, wardens, and society might have and enjoy all such franchises, privileges, advantages, etc., in respect of aromatics, pharmacy, drugs, and other things appertaining to their trade as they did before when included in the grocers' company," and he also says, at page 19, that even at that period the apothecaries were regarded as a trading company in the city.

Mr. Lumley Smith: That may be. Your lordships will remember this, that the position of apothecaries has changed of late years. In old days the apothecary really was what a chemist and druggist is now, and kept a shop for the sale of drugs. He was not a surgeon; but apothecaries were vendors of drugs. You will remember in "Romeo" he goes to the shop of the "lean apothecary," where he finds all these simples exposed for sale. The chemists and druggists now occupy the position formerly occupied by the apothecary, and apothecaries have become now the ordinary medical men. I have read through this deed, and if your lordships will allow me to tell you in two words what the purport is, I will do so. It recites that there have been certain persons, proprietors of stock, carrying on this business. It recites that the partnership should be dissolved, and then it forms a new partnership, consisting of two classes. One is the first class, consisting of one hundred and twenty persons, each of whom brings in a certain portion of capital. The others, the second class, consisting of two hundred proprietors, bringing in a small quantity of capital. The deed provides that everybody of the second class should be a practical apothecary, that is to say, that he should be an apothecary in actual practice on his own account. Then the first class are to be elected out of the second class, and they must be liverymen. So that it comes to this, that the Society is carried on by two hundred men who must be apothecaries, and by one hundred and twenty, who must be both apothecaries and liverymen of the company. They are entitled to use the premises of the master and wardens and the management—that is the only other point that may be interesting—is to be superintended by a committee of managers, consisting of the master and wardens for the time being, and thirty of the proprietors of the first class. So that the master and wardens are always elected from the livery, and apparently they are all apothecaries. It is really in fact a society of apothecaries. Now we have the fact that that was a partnership carried on at the time when this Act was passed, because the deed is in 1822. I submit to your lordships that in one of two ways that society have been exempted from this Act. First we were pressed with the apprehension that this Act might put an end to the trade of this Society. First of all I have submitted that they might have registered, because they were in fact chemists and druggists carrying on business at that time. There would have been a difficulty about the actual form of the schedule to be signed; but supposing they could not register, then section 16 would have protected them. Section 16 provides that "nothing hereinbefore contained shall extend to or interfere with the business of any legally qualified apothecary." Now, the actual business of an apothecary admitted according to this old charter was not in advising a patient whether he had a fever or not, but in vending drugs, and the actual business of an apothecary was in keeping a shop for the sale of drugs. Then if these two hundred gentlemen or more were all carrying on business under this name of the Apothecaries' Society, being in fact a private partnership, they would be all protected by that section, "Nothing hereinbefore contained shall interfere with the business of an apothecary." Doubtless they would have to sell poisons with labels in the same way. That would come within section 17; but see the position of that section, some stress may be laid on that. The position of section 16 comes immediately after section 15, which is a general one with regard to keeping shop, Then comes that section from which they are not exempted; because when it comes to the actual regulation as to the sale of poisons it is desirable that all the world should be within it. I think, my lords, the position of that section in the Act of Parliament rather goes to show that the previous section was intended to be universal; and then this clause was put in. Only one more word, my lords, on the remark that fell from the Lord Chancellor as to whether it was intended to prevent chemists and druggists taking advantage of the Limited Liability Act.

The Lord Chancellor: I ought to have said the Joint Stock Companies Act.

Mr. Lumley Smith: Yes, my lord. The case your lordship put was the case of certain chemists and druggists. Consider how far the argument would lead. I leave out the chemists and druggists, and consider the proposition whether or not a company could be formed of ordinary persons for the purpose of carrying on the business of chemists and druggists, although they were not qualified persons. I think a difficulty would arise in this way; because the Act of Parliament under which joint stock companies are regulated restricts them to be companies formed for a lawful purpose. Now it is admitted in this case that if an individual was doing what the company have done here, if Mr. Mackness had not formed himself into a company as he did in this case, that it would have been an unlawful act.

Lord Blackburn: It may, if he remained subsequent to 1868; but if he had done it between 1862 and 1868 there would not be a pretence for saying so.

Mr. Lumley Smith: Probably that would be so; but since 1868, supposing we have the case of a firm formed now; if a certain number of persons were to form themselves into a company and to state in their memorandum of association that they were formed for the purpose of keeping open shop for the sale of poisons, that, I submit, would be for an illegal purpose, and the company illegal.

Lord Blackburn: Is it not rather begging the question. It would be because they are prohibited by the Act from doing so.

Mr. Lumley Smith: My friend will admit, I think, that if an ordinary individual had kept an open shop, if Mr. Mackness had kept an open shop, although he had a qualified assistant, he would have been breaking the law.

Lord Blackburn: Probably he would.

Mr. Lumley Smith: If half a dozen or more gentlemen choose to get up a company for doing that which an ordinary individual could not do, I should submit it would be for an illegal purpose. Of course, as your lordship says, it would be begging the question if you say by forming the company they cease to be within the Act. You see in the memorandum of association of this company they carefully give the go-bye to that difficulty, because they are expressly stated to be formed for the purpose of carrying on the grocery business, or the business of Mr. Mackness, and there is not a word about chemists and druggists in it. I do not think I can usefully add anything more to the argument; but I submit that the judgment of the Appellate Court ought to be reversed.

Mr. Wills: I appear, my lords, in support of the judgment of the Court of Appeal, and after the ample discussion which the case has already received so much of the ground has been covered, that my observations may, I think, be compressed within a very few words. After all, the arguments on the one side and the arguments on the other may be put into two or three sentences. The argument of my learned friend is that what is done in the Act amounts to a general prohibition; that certain persons may bring themselves within the excepted words to allow them to carry on this trade; if you cannot do so by reason of your being a company, *tant pis pour vous*. That is the end of it. That is the argument reduced to its lowest form. The argument on our side is that is not so; the prohibition is contained in express words. The words of the section when compared with the words of the rest of the Act of Parliament clearly show that "person" is used in its natural sense, and in that sense only; and inasmuch as there is no prohibition except that which is contained in the section, if you can see by the rest of the Act that "person" there, as in the rest of the Act, meant a natural person there is no prohibition. Therefore, our argument is, looking to the terms of the Act, looking to the object for which the Act was passed, the prohibition is confined to natural persons, and does not mean there anything beyond natural persons. There are certain parts of the argument in the Court below which have been referred to by my learned friend which I will deal with very shortly. For instance, my friends have said something as to the argument which was presented to the Court below to show that "person" does not by any means necessarily, or it may be in Acts of Parliament, presumably, mean a corporation, unless by aid of an extending clause. My lords, the judgment of Lord Justice Baggallay contains a sample of a number of Acts of Parliament, which had been brought before your lordships' notice. I took half a dozen years, taking two or three just about the time when this Act was passed, two or three close to the present session, and one I think in the middle, and I showed them that the class of cases in which the word in question is extended to corporations by express enactment is extremely numerous, and that there is scarcely a case in modern Acts of Parliament where any doubt or question could arise as to the extension of the word "person" to corporations.

The Lord Chancellor: Do you mean that there are many cases which are made very clear, and that, therefore, the previous presumption of law must be changed?

Mr. Wills: I do not put it so high as that. I only point to that as showing the very extensive use of interpretation words in modern Acts of Parliament when it was intended to include corporations.

Lord Watson: That is rather dangerous. You say there are these interpretation clauses, but do you deny that the onus is on you to say that "person" does not include legal as well as natural persons?

Mr. Wills: No, my lord, I do not attempt to deny that.

Lord Watson: I am afraid if you examine the interpretation clauses, in many cases you will find that a statute extends the meaning of a word to a great many things it naturally includes.

Lord Blackburn: I suppose it will answer your purpose just as well, and it would be quite indisputable to say that in common parlance if you use the word "persons" it means natural persons. For instance, no person in common talk would say the London and North Western Railway was the richest person in London. That is that in ordinary talk the word "person" without any strict legal interpretation means a natural person, and the context shows in which sense it is used.

Mr. Wills: I cannot help thinking that the use of the extending clause has become much more common since the Act of George IV., to which my friend referred. There are a great number, and I have looked with some care at the Acts, where that interpretation clause is used, and it seems to be in all of them. They often put penalty clauses which by virtue of that Act of George IV. would extend to every person in certain parts of the Act necessarily, and then, in a number of other sections, where that kind of assistance is not given by any Act which has yet been passed—of course, Lord Brougham's Act, which was passed for shortening Acts of Parliament, effected that; then the framers of the Act have constantly used an interpretation clause for that purpose. Well, my lords, I do not desire to say any more about that, because after all, you really must look closely in all cases of this kind to the language of the particular Act, and I do not think that from the general principles one gets any great assistance. The general principles are tolerably familiar, and are tolerably well established; the difficulty in most cases, when there is a difficulty, is in the application of them. Now, my lords, here what is the mischief which is really intended to be corrected? Unless it may be, which my friends can hardly say, that this Act was framed by those who had one purpose, and passed by the Legislature for another purpose—if the purposes to which it is now sought to apply it had been recited, namely, that of putting an end to all joint stock enterprises in dealing with trade of this kind, I suppose there would have been no chance whatever of getting the Legislature to pass it. My friends have said that there were no companies existing at that day, no joint stock companies, for dealing in drugs, which would necessarily include the sale of poisons. I do not know how that is. There is no evidence on the subject. Those who instruct me say it is otherwise. Those who instruct my friends say one way and those who instruct me say the other; and inasmuch as it is not before the Court, one cannot safely act on any presumption of that kind. All one can say is that there is no conceivable reason why that should not have been the state of things. Joint stock enterprise had been very largely used already in the year 1868, and especially since 1852, since the Limited Liability Act has been introduced, and nobody can doubt that this is a business which offers a great deal of temptation to embark in because it is one in which profits are ordinarily supposed to be large, as compared to the amount of capital embarked, and it is also a business which presents no difficulty whatever, in the nature of it, to carrying it on satisfactorily by properly qualified persons, managing, buying, selling and dispensing goods.

Lord Watson: Your argument is much the same in either event, whether there were companies existing or not. There is not much difference between the intention of the Legislature to stop a company from trading or to prevent corporations trading in future.

Mr. Wills: But there is one salient exception to any doubt or uncertainty on the subject, and that is the one that has been already presented to your lordship's mind, namely, the case of the Apothecaries' Company. I was very much surprised to hear it suggested to-day, because we threshed this out pretty well below, and no suggestion was made there that we were in error, that the Apothecaries' Company had for a great many years past carried on this trade. Now, it appears they do carry it on in their own name. We know perfectly well that every bottle we get which comes from there is marked with the name of the company, and one supposed that was so. It turns out now that the business is an apothecaries' business carried on in the name of masters and wardens of the corporations, only that certain other persons who provided the capital, I suppose there having been no capital the property of the corporation itself, which had not some specific distinction which made it difficult to apply it to the purpose of carrying on the trade, and so they get certain other people to supply the capital; but the business is carried on in their name, and the only result is that the profits must be disposed of in a particular way and for the benefit of particular persons. Now, can it have been the intention of the Act of Parliament, as it is undoubtedly the effect of the Act of Parliament if my friends are right, to prevent the Apothecaries' Hall dealing in medicines in future? To state the proposition is its own refutation and yet how can it be doubted that, if my friends are right, that consequence must follow? My friends have dwelt much on the fact of all the individual corporators or members being duly qualified apothecaries; but duly qualified apothecaries are just the persons who are not entitled to carry on this business, because there is a provision in the earlier Act that so soon as a pharmaceutical chemist becomes an apothecary under the licence of the Apothecaries' Hall, that he is to cease to be a pharmaceutical chemist; therefore these persons are expressly disqualified from carrying on this business. They are persons expressly excepted from those protected by this legislation. It is true, it is said that nothing shall interfere with the business of a legally qualified apothecary, but the business of a legally qualified apothecary is not the vending of drugs, but making them up for his patients.

Mr. Benjamin: Will you refer to the clause of the Act in which it says that. You will only find that he ceases to be a member of the Society, not to be a pharmaceutical chemist.

Mr. Wills: I believe it is there. I will not stay to look now; but I am convinced there is some such enactment. Yes, it is section 11 of the Act of 1852. "That no person who is a member of the medical profession, or who is practising under right of a degree of any university or under a diploma or licence of a medical or surgical corporate body, shall be entitled to be registered under this Act, and if any registered pharmaceutical chemist shall obtain such diploma or licence, his name shall not be retained on the said register during the time that he is engaged in practice as aforesaid." That is the diploma or licence from a medical, surgical, or corporate body. I suppose that does not apply to Apothecaries' Hall.

Lord Watson: But he may dispense.

Mr. Wills: I thought it was not only licentiates of medical bodies, I thought it included Apothecaries' Hall.

Lord Blackburn: No.

Mr. Wills: I may be wrong there; but the fact of persons being legally qualified apothecaries does not make them—and that is quite enough for my purpose—pharmaceutical chemists. One really is almost entitled to complain of the extent to which, in this case, the confusion has been introduced—and it pervaded even one of the judgments of the Court of Queen's Bench—the confusion between the qualification of the individual corporator and the qualification of the corporate essence. I thought nothing was more clearly established than that as soon as a corporation was created by charter or any other means by which a corporation can be created, that the individuals ceased to have any existence, except as persons having rights within the ambit of the corporation; and as far as the corporation itself is concerned, it is a distinct person in law; and that consequently this 16th section, which says, that nothing herein contained shall extend to or interfere with the business of any legally qualified apothecary cannot possibly save the business of Apothecaries' Hall which is not and cannot be a legally qualified apothecary. Now that such a body as Apothecaries' Hall cannot bring itself within section 3 by registration appears, I think, abundantly plain, not only from the provisions with regard to registration, not only from the provisions which regulate the details in which registration is to be effected, but also by the consequence of registration, because one of the numerous consequences of registration is that every person appearing on the register is to be eligible to be a member of the Pharmaceutical Society, and there are further provisions which entitle him to be elected an associate of the Pharmaceutical Society. Then it goes on:—"Every person who at the time of the passing of this Act is or has been in business on his own account as a chemist and druggist as aforesaid and who shall be registered as a chemist and druggist shall be eligible to be elected and continue a member of the Pharmaceutical Society according to the bye-laws thereof; but no person shall in right of membership acquired pursuant to this clause be placed on the register of pharmaceutical chemists, nor, save as is hereinafter expressly provided, be eligible for election to the Council of the Pharmaceutical Society." Now, inasmuch as those sections of that clause apply to every person that is registered, it shows that corporations cannot be amongst every person who may be registered; consequently it shows that such a body as Apothecaries' Hall could not bring itself within the section, and by registration enable itself to carry on its business as having been a person who at the time of the passing of the Act carried on business. Now, my lords, can there be a more complete *reductio ad absurdum* than to suppose that the Act of Parliament meant to put a stop to the sale of poisons, and therefore incidentally to the dispensing of medicines, by the body in England most qualified and most fit in every sense to carry on such a business, the place to which everybody sends if they want to have their prescriptions properly made up with perfect certainty of being right?

Lord Watson: The most serious difficulty that Mr. Benjamin's argument raised on this part of the case was this, that if your construction of the statute were correct, a corporation can never be obnoxious to one of the several penalties imposed by section 15. The contention is, and I think it seems well founded, that any individual, no matter what number of qualified assistants he has, is liable in a penalty if there are found in his open shop poisonous drugs for the purpose of sale; but a corporation may keep any quantity of poisonous drugs for the purpose of sale, with unqualified assistants, and that corporation can commit no statutory offence; and no body can commit a statutory offence on their premises until there is an actual sale.

Mr. Wills: It is impossible to deny that. That consequence has been admitted throughout. It points to this, that for one clause or so, you have unforeseen circumstances to deal with; but the Act of Parliament

I submit was framed without any reference to a corporation and corporations were not thought of. This expression about keeping open shop was thrown in, as it were, by a kind of process of supererogation, something thrown in over and above, having dealt with the sale, which was essential for the safety of the public. I imagine that what was present to the mind of the person who framed this section 1, when he was drawing that section, was not the case of a person who had an assistant at all; but he was thinking in his own mind of an individual carrying on business and selling, without the question of an assistant being present to his mind.

Lord Watson: He must have had in view the difference between selling and keeping open shop.

Mr. Wills: Then this occurred to him:—Well, there may perhaps be a question as to whether sales have actually been effected, and I may as well throw in—inasmuch as the intention is that sales of poisons should be prohibited except by a qualified person—an expression about keeping open shop; it will do no harm, the same people are intended. A man cannot keep an open shop unless he does sell. Unless he sells as well as keeps an open shop, there is no harm done; the prohibition would do no harm, and the same people will be hit in each case. And, inasmuch as what was present to the mind of the person who drew that section was nothing but a natural person, it did not occur to him that there was any reason to draw any kind of distinction in the language.

Lord Watson: It has a much wider application. Apparently it is keeping a shop open for the sale of a particular commodity; because, in the one case, all that the prosecutor has to prove in order to entitle him to the penalty, is that there was an open shop, and that in the shop there were certain articles presumably for sale; that is enough. In tho other case he must prove the actual sale. Of course, he could do that by going in and purchasing.

Mr. Wills: So long as you are dealing with the case of natural persons, really the distinction of the person keeping an open shop is perfectly immaterial, because the person only keeps the open shop for the purpose of sale, and only keeps an open shop for the purpose of effecting repeated sales.

Lord Blackburn: It is to facilitate proof, I apprehend. I suppose as soon as the officer of the Pharmaceutical Society were to go down to a small shop in a little village that the people would at once say they were selling cheese, or bread, or something of that sort; and that if he asked them to sell him a pennyworth of arsenic, they would of course say "no." Therefore it was to facilitate proof.

Mr. Wills: What I was pointing out is that so long as we are dealing with the case only of the individual person, as far as that person is concerned it is quite immaterial.

Lord Blackburn: If that was their object, to facilitate proof, there was no intention to deal with a corporation; because a corporation keeping shop would hardly be within that difficulty; but if your adversaries are right in saying, as Mr. Justice Mellor did, that one of the intentions was that the profits of the trade should be confined to qualified persons, of course, that is a very different story.

Mr. Wills: Of course, my lord. All I have to say is that the recital of the Act does not suggest that to my mind, and I submit to your lordship it is an unauthorized and an unreasonable inference from anything pointed out in the Act.

The Lord Chancellor: Can you tell me—I do not know that it is very material—whether a man would continue committing a series of offences for each of which £5 could be recovered, if he kept an open shop and did not shut it up, or whether it would be one single offence, for which he would be fined £5 once for all?

Mr. Wills: I should think every day, and I do not confine myself to a day.

The Lord Chancellor: Every minute, every hour, or what?

Mr. Wills: I should think so. I should think you might draw a line at any particular moment. You might say, "Up to that moment has he kept an open shop? Yes, he has."

Lord Blackburn: There is something analogous in the Act of Charles II., imposing a penalty on exercising a lawful trade on a Sunday. It has been held that the baker who had sold one loaf had freed himself for the day.

Lord Watson: I think there is a case under the Inland Revenue Act, where there is a penalty inflicted for not entering spirits under a permit to a retail dealer. I think it was held there in an English Court that although the statute provided for daily entries, the dealer was entitled to make the day's entries at one time. They held that the penalty was only applicable from day to day for each day.

Mr. Wills: I suppose that would be because, according to a reasonable course of business, he would have the evening to make up his books.

Lord Watson: Probably here they would hold it was an open shop from the time he opened it until the time he shut it.

Mr. Wills: I should think in strictness you might draw the line at any moment and say that for any perceptible interval between that time and any other time he was liable.

The Lord Chancellor: It would be a reasonable thing, if he got a notice in the afternoon that he was proceeding illegally, and he removed all those drugs at night, and did not put them in the shop the next morning. It would be rather unreasonable to fine him as many times as there were hours in the day.

Mr. Wills: It certainly is a continuing offence.

The Lord Chancellor: It would be as often as a shop is opened and shut, at all events.

Mr. Wills: Every fresh act of taking down the shutters with the intention of keeping them down for the purpose of inviting the public go in and buy.

The Lord Chancellor: It would be a new keeping of an open shop.

Lord Blackburn: I do not think it would be inflicted.

The Lord Chancellor: I only asked the question because there is that point. It looks very much like an adjunct to facilitate proof.

Mr. Wills: However, my lord, I do not feel myself severely pressed by the argument, that there may be possibly some sections which point to an uncompleted cycle of legislation and to a piece of legislation which is not harmonious in all its details by reason of the construction which we seek to put upon it. In other cases you have anomalous results. It is an anomaly if there is something which would be an offence if committed by an individual, and which would bring an individual under liability under the sections in question, and which cannot be committed by a corporation, or does not bring the corporation within the words of the Act of Parliament. That is an anomaly. On the other hand, surely it would be a much greater anomaly to suppose that the Legislature, without saying it, has intended to prohibit the dealing in drugs of this kind altogether by joint stock companies, and a greater anomaly still to suppose that the Legislature intended to shut out the Apothecaries' Hall from dispensing drugs and selling poisons. What seems to me to be conclusive, if I may venture to say so, is that no one can think that it is seriously conceivable that if those who framed this Act, and those who passed it, had thought of the case of a corporation, they would not have made some natural provision applicable to the case of a corporation for enabling corporations to carry on their business with safety to the public, and without violating any kind of clauses which were reasonably intended for the protection of the public. You must suppose, if you are to adopt the construction of my learned friends, that the Legislature either intended by a side wind to close all corporate energy and enterprise in this department, or that *per incuriam* it has done so. My lords, I submit that either of these circumstances is one which any Court dealing with this Act of Parliament would be reasonably anxious to escape from, and that it would feel itself justified in adopting any reasonable construction which would avoid it. My lords, it is remarkable, and it is a matter which formed part of my argument in the Court below, and will form part of my argument before your lordships, that where a general and universal prohibition is intended, and when it is applicable to everbody, in the 17th section, the language is altered. I do not know whether that was done on purpose, or whether it was simply accidental, but so it is. That section 17, as far as the first enactment in it is concerned, is universal. There are qualifying words, which my friend read, in the latter part of the section applying to wholesale dealers; but they do not touch this first part of it which makes it unlawful to sell any poison, either by wholesale or retail, unless the box or bottle be distinctly labelled with the name of the article—of the poison—and the name and address of the seller.

Lord Blackburn: That bears internal evidence of being an afterthought. In the former sections of the Act it is said the penalties should be recovered in the county court; but here there is a clause in which they have not only altered the word, but in which, without any reason for it which I can see, it says "It shall be recovered before two justices."

Mr. Wills: Anyhow, there it is. You cannot argue as to the construction of the clause from it; because the clauses are in different language. Clause 17 alters the language, and in express terms made it a general prohibition. Of course, if the Act of Parliament had said in clause 1 and clause 15 "from and after the 31st December it shall be unlawful to keep open shop for retailing," etc., there would be an end to the matter. If that had been the thing, then my friends would have been well founded in saying: There is a general prohibition in express terms and you cannot bring yourself within the exception. But here there is no general prohibition.

Lord Blackburn: A very slight alteration in the language would do it.

Mr. Wills: It would; but it would be very important.

Lord Blackburn: If it were in these words "shall not be lawful to keep open shop unless by a person duly qualified," that would be clearly nugatory.

Mr. Wills: They have not said that. If they had said that, nobody could have doubted what was intended by the general prohibition. But here, too, as it seems to me, the general purview of the Act and the constant use of the word "person" from the beginning to the end of this Act indicate that the person who framed it and the Legislature who adopted it, did not think of a corporate existence when it was passing this Act and never thought of dealing with it. Can you suppose that the Legislature really meant in dealing with an enterprise of this kind to establish—I do not want to use a word which carries with it a thought of prejudice; nothing is further from my meaning—but can it be supposed that the Legislature really intended to establish a special class of persons to whom the dealings in these things should be confined. I submit to your lordships it is impossible so to hold or so to suppose, and I really do not think anything could be gained by going over the whole ground again and again. The judgments of the Court below are very familiar to your lordships by this time. In the judgments in the Court of Queen's Bench—certainly in the Chief Justice's judgment—there is, I venture to submit a want of distinction between the position of individuals and of corporate existences in which the individual is merged as soon as there is corporate existence; and, as it seems to me, it is quite idle to suggest that the application of this statute could possibly be affected by the fact that the individual corporators, the individual members of the limited company, were or were not, any one of them or every one of them, persons qualified to be pharmaceutical chemists under the Act. The remainder of the judgment deals with a contention which was never mine, and which I humbly submit I ought not to be saddled with, namely, that supposed contention that it was impossible for a corporate existence either to commit an indictable offence or an offence punishable on summary conviction. I said in the Court of Appeal that I never dreamt of advancing such a proposition as that. I must have been very much misunderstood, and my language must have been very unfortunate if it gave rise to any such supposition. One has been too familiar in one's own practice by this time with the hundreds of cases almost which one has argued before the very Court of Queen's Bench, in which there have been convictions of limited bodies carrying on trades; where this, that, or the other offence has been under consideration. And the cases in which actions have been brought, in which railway companies have been indicted for obstructing highways, are so numerous that one must give the go-bye to all one's experience to make such a contention as that; and although a very large portion of the Attorney-General's argument in the Court of Appeal and in the Court of Queen's Bench was directed to dealing with the proposition, yet I venture to say it is one I never made and am not concerned to support. What I have to support is that every part of this Act shows that the very utmost that can be said is, that this particular case of a corporations is a *casus omissus*, and not that the Legislature ever intended to or has by a side wind effected that extraordinary revolution of our notions and brought about that result, the result, namely, of putting a stop at once to corporate enterprise in this class of transactions and shut out the Apothecaries' Hall also. Let me call your lordships' attention to this observation which arises, I think, very legitimately on the Act. I said that the keeping an open shop was a thing, as it were, thrown in supplementary, that it was not really the gist of the protection required. The real gist of the protection required being to prevent the sale, and the preventing the keeping open shop being only ancillary to that, being in an ordinary case an easy way of getting at it where you cannot prove perhaps that the sale has been so effected.

The Lord Chancellor: There is a little difficulty there in the preamble. It states the offence to be keeping an open shop.

Mr. Wills: Yes, my lord; but even there it is only ancillary to the sale. It is not the keeping open shop, it is keeping the open shop because things are sold there and will be sold there if the open shop is kept. If you can satisfactorily prevent the sale, it does not matter a bit whether the open shop is kept or not; but it is the sale which is the real danger. And one observation which arises, with which I intend to conclude what I have to say, as showing that the real danger intended to be dealt with is that of selling by unqualified people, is that where a chemist or druggist dies, so long as the estate in which his relatives are interested remains open and is not wound up, so long is it competent for wholly unqualified people to carry on the business by means of qualified assistants.

The Lord Chancellor: But then it is said that in that case the Legislature expressly desired qualified assistants which it has omitted to do in the case of a corporation; and, therefore, corporations cannot carry on the business.

Mr. Wills: Well, my lord, I should submit that is a very strong argument for saying that the Legislature did not think of corporations, otherwise they would have made an analogous provision in the case of a corporation, especially in the case of a corporation, if such there were, which was already existing. But if the danger to the public consisted in the keeping open shop by unqualified persons —if that were the real gist of the danger—then the unqualified persons ought not to be permitted to keep them for a day; because nobody can say that the mere preservation of a personal interest shall or ought to be put in competition with securing the safety of the public. I submit that that very fact that that has been provided for and that no provision has been made in the case of corporate bodies is a very strong ground for saying that corporate bodies were omitted, not because it was supposed that they were dealt with by the word "person," or because that was intended, but because their case never was present to the mind of the Legislature, which is another way of saying that their case is not included and that their essence is not included in the word "person."

[Adjourned for a short time.]

Mr. Finlay: My lords, I am with Mr. Wills, and propose to add but few words on behalf of the respondents. The proposition for which the respondents contend is that, if the statute provides it shall be unlawful to do a particular thing unless in compliance with a particular condition and that condition be one with which in the nature of things an artificial person, a corporation, cannot comply, the word "person" in that statute shall be read as applying only to natural persons.

The Lord Chancellor: Just state that proposition over again.

Mr. Finlay: If the statute provides that a person shall not do a particular thing except on condition of his complying with a certain proviso with which it is impossible for any except natural persons to comply, the word "person" in such statute should be read as applying only to natural persons.

Lord Blackburn: Unless the context and the object of the Legislature is such as to clearly show the contrary.

Mr. Finlay: Certainly. If there were anything in the context which intended that the enactment was to be read in the more general sense, I should not contend for the proposition; but what I submit, my lords, should be held to be the law is this, that in the absence of anything in the context or object of the Act clearly indicating the contrary intention, the exception is one applicable to natural persons only, that the rule is only intended to apply to natural persons. There have been cases which have been referred to in the course of the argument, by Lord Blackburn, where the law with reference to the meaning of the word "person" was certainly carried to a point for which we certainly should not contend. By a statute relating to evidence of forgery in Harrison's case, which is referred to in 1st Leach's Crown Cases, it was held that the word "person" did not extend to the Bank of England as being a corporation.

Lord Blackburn: In these cases it is tried before twelve judges and if they all agreed the mind would be contented; but it does not by any means follow that the majority held it. It would be probable enough if one of them doubted.

Mr. Finlay: The facts are stated in East's Pleas of the Crown, 2nd vol., page 988, where I find this passage. "Harrison was indicted for forging a receipt under the statute 7 George II. which makes it felony to forge such receipt with intent to defraud any person. Some of the counts in the indictment laid the offence to be with intent to defraud the London Assurance Company and the Bank of England alternately. It was objected that a company or corporation was not a person: and that the Legislature had so decided by passing the statute 31 George II., c. 22, s. 78, which, after reciting that doubts had arisen whether the word 'person' in the statute 2 George II. c. 25, extended to corporations or companies enacted, that they who were convicted of the offences in that statute should have the same punishment, if they committed them against a company or corporation, as if against any person; but it did not mention the offences comprised in the statute 7 George II. The Court reserved this point for the opinion of all the judges, who decided in favour of the prisoner, and he was discharged." Shortly after the statute was passed to remedy this defect.

Lord Blackburn: That would not be a private matter, but probably it was the Home Secretary who was sent to by the advice of the judges, and would have probably granted a pardon. I think it is rather too much to say that is a decision.

Mr. Finlay: It is not necessary for the respondents to contend for any proposition so wide as that case would involve, if that case indeed amounted to a decision; but, in looking at the meaning of the word "person" in this Act, it is of course material to look at the Act for it. This Act is passed for the purpose of amending the Act of 1852. Now the Act of 1852, 15 and 16 Vict., chap. 56, begins by reciting—"Whereas it is expedient for the safety of the public, that persons exercising the business or calling of pharmaceutical chemists in Great Britain should possess a competent practical knowledge of pharmaceutical and general chemistry, and other branches of useful knowledge: and whereas certain persons, desirous of advancing chemistry and pharmacy, and of promoting an uniform system of educating those who should practise the same, formed themselves into a Society called 'The Pharmaceutical Society of Great Britain,' which Society was on the 18th day of February, 1843, incorporated by Royal Charter whereby it was provided that the said Society should consist of members who should be chemists and druggists, who were or had been established on their own account at the date of the said charter, or who should have been examined in such manner as the Council of the said Society should deem proper, or who should have been certified to be duly qualified for admission, or who should be persons elected as superintendents by the Council of the said Society. And whereas it is expedient to prevent ignorant and incompetent persons from assuming the title of or pretending to be pharmaceutical chemists or pharmaceutists in Great Britain, or members of the said Pharmaceutical Society, and to that end it is desirable that all persons before assuming such title should be duly examined as to their skill and knowledge by competent persons, and that a register should be kept by some legally authorized officer of all such persons." Then the 12th section provides that "after the passing of this Act, it shall not be lawful for any person, not being duly registered as a pharmaceutical chemist, according to the provisions of this Act, to assume or use the title of pharmaceutical chemist or pharmaceutist, in any part of Great Britain, or to assume, use or exhibit any name, title or sign, implying that he is registered under this Act, or that he is a member of the said Society; and if any person, not being duly registered under this Act, shall assume or use the title of pharmaceutical chemist or pharmaceutist, or shall use, assume or exhibit any name, title or sign implying that he is a person registered under this Act, or that he is a member of the said Society, every such person shall be liable to a penalty of £5;" and it provides for such a penalty. Now, my lords, that Act provides against acts which it can hardly be supposed that a corporation was likely to commit in order to be a member of the Pharmaceutical Society. Then it was thought in the year 1868 that merely a preventing of persons who had not been examined from following this trade as pharmaceutical chemists or as members of the Society was not quite enough; and it had been by way of extending the prohibition to certain other acts that the statute now in question was passed. That provides that after a certain date "it shall be unlawful for any person to sell or keep open shop for retailing, dispensing or compounding poisons, or to assume or use the title 'chemist and druggist,' or 'chemist,' or 'druggist,' or 'pharmacist,' or 'dispensing chemist,' or 'druggist,' in any part of Great Britain, unless such person shall be a pharmaceutical chemist, or a chemist and druggist within the meaning of this Act, and be registered under this Act." Now when your lordships find that the Act for the purpose of amending which this statute of 1868 is passed is an Act which in the nature of things dealt with what might be done by natural persons only, the presumption is that the amending Act is intended to deal with the same class of persons; and when in the 1st section it is found that the condition imposed upon persons who are to keep open shop is a condition which only natural persons can comply with, we submit to your lordships that the Act should be read as applying to natural persons only. Suppose there had been in former days an Act that no person should carry on a certain business unless he had taken the oath of allegiance, it would have been a very strong thing to say that such an Act was to have had the effect of excluding all corporations from carrying on the business mentioned in that statute.

Lord Blackburn: Such a hypothetical Act would have been rather more hard to construe than the present one.

Mr. Finlay: Each case one puts is merely an illustration of the proposition which we advance for your lordships' approval, that if the condition is one which only the natural persons can comply with, the reasonable way of reading the prohibition it places on persons unless they comply with the condition is to say that only natural persons were intended to be dealt with. Then, my lords, only one word more with reference to the second question which has been mentioned in the course of the case with reference to keeping open shop. My friend, Mr. Benjamin, on Tuesday mentioned the case of Reynard *v.* Chase, which is reported in the 1st Burrows, at the beginning of the volume, p. 2. The statute on which that case was decided was not then at hand; but I have it here. It is the 5th Elizabeth, chap. 4, sec. 31:—"After the first day of May next coming it shall not be lawful for any person or persons, other than such as now do lawfully use or exercise any art, mystery, or manual occupation, to set up, occupy, use, or exercise any craft, mystery, or occupation now used or occupied within the realm of England or Wales, except he shall have been brought up therein seven years at least as an apprentice in manner and form abovesaid." So that the prohibition there is against setting-up, occupying, using, or exercising any craft, mystery, or occupation, and in the case of Reynard *v.* Chace it was held that one not qualified to exercise the trade himself by having served an apprenticeship, by entering into partnership with a qualified person, and only sharing the profits, without interfering in the trade, is not within the statute of Elizabeth, chap. 4.

The Lord Chancellor: Where is Reynard *v.* Chase?

Mr. Finlay: In 1st Burrows, p. 2.

Mr. Benjamin: It is the first case Lord Mansfield ever decided.

Lord Blackburn: That is under the statute of Elizabeth with reference to apprenticeship. The question there raised was whether within the meaning of that Act a sleeping partner in fact required to have an apprenticeship as well as the other.

Mr. Finlay: I mentioned the case because it was assumed by my friend in argument as incontestable that one individual, a member of the firm of chemists and druggists, who was not qualified, would be liable to a penalty for keeping open shop.

The Lord Chancellor: The Lord Chief Justice seems to have assumed that.

Mr. Finlay: Yes, my lord. The case of Reynard *v.* Chase, which is here, certainly seems to be an authority to the contrary. The words, of course, are not identical.

Lord Blackburn: Where breweries had been carried on by a deceased person, and the Court of Chancery had ordered the business to be carried on by the next of kin, for the benefit of the estate, it would be a question whether the Court of Chancery or the next of kin would be amenable to that.

Mr. Finlay: What Lord Mansfield says is this:—"Let us consider whether the present case be within the letter, or even the meaning of this Act. The general policy of the Act was to have trades carried on by persons who had skill in them. Now here the personal skill of the defendant makes no real difference in the case, for the person who is skilful acts everything, and receives no directions from this man; he neither did, nor was to interfere. The case of Hobbs *v.* Young is not parallel. There the defendant, a single man, directed the whole trade; was the master; and directed all the servants. As between master and servant, no doubt that it is the master who carries on the trade and not the servant. But in Hobbs *v.* Young there was no partnership; nor (what is the distinguishing character of the present case) a mere naked sharing of the profits, and risking a proportion of the loss; without his acting or directing at all, in any manner whatsoever. In many considerable undertakings, it is absolutely necessary to take in persons as partners, to share the profits and risk the loss. And the general usage and practice of mankind ought to have weight in determinations of this sort, affecting trade and commerce, and the manner of carrying of them on. It is notorious that many partnerships are entered into, upon the foundation of one partner contributing industry and skill, and the other money. Many great breweries and other trades have been carried on for the benefit of infants and residuary legatees, under the direction of the Court of Chancery. Now if the plaintiff's construction was to hold, the whole direction and decree of the Court of Chancery was contrary to law and to an express Act of Parliament. So it is likewise practised in other great trades. The late Mr. Child directed his business of a banker to be carried on for the benefit of his children and other persons. Many other instances might be mentioned. It would introduce the utmost confusion in affairs of trade and commerce if this construction should prevail. On the other hand, I see no inconvenience; it is exactly the same thing as to the trade, in every iota, 'whether this partner has or has not served an apprenticeship.'"

The Lord Chancellor: I think some parts of that judgment lay stress on some special stipulation. Mr. Child's executors seemed to go further; but I suppose executors there would not themselves have been apprentices any more than the *cestui que* trusts.

Mr. Finlay: No, my lord. Of course I feel on this part of the case an observation may be made on the other side that the proviso in the 16th section in favour of executors would be unnecessary, unless the conduct of the business by a qualified person on behalf of the executor, who did not personally interfere, would otherwise have been keeping an open shop by the executor. But, perhaps it is a fair observation that that proviso may have been introduced by way of greater caution, and to make things quite safe in the case of executors and representatives of a deceased pharmaceutical chemist; that proviso was inserted, but it does not necessarily follow from the fact of that proviso being inserted that keeping open shop is an offence committed by anyone who does not actually take part in it. The Act recites that it was expedient that persons keeping an open shop should possess a practical knowledge of the business. That is important only where the person on whose behalf the shop is kept actually takes part in it himself, so that it can be said that he keeps the shop himself. On these grounds, my lords, I think that the judgment of the Court of Appeal should be supported.

The Lord Chancellor: In connection with this statute you referred to, may I ask—I am not quite sure how it is—but has it not been the custom in the city of London —I am not sure whether it is not in the Act of Parliament which requires that properly licensed brokers shall carry on a broker's business—to treat it as sufficient, if there is in a firm one such licensed broker?

Mr. Finlay: I do not feel able to answer your lordships question.

The Lord Chancellor; Can you answer that question, Mr. Benjamin?

Mr. Benjamin: I cannot, my lord. I only know that the brokers of the City of London are a sort of chartered libertines, and that they carry on business in the name of a licensed man, though, perhaps, there are half a dozen interested in it. They use the name of a licensed broker.

The Lord Chancellor: It was my impression that that is the way in which the law is understood. The business can only be carried on by a licensed broker; but it is thought enough so there be a licensed broker in the firm who carries on the business.

Lord Blackburn: There is a case in Measom and Welsby where I rather think the decision was that there was no infringement of the Act of Parliament, but only the infringement of a municipal regulation.

Mr. Benjamin: I only propose to trouble your lordships on such points as have been raised by my learned friends, because I should take it to be unworthy of such a tribunal to repeat what I have said in my opening. Now, my lords, the first and principal argument of my friend, Mr. Wills, was this, that apparently on the face of the Act, the words "keeping open shop" were something thrown in parenthetically, so to speak, and that the main offence was the offence of selling; upon which your lordships, anticipating what I was about to say in answer to that, said, "But the Pharmacy Act begins in its preamble by expressing that it is expedient for the safety of the public that persons keeping open shop for retailing and compounding poisons shall have a practical knowledge." It does not say a word about selling, which would lead one to suppose, and it so turns out that the supposition is accurate, that the original Act had nothing about selling in it, the preamble having no reference to it. Accordingly I find—I have the whole series of the Bills as they were before Parliament—and I find the original Act was an Act exclusively confined to keeping open shop, and the word 'sale' was introduced afterwards.

Lord Blackburn: Can we possibly construe an Act by the particular words which were put into it in the course of legislation?

Mr. Benjamin: When it is stated as a fact that these words were thrown in afterwards.

Mr. Wills: I did not assert that as a fact.

Mr. Benjamin: However, it answers my purpose completely to say that the preamble shows that the Act as originally produced was to prohibit keeping open shop for the sale of poisons, and that the selling was not in the preamble stated as one of the objects; but you do find selling in the Act itself.

Lord Watson: If the statute had been in accordance with the preamble, it would have afforded very little protection to the public. A qualified person would have kept open shop and sold as much poison as he chose by means of an unqualified assistant.

Mr. Benjamin: Therefore it became necessary not only to prohibit the keeping open shop, but of course it would occur to everyone that there was a great deal of positive convenience in prohibiting the sale of poisons to people—that there was a great deal of opium and other things of that sort sold, which would not be reached by a prohibition to keep open shop. Therefore the prohibition to sell was absolutely necessary for the purpose of the Act. I do not think, therefore, that it is possible to say that the provisions of the Act are mainly directed against the act of selling. The main thing is against keeping open shop; but selling also is made an offence under certain circumstances. Now my friend says if, however, the purpose had been to make the selling unlawful, why was the language changed in the 17th section? That is a fair argument. You find the 17th section begins: It shall be unlawful to sell any poison without a particular label. This section says, my friend says, it shall be unlawful for any person to do so; but why was it changed in the 17th section? It is now conceded that the 17th section does apply to corporations, and therefore the entire argument based on the fact that there are a large number of sections which do not apply to corporations when the word "person" is used, is completely done away with and the argument disappears. But my friend says: Why change the language of sections 1 and 15 from the language of the 17th? The language in the 17th is: It shall be unlawful to sell so-and-so; and the language in section 1: Is it shall be unlawful for any person to do so. Now, my lords, take this section, and leaving out the unnecessary words so as to get at the exact meaning of the phrase as used: "From and after the 31st December it shall be unlawful for any person to keep an open shop for retailing poisons unless such person be a pharmaceutical chemist and druggist within the meaning of the Act and be registered" It is said that none but a natural person can be registered, *ergo*, it is lawful for a corporation to keep open shop for the sale of poisons, because the prohibition is levelled only against those who can pass an examination. But surely, my lord, when you come to see the purpose declared in the Act itself, that the purpose is to protect the public against keeping open shop for the sale of poisons, it is to make that the thing which is to be avoided; that is the thing. Why declare the policy of the Act? The policy of the Act is not to allow open shops to be kept, except by qualified persons. Then the 1st section says: "No person shall keep an open shop for the sale of poisons except a qualified person," because that is the meaning of it. Now as a corporation cannot be a qualified person, where is the difference in sense and in construction between the 1st and the 17th section, upon which my friends rely? Take the 1st section and put it in plain language, such as would be read and understood by an unlettered person, meaning thereby a layman, as we call him amongst us lawyers. "Be it enacted that from and after the 31st day of December, 1868, it shall not be lawful to keep a shop open for the sale of poisons, except by a person duly qualified." Is not that as much a general prohibition as the other? Is not that really what is said? After the 31st day of December no person, except a duly qualified person, shall keep open shop for the sale of poisons.

Lord Watson: That is just the question, whether it is the same thing to prohibit the thing itself or to prohibit certain persons from doing it.

Mr. Benjamin: Then, my lord, in order to settle that you must then see what the purpose of the Act was, and in looking at the purpose of the Act the Legislature tell you what their purpose is. They say it is expedient for the safety of the public that persons keeping open shop shall be duly qualified chemists.

Lord Blackburn: Not exactly; "should possess a competent practical knowledge of pharmaceutical and general chemistry; and other branches of useful knowledge."

Mr. Benjamin: Substantially the idea is the same. The Legislature tell you the purpose is to protect the lives of the subjects of Her Majesty from being exposed to danger by buying poisons. Therefore they provide against keeping open shops. That is the purpose of the Act, to provide against keeping open shops for the sale of poisons. Now that being the policy of the Act, and that view being declared to be accomplished by the declaration that this keeping open shop for the sale of poisons shall be only by persons duly qualified, the question is whether they meant all persons.

Lord Watson: You must not leave out those important words, the remedy proposed for the mischief, that all persons shall be examined. Does not "all persons" include all such persons who are referred to before?

Mr. Benjamin: My lord, I rely on that instead of leaving it out, with submission to your lordship. The purpose is that nobody shall sell except persons that shall be examined. Corporations cannot be examined, *ergo*, corporations shall not sell. That is our argument. The Legislature say: "Our purpose is that no shop shall be kept open except by duly qualified persons." Corporations cannot be duly qualified persons under the Act, therefore we say corporations cannot sell. The other side say: The Act says that none but duly qualified persons can keep open shop, and inasmuch as corporations cannot be duly qualified persons they are not within the Act. Which of those carries out the purpose of the Legislature? The 17th section clearly, as regards certain provisions of the Act as to the sale of poisons, is applicable to corporations. The 15th, 16th and 17th follow each other. The 15th speaks of persons selling poisons who are not duly qualified and on the register. The 16th says what those persons are, and the 17th says if bottles and boxes are wrapped up in any other than a particular way, that shall be an offence. Now why shall not these three be read together; and if you so read them together, unquestionably the 17th, which is the third, referring to the other two, can you adopt the other two and bring the three within the prohibition of the kind named?

Lord Watson: You cannot read them together, because in the first place, even according to your own view, they include all qualified persons. It is not a question of qualification or disqualification. No person, qualified or unqualified, can sell except he complies with those conditions.

Mr. Benjamin: You have an open shop, and the 17th section provides how the business of the open shop is to be conducted.

Lord Watson: It goes a long way beyond the open shop—in a warehouse, or elsewhere.

Mr. Benjamin: No doubt; but it does include an open shop, and it includes a corporation as acting in the way pointed out in that Act, as constituting the offence. My friend, Mr. Finlay, opened his remarks with a general proposition, which I think very fairly stated the question, and which brings us right back to the inquiry to which I have just directed your lordships' attention. He says, their proposition is that where only natural persons can comply with a condition under which it is lawful to keep open a shop for the sale of poisons, there the whole section must be construed as having reference to natural persons; but he adds that it cannot have reference to corporations, because they cannot comply with the conditions. Now I say, my lords, that that proposition cannot be maintained; that there are numerous cases in which particular privileges of practising or doing acts are allowed by law to certain classes of persons who can comply with certain conditions, and that it is a false conclusion, a false inference to draw from that premise, that because other persons cannot comply with those conditions, therefore they may do the thing without complying with them. It is just the reverse of a fair inference, according to my views.

Lord Watson: This would shut out not only all the female sex—I do not think they are within the charter and the Act of Parliament?

Mr. Benjamin: Oh yes, my lord, we have many female practitioners who have received their diplomas. There is no doubt about that. Besides which, "persons" would always include the two sexes. It has been held that politically the word "person" does not extend to females, but we have ladies members of our Society. Our contention is this:—If the Legislature says we do not want open shops to be kept for the sale of poisons except by really qualified persons, we say, you therefore cannot keep it, because you cannot be duly qualified.

Lord Watson: I do not doubt that. I do not think it is controverted, if the Legislature have said that.

Mr. Benjamin: That is substantially what they have said.

Lord Blackburn: If you can show from the nature of it that the Legislature really meant that the form of words would do it. But you assume the Legislature have said that, and you change the form of words.

Mr. Benjamin: My lords, I only say that because of what they have said is the purpose of the Act.

Lord Blackburn: You rest on the preamble.

Mr. Benjamin: Yes, my lord, I rest on the preamble. My friend has referred to Harrison's case in the first Leach. But, my lord, that case proves nothing. The facts were these. There were two successive Acts of Parliament making criminal the offence of forgery to the detriment of any person or persons. I do not say I am using the exact words, but that was the substance of them; and doubts were entertained whether, under the word person or persons, corporations were included. Parliament then passed an Act, by which it said that corporations were included in the first of the second Acts, but did not say anything about the construction of the second Act. Then a prosecution having been brought forward under the second Act it was argued, Parliament has had this matter under consideration, and it has decided that "person" or "persons" means corporations in the first of these two Acts; but it has not said it is so in the second, therefore the fair inference is that in the second it means natural persons.

Lord Blackburn: Surely that is very bad reasoning. The construction would be as it was before.

Mr. Benjamin: I am stating the fact, my lord, not maintaining an argument. Under those circumstances the Court held they could not hold that the second Act applied to corporate bodies as well as to individuals, because Parliament had not connected the two Acts at the same time, or rather, having the two before it had only dealt with one, and thereupon a second Act was passed for the second.

Lord Blackburn: I rather think you are stating the case too highly. It does not appear that anything of the sort was held. It was only that the result was that there should be a second argument; for it was never bad, for in the interim the Government made up their mind to pardon the man, and passed a new Act.

Mr. Benjamin: That would rather strengthen the view of the case I am putting before your lordships. Now, my lords, we come to the case of Reynard *v.* Chase. That case applies to a partnership, and says that where the law has made it illegal for a person to carry on a business who has not gone through the apprenticeship required by the statute, that person may take another into partnership with him and may continue the original trade if the silent partner takes no part in it at all. But in that very case my friend overlooked the fact that his lordship, Lord Mansfield, distinguished it from a former case in which there was no partner, and then he said the whole business was not the business of the servant, Longmore, as stated in the statement of facts here. But it is the business of the master, and consequently a business conducted by the defendant company, whether right or wrong, whether lawful or unlawful, is a business conducted by the master who is unqualified. Longmore is merely a servant who obeys the order of the master; and Longmore's qualification cannot give a qualification to the master. The master, as an individual, would be violating the Act; and the whole question is whether the Legislature have drawn an Act in such a fashion that if a single individual conducting this business on his own responsibility would unquestionably be committing an unlawful Act—if all the members conducting this business, each one of them in an ordinary partnership, they would be doing unlawful acts; but because the Government says by charter of corporation under the Companies Act, 1862, they may carry on business, that enables them to defy the Act of Parliament, and carry on the business which otherwise they could not carry on. I apprehend as to the danger to the public it is just the same.

The Lord Chancellor: I see Mr. Serjeant Hill was very angry with the decision in Reynard *v.* Chase, from the two notes of his, one at the beginning and the other at the end.

Mr. Benjamin: Mr. Burrows in reporting it says it is not a good decision.

The Lord Chancellor: I think you are referring to the note of Serjeant Hill. In the advertisement to Burrows, in the edition I have in my hand, it was said that the publishers have in their possession a copy of these reports which belonged to the late Serjeant Hill, and have ventured to add to this edition a variety of valuable notes, etc., which he had made in his copy, and which are now for the first time presented to the public. These will be found at the bottom of the page in the shape of notes, or in the margin enclosed in brackets. At the bottom of page 2 is the first of the notes I have referred to, and that is repeated again. I mean there is another note of the same character at page 9, and both of them I assume are notes of Serjeant Hill, judging from that advertisement.

Mr. Benjamin: My lord, I had seen the notes, and I thought they were notes of the editor. I had not seen the passage your lordship has read, stating that they were Serjeant Hlil's notes.

Lord Blackburn: It is not likely that Sir S. Burrows would have said anything against a decision of Lord Mansfield. Was Serjeant Hill a counsel in the case?

Mr. Benjamin: I believe not.

The Lord Chancellor: It must be the first case Lord Mansfield decided.

Lord Blackburn: If Serjeant Hill was a counsel in the case it would hardly be judicious for him to dispute the judgment.

The Lord Chancellor: I do not think he was.

Mr. Benjamin: I really do not think, in this case Reynard *v.* Chase adds anything to the argument of the appellant.

The Lord Chancellor: On the whole I should be inclined to think, as far as the specific question was concerned, taking Reynard *v.* Chase and Hobbs *v.* Young together, the bearing is rather in your favour that otherwise, as far as it goes.

JUDGMENT.

The Lord Chancellor: My lords, I cannot say that this case appears to me to be one free from difficulty, especially as we have two Courts of high authority differing from each other, the Lord Chief Justice and Mr. Justice Mellor having taken the view of the statute for which the appellants contend, and the Court of Appeal the opposite view. My lords, the question really comes to be one upon the construction of particular words in the 1st and 15th sections of this statute, having regard to the general principles on which ambiguous words such as "person" ought to be construed. There can be no question that the word "person" may, and I should be disposed myself to say *primâ facie* it does, include in a public statute a person in law, that is a corporation as well as a natural person; but it is never to be forgotten that although that is a sense which the word will bear in law, and as I said perhaps should be attributed to it in the construction of such a document as a statute, unless there be any reason for a contrary construction, yet, that in its popular sense and ordinary use it would hardly extend so far. Therefore, as statutes like other documents are constantly conceived according to the popular use of language, it is probable, and may be taken to be certain, that the word is often used in statutes in a sense in which it cannot be intended to extend to a corporation, and that accounts for the frequent occurrence in some statutes, in interpretation clauses, of an express declaration that it shall extend to a body politic or corporate, and in other statutes, of which an example will be found in one cited during the argument by Mr. Benjamin, I mean the Act as to apothecaries, in which there will be found clauses which say, as in that instance, that remedies by persons who complain of acts done under colour of the authority of the Act, or in pursuance of it, must be prosecuted within a certain limit of time against all persons or bodies politic or corporate, which upon the face of the Act shows that corporations were contemplated. Now, I hold that with some qualification the language used by the junior counsel for the respondents is substantially right, that if a statute provides that a person shall not do a particular act, except on condition of his complying with a certain proviso, *primâ facie* it is the natural and reasonable construction of such a statute, unless there be something in the context, or in the manifest object of the statute, or in the nature of the subject matter to exclude it—*primâ facie* I say it is the natural and reasonable construction of such a clause that by the use of the word "person" the Legislature contemplates one of a class of persons who may or may not do the act, or who are capable of doing the act, the doing of which is to take them out of the scope of the provision. Now, if that be a sound observation, it appears to be decisive of this case when we look to the language of the 1st and 15th sections. The 1st section, merely transposing the place in which certain words are used, is this:—"From and after the 31st day of December, 1868, it shall be unlawful for any person, unless such person be a pharmaceutical chemist or chemist and druggist within the meaning of this Act, and be registered under this Act," to do certain things. *Primâ facie* that contemplates a class of persons who may or may not be pharmaceutical chemists or chemists and druggists within the meaning of the Act, and be registered under the Act. What class of persons can be such pharmaceutical chemists or chemists and druggists, and be registered? Can a corporation, or can it not? My lords, I think it clear upon the sequel of the Act that a corporation cannot be so. A corporation certainly, looking to the former Pharmacy Act, cannot be a pharmaceutical chemist, nor can it be a chemist and druggist within the meaning of this Act, and be registered under this Act; because the 3rd clause says:—"Chemists and druggists within the meaning of this Act shall consist of all persons, who, at any time before the passing of this Act, have carried on in Great Britain the business of a chemist and druggist in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners." That indeed might have applied to a corporation if a corporation could be registered. But then with regard to that class of persons who had previously carried on such a business, the 5th section requires them to be registered, and in order to registry requires a claim to be made by a notice in writing, signed by the person, which notice is to be in the form set forth in the schedule. I do not see myself that it is possible to suppose that the Legislature contemplated that anyone but a person who could sign the claim was to be registered under those clauses. In addition, I find in the 18th section, this is expressly provided:—"Every person who at the time of the passing of this Act is or has been in business on his own account as a chemist and druggist, and who shall be registered as a chemist and druggist, shall be eligible to be elected and continue a member of the Pharmaceutical Society according to the bye-laws thereof." That appears to me plainly to show that the Legislature enforced and required the registration of persons who before the Act carried on business as chemists and druggists in a sense applicable only to those who could become members of the Pharmaceutical Society, in other words, only to individual persons. With regard to those who should afterwards carry on business as chemists and druggists, the Act plainly, I think, shows that they must undergo certain examinations which are wholly inapplicable to any corporation. The conclusion, therefore, which I come to is that these words, "unless" and so on, are inapplicable to any corporations; that there being not a general prohibition of the trade or business, but merely a declaration that it shall be unlawful for a person, unless he complies with certain conditions, to carry on these otherwise lawful trades or businesses, not only keeping a shop for retailing poisons or selling poisons, but also to assume the title of chemist and druggist, or chemist or druggist, I cannot, my lords, but think that it is a sounder construction of the word "person" to hold that only such persons are contemplated as might, by taking proper means, comply with the condition and so enable them to carry on the trade. Exactly the same observations occur, my lords, upon the 15th section. There, again, transposing only the words which occur in it, we find—and this is the section which imposes the penalties in question—the enactment is this: "From and after the 31st day of December, 1868, any person not being a duly registered pharmaceutical chemist or chemist and druggist; who shall sell," etc., and again, or who not being a pharmaceutical chemist, "shall take, use or exhibit the name or title of pharmaceutical chemist" shall be subject to certain penalties. The words follow also, "or who shall compound." I think, having reference to the particular act of compounding mentioned on each occasion, it rather fortifies than otherwise what I may describe as the individual—I was going to say personal—construction, but the very use of that word exemplifies the difficulty of applying the word "person" in the popular sense otherwise than to individuals. Well, my lords, if you look through the Act it will be found that there is only one place in the Act where it is necessary to put upon the word "person" the larger sense, and that is in a clause which is in several respects remarkably contrasted with the rest of the provisions of the Act, I mean the 17th section. It begins with a general prohibition in unequivocal terms. Not it shall be unlawful for any person not coming under a certain definition to sell, but it shall be unlawful to sell at all, absolutely, unconditionally, to sell any poison as to which certain precautions are not observed. And that is repeated. It shall be unlawful to sell, it says at the beginning; and four lines afterwards, it shall be unlawful to sell, again; and, as I say, that is a universal prohibition not qualified by any exception as to the person, though no doubt the thing which is made unlawful is a thing done in a certain manner, or without the observance of certain conditions. In addition to that, the penalty there is not like the penalty under the 15th section, a civil debt to be recovered by a civil form of proceeding, or action, notwithstanding that it is for what is called an offence; but it is a penalty to be recovered upon summary conviction before two Justices. And then these words are added: "And for the purposes of this section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller," which, the thing being made universally unlawful, I think must include a corporation, if the sale was made by any apprentice or servant on behalf of the corporation. My lords, it appears to me that the difference in the phraseology of that section from the rest is such as not to justify any other construction of the word "person" in the other sections, than that which it ought to have received if the 17th section had not been in the Act. And with regard to the main argument of the appellants, which would be a very important argument indeed if it were sustained, that the object of the Act would be defeated unless a corporation as well as an individual were included, it seems to me, my lords, that that argument cannot be successfully maintained. The act of selling, the act of compounding, and every other act mentioned in these two sections, by which penalties are imposed, and also in the 1st, is struck at, whether done by the principal to whom the business belongs or done by the person whom he employs to carry on the business. The words "keeping open shop" may not perhaps be so, and upon those I will make an observation presently; but that the word "sell" is, and that the word "compound" probably is, I think is clear from that very clause I just now read in the 17th section, that for the purpose of that section the person on whose behalf any sale is made by any apprentice or servant shall be deemed to be the seller. My lords, that indicates—I will not say necessarily—but naturally implies that that is a special construction for the purpose of the particular section, and is not to be extended to sale where mentioned in other sections; and, my lords, I will add that regard to the mischief which, beyond all controversy, the Act was intended to prevent, leads necessarily to the same conclusion; that he who sells, whether he be master or servant, whether he be the principal or the person delegated to conduct and manage the sales, is struck at by the 15th section, because otherwise you get this, that a very wide door would be open to all the things which the Act is intended to prohibit. Nothing more would be necessary according to the appellants' argument, if it were otherwise, than that the business should belong to a person who does not himself carry it on, but who is qualified under the Act; and he might be at liberty to employ in the management of his business persons not qualified. By them the actual sales would be conducted, and the public would suffer those very evils which the Act was intended to prevent. The Act therefore, to be effectual, must strike at the particular acts of those who actually conduct the sales—who actually compound the medicines. And if it does strike at those acts, no doubt that the words, "keeping open shop" extend to something more and will comprehend a person who keeps an open shop, although he may not with his own hands do all the business of the selling or compounding medicines, and who is the master or proprietor of the premises, if he be a "person" within the proper construction; but to say that you must in order to include a corporation, which may keep an open shop, necessarily extend the construction of the context, because if you do not there may be a shop kept by a person who will do nothing and who is not qualified—to say that is necessary for the objects of the Act appears to me to be really begging the question, because on that hypothesis, the corporation does nothing. It does not itself conduct the business, and the particular mischief which the public would suffer, from the sale of things which ought not to be sold, is sufficiently guarded against by prohibition of such sales, and the conditions to which they are made subject. Well, my lords, I said, to begin with, that I did not regard the matter as free from difficulty, but in a difficulty, if there be one, it does seem to me to be best to remember the principle that the liberty of the subject is not by unnecessary construction to be held to be abridged any further than the words require, and inasmuch as it was open to Her Majesty's subjects before this Act passed to carry on the business of chemists and druggists, using the title of chemist and druggist, and, for the purpose of that business, keeping open shop for the sale, amongst other articles, of poisonous drugs, as it was perfectly lawful to do that by means of a company incorporated under the Companies Act, and as there is nothing whatever to show that the Legislature had grounds for assuming that there could be no such companies, and moreover, as there was a very great and leading company incorporated as a company of sellers of drugs and pharmacopists as long ago as the reign of James I., in whose name it is admitted the business of selling drugs has been carried on by their authority down to the present time, as that was the state of the law, I do think that it would be wrong for your lordships to impose upon the word "person," used in such a context as that in which you find it used here, a construction which would at once render illegal that mode of carrying on the business of chemists and druggists by such corporations, without any reference from the beginning of the Act to the end to that class of persons, or to that kind of case, more especially when you do find in the Act, in the 16th section, a special provision for the case of individuals carrying on that kind of business, who may die, whose executors or trustees may carry it on after their deaths. It is true that the Legislature there requires for the safety of the public this safeguard, that there shall be an assistant duly qualified, but the Legislature shows that having that case in view it was not thought that the object or policy of the Act required that such a business should be prohibited. It was not thought necessarily inconsistent with the object and the policy of the Act that the principals, the proprietors of the business, the persons to whom those actually selling the drugs would be responsible, should be unqualified, provided that there was in the business a duly qualified assistant. It by no means follows that all the drugs would be sold by that duly qualified assistant or that he might not be, as in this case, under the general superintendence of a manager not himself duly qualified. All that is left open, but it is thought not indispensable that the persons carrying on such businesses should be themselves duly qualified. My lords, if there were not safeguards against the sale of poisonous drugs in a manner contrary to the provisions of the Act by the persons actually conducting the business for the corporation, then, I think, the argument would have been extremely strong against a corporation being permitted to carry on the business, but where you find that there are such safeguards and that the keeping open shop in the case of executors is permitted although they be not qualified, I think it is impossible to infer that the object of the Act did require a larger construction to be put on the word "person," which the context appears to me upon a fair construction to exclude. I shall therefore advise your lordships that this appeal should be dismissed with costs.

Lord Blackburn: I am of the same opinion. The question really, when it is cleared of all superfluity, is reduced to a very short point, but, I agree that it is one not free from difficulty. The difficulty which I feel about the case is not generally upon those things which seem to have troubled most of the members of the Court below. I own I have no great doubt myself, for instance, that the word "person" may very well include both a natural person, a human being, and an artificial person, a corporation. I think that in an Act of Parliament, unless there be something to the contrary, probably (I would not like to pledge myself to that) it ought to be held to include both. I have equally no doubt that in common talk in the language of men, not speaking technically, a "person" does not include an artificial person, that is to say, a corporation. Nobody in common talk, if he were asked who was the richest person in London, would answer, the London and North Western Railway Company. It is plain that in common speech "person" would mean a natural person. In technical language it may mean the other, but which meaning it has in any particular Act must depend on the context and the subject matter. I do not think that the presumption that it includes an artificial person, a corporation, if the presumption does arise there, is at all strong. Circumstances, and indeed very slight circumstances, in the context might show which way the word is to be construed in an Act of Parliament; whether it is to have one or the other meaning. And I am quite clear about this, that whenever you can see the object of the Act requires that "person" shall have the more extended sense or the less extended sense, whichever of those the object of the Act shows that it requires, then you should apply the word in that sense and construe the Act accordingly. My view of the matter is that the question of what "person" means in this particular Act gives rise to the whole difficulty, but I may further say now, in order to avoid coming back to it, that I do not feel the least difficulty arising from what seems to have troubled some of the judges below in this case. If this means a corporation, I quite agree that a corporation cannot commit crime in one sense, a corporation cannot be imprisoned, if imprisonment be the sentence for the crime; a corporation cannot be hanged and put to death, if that be the punishment for the crime. In all those senses a corporation cannot commit a crime, but a corporation may be fined or may pay damages, and I must totally dissent, notwithstanding what Lord Justice Bramwell said, or is reported to have said, from the supposition that a corporation that incorporated itself for publishing a newspaper could not be fined, or an action for damages brought against it for libel, or that a corporation that commits a nuisance could not be convicted of the nuisance, or the like. I must really say I do not feel the slightest doubt about that part of the case, and I think if we could get over the first difficulty of saying that the "person" here may be construed to include an artificial person, a corporation, I should not have the least difficulty upon the other grounds that have been suggested. But then, my lords, my conclusion, looking at this Act, is that it is clear to my mind that the word "person" here is so used as to show that it does not include a corporation, and that there is no object or intention of the statute which shows that we should require to extend the word to a sense which probably those who used it, the Legislature, did not think of and were not thinking of at all. I do not think the Legislature were thinking of bodies corporate at all. They begin with a preamble. "Whereas it is expedient for the safety of the public that persons keeping open shop for the retailing, dispensing or compounding of poisons, and persons known as chemists and druggists, should possess a competent practical knowledge of their business." Stopping there, it is quite plain to my mind that those who used that language were not thinking of corporations. A corporation may, in one sense, possess a competent knowledge of its business, if it employs competent directors, and so forth, but it cannot possibly have, for all substantial purposes of the public protection, a competent knowledge of itself. The metaphysical entity, the legal person, cannot possibly have a competent knowledge, nor can, I think, a corporation be supposed to be a person known as a chemist and druggist. They were not thinking of a corporation; they said that henceforth it was desirable that those who carried on this business should have a competent knowledge. It afterwards appears that the Legislature were persuaded by the Pharmaceutical Society (I dare say very rightly) to think that the best test of competency was that they should be a member of this Society. It then goes on to the enacting part, and the 1st section is the most material, that "it shall be unlawful for any person to sell or keep open shop for retailing, dispensing or compounding poisons, or to assume or use the title of chemist and druggist, or chemist or druggist." Now, stopping there, it does seem to me that, without laying down any technical rule, the plain meaning of the words, and the words are used in that sense, is such a person as could become a pharmaceutical chemist. A corporation cannot, a individual can. It seems to me, therefore, it plainly says in section 1 "that it shall be unlawful to sell or keep open shop, or assume the name of chemist or druggist for any person, that is to say any natural person, unless he becomes a pharmaceutical chemist. The 15th section imposes a penalty, and in imposing the penalty repeats the words which made the thing unlawful. I think those two sections must be construed together. Now, is there anything here in the context or in the object to show that we should take that word "person," which I think must have been used by those who framed the Act, and understood by the Legislature as meaning a natural person and extend it, and say that it applies to a corporation? I cannot see anything. If there had been anything in the Act or anything in the nature of things which made it reasonable that it should be provided that all the profits to be derived from vending poisons or poisonous drugs should be shared amongst those who are pharmaceutical chemists and that nobody else should intermeddle with that trade; if there was anything of that sort, in order to carry out that object it would be necessary to say that "person" includes corporation, and not a natural person only. But that object is certainly not avowed on the face of the Act. Whether any of those who promoted the Act had any such idea in their minds or not I cannot tell; but they have not brought it forward or put it in such words as would at all lead the Legislature to think of it. and it is exceedingly improbable that if they had boldly said "and bodies corporate and joint stock companies shall not deal in drugs," or, if you like, in poisonous drugs, "unless they pay black mail to us," I think the Legislature would hardly have done it. They have not done that in distinct terms. Now is there anything in the object of the Act which requires such an interpretation? I quite agree that a body corporate may keep an open shop, and no mischief is done there, if they employ for the purpose of conducting the sale qualified assistants and people who may manage the sale; if those qualified persons do superintend the sale there, I see no harm that can arise. But no doubt the Legislature have, for what reason it is for those who passed the Act to say, thought it best to say that a person—whom I take to be a natural person—shall not only not sell, but shall not keep an open shop for the sale. I think myself that probably one reason for that was to facilitate convictions; and another reason may have been that it was thought if there may be a person who keeps a shop, who is unqualified, and he may have a qualified assistant, he may overrule the qualified assistant at any moment he pleases and there may be danger in that. Those are intelligible motives; but neither of those motives applies where it is a case of a corporation; for the body corporate itself could not interfere and however much the body corporate may have been unqualified, their being so would not affect the matter. Then comes another objection. It is said, if you put that construction you defeat the Act altogether. That I cannot admit. I hold distinctly that there can be no sale, whether a corporation be the ultimate vendor or not, unless a person, a natural person, manages the sale, and that natural person, if unqualified, would in my mind clearly become liable to the penalty under the Act. And though I am not so clear on this, I feel strongly inclined to think that, if a corporation or anybody else caused an unqualified person to conduct sales, and it could be brought home to them and shown that they deliberately did cause the person to infringe the Act, I am by no means clear that they would not be, under section 15, liable to penalties themselves. *Qui facit per alium facit per se.* I do not, however, say that I am quite certain of that; but I think it necessary to say that because so repeatedly in the argument it was assumed that a corporation was entirely out of this Act altogether, which is not at all my view of it. I say that a corporation is out of that clause which prohibits persons from keeping open shop. I do not go further than that, and say anything more. Now, as to the rest, I really do not think that there are any sections of the Act, or any of the cases cited, or any general legal principle, which requires to be noticed. It does seem to me that the case will come after all to this: Does "person," which may include a corporation, include it here? For the reasons I have given, I think it does not. Is there anything in the context or anything in the object of the Legislature which requires that, although the word "person" would not properly include a corporation, yet in this particular case we should extend it and make it include a corporation, I think there is not in this section. In section 17 there is quite sufficient reason for doing so; but in sections 1 and 15 I think there is not.

Lord Watson: My lords, it is impossible to disguise the fact that this statute is characterized by great ambiguity, I would almost go the length of saying confusion, of language. That probably arises from the circumstance that the framers of this Act were dealing with two separate matters: the one, improvement of a society called the Pharmaceutical Society; the other the regulation of the sale of poisons generally throughout Great Britain. That Society had existed from 1843, when it was incorporated by Royal Charter for the avowed purpose "of advancing chemistry and pharmacy, and promoting an uniform system of education of those who should practise the same; and also for the protection of those who carry on the business of chemists and druggists." In 1852 the Legislature, by the statute (chapter 56 of the 15th and 16th of the Queen), made various improvements in the constitution of the body upon the recital that it was "expedient to prevent ignorant and incompetent persons from assuming the title of or pretending to be pharmaceutical chemists or pharmaceutists in Great Britain." When you come to the Act of 1868, the Act which we are dealing with, you not only have further improvements made in the character of the body and its constitution but you have very important changes made, and a position and privilege accorded them by statute. Down to 1852, and subsequently to 1852, they had no special privilege; nothing in the nature of monopoly or exclusive privilege, and the Act of that year was simply intended, not to prevent other persons from dealing in drugs of any description, but to prevent those persons when dealing in drugs from assuming a title which the members of the Society were alone entitled to. But when you come to the Act of 1868, the provisions of the statute undoubtedly give to them the sole right to sell drugs as individuals, or to keep open shops for the sale of poisonous drugs as individuals, because all individuals who are not possessed of the qualification of membership of the Society, or who have not passed the requisite examination and had their names on the register, are prohibited under penalties from dealing by retail in these articles. Now, my lords, I must say that when I come to deal with what is called—I say it with respect—the intention of the Legislature, I find the greatest possible difficulty in making up my mind as to what it should be. I think the considerations of policy on either side are pretty evenly balanced, in fact I have almost been inclined to hold that considerations of policy rather preponderate in favour of the appellants' argument; but that is not enough; it is not enough for me to speculate as to what was in the mind of the framer of this statute; whether he had forgotten the fact that there were corporations which either were dealing or might deal in poisonous drugs; or whether, having this in view, he framed this Act for the purpose of subjecting them to certain disabilities. I can only look, my lords, at the language the Legislature had employed in the enacting clauses, sections 1 and 15, and I can only say this, that even if I were satisfied that it had been the intention of the framer of these two sections to give to individuals registered under the Act the exclusive privilege of selling poisonous drugs by retail, and so impose penalties upon a corporation keeping open shop for that purpose, I must say I come to this conclusion, that it would have been very simple for the Legislature to have said so in express terms. And I, for my own part, am quite satisfied, even apart from those considerations which have led your lordships to put another construction on the terms of the statute, that the framer, if that was his intention, has entirely failed to use language adequate for the purpose which he intended.

The Lord Chancellor then formally put the question that the appeal be dismissed with costs, and declared it to be carried.

Obituary.

JAMES FOULIS PLOMLEY.

It is with regret that we announce the death of another of the founders of the Pharmaceutical Society, Mr. James Foulis Plomley, at his residence, Fairfield, near Rye. Mr. Plomley, in 1836, acquired the old established business in High Street, which he continued to conduct until 1857, when he took into partnership Mr. W. A. Waters, and in the following year retired from the active duties of the business.

In all affairs connected with the town of Rye, Mr. Plomley took an intense interest, he having been a member of the Corporation for several years, and in 1852 he was elected Mayor; in virtue of that office he attended the Duke of Wellington's Funeral as one of the Barons of the Cinque Ports. A few years later he was made a magistrate for the borough; but having had a stroke of paralysis a few years ago, he was compelled to relinquish all active duties, and he gradually grew weaker and more feeble till his death, on July 14, at the age of 71 years.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE SOCIETY'S CASE IN THE HOUSE OF LORDS.

Sir,—On reading your remarks on this case at page 61 of this week's Journal, as regards individual traders, I cannot shut my eyes to the fact that many of our members conduct business on the same principle as the stores, inasmuch as some members open branch establishments at a distance from their own, and place an assistant to manage such branch.

I could give many instances; there is one in a village not far from where I live, and the proprietor has an establishment twelve miles distant, and visits his branch, sometimes once a month or fortnight for a few hours.

Now, our member may perhaps understand his business better than the proprietors of the stores generally do, but as he is absent on other duties, and, as the stores place a competent dispensing gentleman in their establishment, where is the difference? Is it not *tu quoque*?

Downside Villa, Chilcompton, Bath. JOSEPH LEAY.

THE PHARMACEUTICAL SOCIETY *v* THE LONDON AND PROVINCIAL SUPPLY ASSOCIATION.

Sir,—It is pitiful to observe upon what technical grounds the decision in this case rests. It really turned upon this point—"persons" must not be interpreted to include "corporations" in the prohibitory sections of the Pharmacy Act, because the qualifying sections demand from "persons" that which "corporations" cannot possibly fulfil. In other words, because a "corporation" cannot qualify, it cannot be disqualified. In effect it reduces qualification to a negative state, and might, with as much reason assume everybody to be qualified who has not presented himself and been pronounced disqualified by the examiners.

The statute requires a qualified master; it does not require a qualified servant. The judgment dispenses with a qualified master, and sanctions a qualified servant. This may be an improvement on the statute, but it is not the meaning of the statute; but perhaps I am

NO JUDGE.

Sir,—The recent decision of the House of Lords in the case of the Pharmaceutical Society *v.* the London and Provincial Supply Association cannot be said to come as a surprise to the trade. Though not unanticipated, it will still be a bitter pill to many. Those who so eagerly advocated interference with the operations of co-operative stores will now perhaps see with regret that the only results attained are a loss of prestige on the part of the Society as a body established for and acting in the public interest, an advertisement of the stores, and to give to what have hitherto been unauthorized traders a definite legal position. Henceforth it will be perfectly easy for a grocer to convert himself into a limited company, with a qualified chemist holding one share, and by whom a regular drug business may be carried on. Grocers will for the future feel quite secure against legal action in the knowledge of the defeat of the Society, and we must expect that they will act on that knowledge. Drugs offer a wide and profitable field as an opening to a grocer, who can afford to retail them at prices which to a chemist would be totally unremunerative.

No doubt a loud outcry will be raised at the dismissal of the appeal to the House of Lords, and demands made for an alteration of the law. It will be as well to recognize at once the fact that no alteration of the law in a sense adverse to the Lord Chancellor's judgment is possible, and for this reason: in the case just concluded, though the Society may or may not have had law on its side, it was fighting an adversary who in the long run always wins, viz. common sense. Any appeal to Parliament would have to be based on common sense and the public welfare. How then would it be possible to go before the Legislature with a proposal to restrict companies in the sale of drugs—acknowledging, as it would be necessary to do, that none but qualified men were so employed—when it is perfectly competent for a chemist to keep open half a dozen shops without a qualified assistant in any one of them? So obvious is the retort, and so certain in my view is it to be the position taken up by Parliament, that even had the Pharmaceutical Society won a victory in the recent contest, it would have been an inglorious one, resulting in the introduction to the House of Commons, next session, of a measure legalising the carrying on of drug businesses by companies, a measure which having common sense on its side, would undoubtedly have been carried.

Nothing it appears to me can be done. The House of Commons will not prevent co-operative societies carrying on the trade of chemist and druggist, unless it can be proved that in so doing they are acting in a manner injurious to the public welfare. This, under the circumstances, cannot be done, and it would therefore be fatuous to approach Parliament with proposals for a monopoly, based on interests so manifestly private.

MAJOR.

Sir,—Now that the lawyers have sifted the question of liability of co-operative stores, in the matter of qualification for dispensing prescriptions, etc., and the House of Lords has finally settled the object, may we not, as sadder, but wiser men gain some small advantage as well as disappointment at our defeat?

It is evident that the point of view from which their lordships decided the question was one which many in our profession had in a measure lost sight of, viz., that the Act of 1868 was not so much to benefit those whose names were placed on the register as to protect the public from a class of compounders of medicine wholly incapacitated for their calling; and so long as the preparation of prescriptions, etc. is confined to the hands of those whose education qualifies them for their duties and are responsible for their own acts it was with their lordships only a secondary consideration whether they were in the service of co-operative stores, or in the position of assistants, or in business on their own account.

It is difficult to us, as parties concerned, correctly to view a question in which our own interests are so much at stake, but apart from that the decision appears very much in accordance with what the public have a right to expect from the authors of the Act, and it would be well for those who are looking for benefit derived from having their names on the register, or to the decision of legal tribunals in their favour, to fight the battle of competition with their own hands, and instead of allowing a mere professional education to give a distaste for the tradesman-like work at the counter, remember that acuteness in conducting business in kindred trades has increased greatly in the competing times in which we live, and not only must the stores, but oilmen and grocers be met in their own way of conducting business, but in a manner perhaps never contemplated by our predecessors in business thirty years ago.

Wandsworth. G. N.

"*Lavandula.*"—Your problem is one that might be solved by experiment. Possibly your object would be attained by slightly varying the relative proportions of the ingredients.

T. H. Powell is thanked for his communication.

W. U. C.—You are recommended to submit the question to a solicitor.

"*Beta.*"—A recipe for "bay rum" will be found in vol. viii. of the present series of this Journal, p. 679.

"*Bay Leaf*" will find recipes for effervescing saline preparations in the Journal for March 29, 1879, p. 807.

R. E. Williams.—(1) The table, etc., was published in vol. vii., p. 989. (2 and 3) We can give you no information on these points beyond what is contained in the Regulations of the Board of Examiners. (4) We believe not.

J. Y. H.—The examiners are not limited to any particular work, in making the selections.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Waters, MacCormac, Crocker, Williams, Postans, Wright, Stewart, Landerer, Powell, Edward, Valkenburg, Bouttell, Haydon, Grant, J. G. H., J. J., P. T. W., 374, J. G. S., L., T. P. J., R. L. G., J. N., C. T. W., J. F., A. B. C., Tyro, Ivor, Associate, Beta, Assistant, Nemo, Student.

"THE MONTH."

Although like the witches in 'Macbeth' we have been "in lightning, thunder and in rain" during the past month, very little damage appears to have been done as yet to the vegetable kingdom.

Of all the months in the year July is perhaps the most prolific in flowers, and the laboratory of nature is in this month most abundantly furnished with material upon which the student, fresh from his three months' course of lectures, can experiment, and can thus practically acquaint himself with the truths already learnt theoretically from books.

Among the medicinal plants in blossom in botanical gardens this month may be mentioned *Atropa Belladonna*, *Datura Stramonium* and *D. Tatula*, camomile, lavender, foxglove, hemlock, dulcamara, elecampane, rue, hyssop, borage, alkanet and valerian. The last mentioned is now unrolling the pappus from the rim-like limb surmounting the calyx tube and thus shows how nearly allied the family is to the Compositæ, which it also approaches in the character of the ovary, of which one or two cells frequently become abortive in some species.

At Kew Gardens the white horehound (if it be correctly labelled) seems to have taken on a peculiar character, the flowers having a decided pale purple tint, like that of the blossoms of *Stachys germanica* or *Calamintha Clinopodium*, as if the insects visiting the horehound had gone to it from some other hoary leaved plant, such as those above named, with purplish flowers, misled by the general resemblance of their leaves, and so cross-fertilized it and caused a variation in colour. At all events the plant has appeared year after year with blossoms of the same hue.

Another plant, belonging to the same natural order, viz. *Salvia Sclarea*, now forms a beautiful object in the Herbaceous Ground at Kew. The white flowers, and the large white bracts, faintly tipped purple, are almost indistinguishable from each other at a distance and the handsome groups of white spike-like inflorescences are thrown into strong relief by the background of green foliage close by. The seeds of the common wild species, *Salvia verbenaca*, as well as several others, develop a quantity of mucilage when placed in water, and have been used in Cheshire and other parts of England to clear the eyesight; hence the common name of clary or clear eye. For this purpose a single seed is placed in the eye, and any irritating particle soon becomes enveloped in the mucilage and is thus easily removed. The pretty meadow sage, *Salvia pratensis*, found only in two or three localities in this country, seems on the other side of the channel, in the neighbourhood of Paris, to be one of the commonest species. It is to this plant, under the old name of *Salvia hæmatodes*, that red behen root is ascribed in India. Another species, *Salvia lyrata*, a native of Canada, has a reputation for the cure of cancer, and has thus acquired the name of cancer weed.

An interesting account, by Professor Rothrock, is given in the *Gardener's Chronicle*, June 26, p. 808, of the seed of a species of *Salvia* (*S. columbariæ*, Benth.), possessing mucilaginous properties. These seeds, which are roasted and ground, when mixed with water into a sort of porridge, are eaten as food. A small portion mixed with a quantity of water is used to assuage thirst, and enables those who drink it to lessen the large amount of liquid which otherwise is often taken in hot countries to the detriment of health. In gastro-intestinal disorders it forms a valuable remedy, on account of its demulcent and at the same time exceedingly nutritive properties. It is also used to remove foreign bodies from the eye by means of the mucilage it develops. The popular name for this seed is "chia." The student should not neglect to observe the distractile anthers in the genus *Salvia*, and that two of the stamens are not developed. The curious effect of the arrangement of the stamens, by which the insertion of the proboscis of a bee causes the pollen to be deposited on the back of the insect, may be readily imitated by pushing a stalk of grass or a pin's head down the tube of the corolla.

Professor Rothrock states also that he believes that the early natives of California smoked the leaves of *Nicotiana Clevelandii*, A. Gray, a species which has only lately become known to botanists. It is a small plant with small flowers, and the tobacco made from it is said to be exceedingly strong.

Among the rarer British plants which may now be seen in flower at Kew may be mentioned *Urtica pilulifera* and its two varieties, *Herniaria glabra*, *Leonurus Cardiaca*, *Ajuga Chamæpitys*, *Melittis Melissophyllum*, *Phyteuma orbiculare*, and the blue pimpernel. Several of the natural orders with inconspicuous flowers are now in good condition for examination, such as Chenopodiaceæ, Paronychiaceæ and Polygonaceæ. The singular calyptrate calyx of *Eschscholtzia*, the clavate filaments of the meadow rue, the flowers of the mullein, *Nigella sativa*, and the curious inflorescence of *Eryngium* and *Astrantia*, are now in good condition for observation. The coriander is also in full blossom, and anyone who chooses to rub a leaf between the fingers will observe what a remarkable difference there is between the fetid odour of the fresh plant, which will doubtless be familiar to most Londoners, and the fragrant perfume of the ripe fruits. In the Economic House at Kew the *Adenanthera pavonina* is now in blossom. The flowers are small and yellowish and arranged in a raceme, and, from being regular, would hardly be recognized as belonging to the Leguminosæ. The anthers are tipped with a stalked gland, whence the name *Adenanthera*. It is rather singular that the flower should be so inconspicuous, and that the beauty which seems the natural right of flowers should be lavished on the seeds, which are brilliantly polished and of the most splendid scarlet colour. Indeed, the object of the brilliant hue of seeds is one that would probably repay investigation. These seeds weigh almost uniformly 4 grains, and are used as weights by jewellers in the east, and are sometimes pounded and mixed with borax to form a cement.

Buttercups and daisies are almost regarded in the light of children's playthings, but, like other toys, are occasionally found to injure the little ones. In the *Times* for July 12 it is stated that a child died from the effects of eating some buttercups in Newsham Park, Liverpool. The acrid principle is evidently of a volatile nature, since the buttercups are not injurious when made into hay. Although the juice is used in homœopathic medicine, its chemical constitution does not appear to be well known.

In the *Gardener's Chronicle*, July 3, p. 11, an interesting notice is given by Mr. W. B. Hemsley of the nectaries in the *Marcgraviaceæ*, which is well worth reading by those who take an interest in the fertilization of plants by the external agency of insects and birds. The members of this exotic family have usually an inflorescence, which either forms a long raceme, as in *Norantea*, or, as in some species of *Marcgravia*, is condensed into an umbellate form. In several of the species with a racemose inflorescence the flowers are erect, and the nectaries, at first erect, become pendulous. In these cases, as in *Norantea Paraensis*, the nectaries which are tubular, flask or helmet-shaped are formed of the bracts, and the humming birds which visit them for the nectar, brush off the pollen from the flowers with their breasts. In *Marcgravia*, in which the inflorescence is generally a raceme condensed into an umbel, four or five of the terminal or central flowers of the umbel are not developed as blossoms, but remain in a rudimentary state, while the united pedicels and bracts form nectaries. As the umbel is pendulous and the nectaries hang down in the centre and are usually brilliantly coloured, while the flowers are small and inconspicuous, the humming birds which visit the plants brush off the pollen with their wings and backs while dipping their beaks into the nectaries. The inner surface of the nectary cup corresponds with the under surface of the bract.

Those readers who follow bryology as a hobby, will be glad to learn that Dr. R. Braithwaite has commenced his monographs of the families of the British mosses. The first number contains the Andreæaceæ and the second one the Buxbaumiaceæ and Tetraphidaceæ, and from the character of the illustrations, which are excellent, and of the botanical details, which are most complete, it is evident that the work will be a standard one for British bryologists.

The *Journal of the Royal Microscopical Society*, which is now issued bi-monthly, has become a most valuable publication, which is due in great measure to the energy of Mr. F. Crisp. The journal gives the most complete record published in this country of current researches relating to microscopic subjects, conveniently arranged under their various headings of botany, zoology, etc.

The peculiar glaucous appearance of eucalyptus leaves has been found by Dr. Schunck (*Chemical News*, July 16) to be due, not to a special condition of the chlorophyll, but to an extremely thin film of fatty matter, upon the removal of which by ether the leaves assume the ordinary green colour of other leaves. But there does exist a peculiarity in the chlorophyll of eucalyptus leaves in that although the green solution obtained by extracting the leaves from the tips of the branches with ether or alcohol shows at first the usual absorption bands of ordinary unchanged chlorophyll, yet after being kept a few days in the dark it acquires a yellowish colour and then shows absorption bands coinciding with those of "acid chlorophyll," being that modification produced at once by adding a few drops of acid to an ordinary solution of chlorophyll. Dr. Schunck appears inclined to attribute this peculiarity to the ozonizing effects of the essential oil present in the leaves, but this hypothesis is not supported by the result of some experiments made with leaves from the orange tree.

Thundery weather generally brings mildew and blight with it, but this year there is comparatively little to be seen as yet. As the use of the microscope becomes more common and the study of these minute organisms better known, it seems probable that sanitary as well as botanical science will make rapid strides, while various arts will be no less indebted to what at first are liable to be regarded as dry scientific facts. Thus the discovery that a minute fungus, *Mucor circinelloides*, common on horse-dung, has the power to cause fermentation in glucose, while it does not alter cane sugar, has been utilized to separate cane sugar from molasses by fermenting the glucose and so allowing the cane sugar to crystallize out (*Journ. de Pharmacie*, June, p. 542).

Another instance of a rule of thumb practice proving to have a sound basis is found in the custom that has long been almost universally followed of allowing the plucked olives to stand in heaps until fermentation takes place before pressing them, under the belief that the yield of oil is then greater. M. Planchud (*Journ. Pharm. et de Chim.*, July) has made some experiments that have led him to the conclusion that this belief is founded on fact, and that during the fermentation, which is due to a mycoderm belonging to the genus *Penicillium* that is developed on the surface of the olive, there is a transformation of a portion of the pericarp into oil. If, however, the fermentation be allowed to go on too long, the odour becomes disagreeable, the colour of the fungoid growth changes, and a portion of the original oil disappears. When the development of fungus was prevented by dusting the olives with powdered borax no variation in the yield of oil took place.

At the meeting of the Royal Society on June 10, Dr. Hind read a paper on *Bacterium fœtidum*, an organism to which the fetid odour of profusely perspiring feet appears to be due. It was obtained for purposes of experiment, by teasing out a small portion of the sole of a wet stocking in water and cultivating the micrococci in pure vitreous humour. The fetid odour of the stocking was reproduced in the liquid used for cultivating the bacteria. Although the strength of the odour diminished in successive generations, Dr. Hind stated at the meeting that an antiseptic treatment, by which the bacteria were killed in the stocking and inner surface of the soles of the boots, completely destroyed the fœtor.*

Reports from Nicolaieff and Taganrog speak of the enormous damage done to the cereal crops in South Russia by a species of May beetle, the *Anisoplia Austriaca*. The insect first appeared in the country in 1865, and some idea of the increase of the plague may be gathered from the statement that ten bushels of beetles have been collected from a single acre of wheat. The insect takes about twenty-two months to develop from a lava to a full grown beetle, so that the greatest damage has hitherto been done in alternate years; but there are signs in some districts that the destruction will henceforth be annual. The beetle attacks the half ripe ears of wheat, but oats and barley escape. Very little appears to be done effectively to limit the ravages of these destructive insects, for when they are observed blackening the ears of corn by their countless numbers, all that is usually done is to stretch a rope across the field and drag it over the corn. The insects are thus shaken off, but with them a great number of wheat ears, while it is only a matter of time for the insects to regain their places.

The cultivation of the red cinchona in Jamaica is, according to the *Gardener's Chronicle*, June 26, p. 806, in a most satisfactory and encouraging state. Ten thousand pounds weight of bark has been obtained from 2490 trees, giving an average of a little over 4 lb. of dry bark per tree.

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* *Nature*, July 1, 1880.

It is now four years since Dr. Lauder Brunton published his experiments[*] on the action of mancona, sassy or casca bark, as it has been severally called, and but little use appears to have been hitherto made of the properties of this powerful drug. MM. Sée and Bochefontaine have, however, recently been using it in the treatment of certain cardiac and respiratory affections. They find that the active principle erythrophlœin increases the vascular tension and at first slows the pulse and respiration; the respiratory movements are, however, afterwards quickened, and in fatal cases persist, even after the cessation of the action of the heart.[†]

Drs. Tomlinson and Murphy[‡] call attention to the value of hydrochlorate of apomorphia in the treatment of sunstroke. The drug administered as soon as possible in a dose of one-tenth of a grain, injected subcutaneously, produced emesis in less than ten minutes. In no case was there distressing nausea, but apparently an almost instantaneous evacuation of the contents of the stomach. The temperature was reduced, the pupils became widely dilated, and sensation and movements returned in half an hour.

One of those curious cases in which the medical profession is indebted to those outside of it for suggestions or remedies, is recounted in an amusing manner in a recent number of the *Lancet* (July 3, p. 6), by Drs. Ringer and Murrell. An old gentleman, who for many years suffered from distressing acidity, read in a daily paper that glycerine added to milk prevents its turning sour, and he reasoned thus:—"If glycerine prevents milk turning sour, why should it not prevent me turning sour?" and he resolved to try the efficacy of glycerine for his acidity. The success of his experiment was complete, and whenever tormented by his old malady he cures himself by a recourse to glycerine. Drs. Ringer and Murrell quote the statement of J. Mekulics[§] that glycerine, although it destroys bacteria and prevents the formation of septic poison, dissolves and preserves the septic poison itself, and point out that glycerine does not hinder the digestive action of pepsine and hydrochloric acid, so that while it prevents the formation of wind and acidity, probably by checking fermentation, it in no way retards digestion. The use of 1 to 2 drachms of glycerine, either before, with or immediately after food is recommended, or it may replace sugar in tea and coffee. In some instances, a cure does not occur till the lapse of ten or sixteen days. Mekulics found that glycerine in the proportion of 2 per cent. prevented decomposition in nitrogenous fluids, such as diluted blood, for twenty-four hours, at ordinary temperatures, that 10 per cent. would prevent it for five days, and that 20 per cent. prevented it altogether, even at a higher temperature.

According to the *Progrès Méd.*,[||] Dr. Fonssagrives, having ascertained that the addition of oil of anise effectually masks the taste of cod liver oil and iodoform, employs this combination where it is necessary to give iodine, as that substance can be conveyed into the economy in larger proportion by means of iodoform than in any other way. To 100 grams of cod liver oil ¼ of a gram of iodoform and 10 drops of oil of anise are used.

A ranunculaceous plant growing in a limited chalky district in the Lower Pyrenees,—the *Thalictrum macrocarpum*,—having been observed to possess poisonous properties, has been examined by Messrs. Bochefontaine and Doassans, and the latter has succeeded in isolating from it a colourless crystallizable principle, giving alkaloidal reactions, which he has named "thallictrine" and considers to be the toxic principle (*Comptes Rendus*, xc., 1432). A non-nitrogenous crystalline colouring matter has also been separated in small clear yellow prisms, devoid of apparent physiological properties, and named "macrocarpine." Thallictrine crystallizes in slender needles grouped around a common centre; it is soluble in alcohol and nearly insoluble in water, but combines with acids to form salts that are soluble in water. The physiological properties of thallictrine are compared to those of aconitine. The paralysis of the nervous system which it determines is however more marked than that caused by aconitine, whilst with aconitine the emesis and respiratory disturbances are greater. Aconitine is toxic in smaller doses than is thallictrine, and it is therefore suggested that thallictrine, being hence more manageable, might be of service in therapeutics.

Still further progress has been made by Herr Ladenburg in elucidation of the relation of the principal solanaceous alkaloids to each other. It will be remembered that he had arrived at the conclusion that hyoscyamine, daturine and duboisine are one and the same alkaloid, which although isomeric with nevertheless differs from atropine. He has now found (*Ber.*, xiii., 607) that even this difference is probably only a physical one, and that the decomposition products yielded when these alkaloids are treated with baryta—namely, tropine and tropic acid from atropine, and hyoscine and hyoscinic acid from hyoscyamine, daturine and duboisine—are identical. This he has confirmed by preparing atropine artificially by treating with dilute hydrochloric acid compounds formed from (1) tropine from atropine and hyoscinic acid from daturine, (2) hyoscine from hyoscyamine and tropic acid from atropine, and (3) hyoscine and hyoscinic acid both from hyoscyamine. The resulting alkaloidal products were converted into gold salt, which in each case agreed in every respect with the characteristic gold salt of atropine. In this way, therefore, it would appear that hyoscyamine may be converted into atropine, and Herr Ladenburg is still engaged on experiments as to the possibility of converting atropine into hyoscyamine. With respect to homatropine (see vol. x., pp. 755, 955) it is now announced (*Ber.*, xiii., 1340) that it has been obtained in the crystalline condition. When recrystallized from absolute ether it occurs in well-formed colourless prisms, melting between 95·5° and 98·5° C., and having a composition corresponding with the formula $C_{16}H_{21}NO_3$. Nothwithstanding that the base is not readily soluble in water, the crystals are hygroscopic and even deliquescent. One advantage that is claimed for homatropine in ophthalmic practice is that it is not so powerful a poison as atropine.

Professor Stöder, of Amsterdam, has been making some experiments in working up the press residues from the preparation of syrupus rhei for the chrysophanic acid they contain. The dried residue reduced to a powder was treated in a displacement apparatus with benzol until the benzol passed through colourless, when the greater part of it was distilled off. The concentrated liquid was decanted from separated emodin, and evaporated in a water-bath nearly to dryness, and the residue again carefully extracted with hot benzol. Upon evaporation and cooling of the liquid the chrysophanic acid crystallized out, and was purified by recrystallization from spirit. In this way it is stated that the press residues yielded as much as 0·9 per cent. of crystallized acid; but it is worthy of remark that this is a larger proportion of crysophanic acid than was found to exist ready-formed in good specimens of rhubarb by Dragendorff (*Pharm. Journ.*, [3], viii., 829) or H. Greenish (*Ib.*, ix., 933). The subject is not a new one, as there is a specimen of chrysophanic acid in the Society's Museum which was prepared from the residue of extract of rhubarb by Mr. T. F. Hanbury in 1872.

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[*] *Lancet*, Dec. 2, 1876.

[†] *Lancet*, June 26, 1880, p. 1011.

[‡] *Practitioner*, June, 1880, p. 456. From *Ind. Med. Gaz.*, November 1, 1879.

[§] *Archiv f. klin. Chir.*, Bd. xxii., Heft 2, 1878.

[||] *Med. Times and Gaz.*, p. 6.

It is now stated on the authority of the *Farber Zeitung*, No. 2, that Professor Baeyer has discovered a practicable method of preparing indigo artificially on the manufacturing scale, and that the patent has been assigned to the Baden Aniline Company. The indigo is said to be prepared from isatine chloride, which in its turn is produced from benzol.

The nature of the corrosion which takes place in vessels in which caustic soda is constantly melted has been the subject of an investigation by Messrs. Brunck and Graebe (*Ber.*, xiii.). The mud which is deposited in such a vessel was found to contain dark brownish-violet bronze coloured scales, with a high metallic lustre, having mainly the composition of the hydrated ferric oxide, $Fe_2O_4H_2$, but with a little ferric oxide replaced by manganese. Under the microscope the scales appeared transparent, and yellow or brownish-yellow, according to thickness; they had a specific gravity of 2·91 to 2·92, being thus distinguished from göthite, the native ferric hydrate, which has a specific gravity of 4·0 to 4·4. Crystallized hydrated ferric oxide thus produced is slightly magnetic. It dissolves very slowly in cold hydrochloric acid, and rapidly in hot. Dilute sulphuric acid and nitric acid dissolve the crystals slowly when heated, but have no other appreciable effect upon them. The water is only driven off gradually by heat, part being retained until after prolonged exposure to a temperature of 200° C.; after ignition an almost black oxide of iron is left.

Dr. Farrar, of Brooklyn, is responsible for the following curious calculation in dentistry. He says that in the United States alone not less than half a ton of pure gold is annually packed into decayed teeth by dentists, and that if the consumption continues at this rate all the gold at present in circulation will be reburied in the earth in about three hundred years.

It is estimated that the daily yield of petroleum by the Pennsylvania oil wells during the month of September last, amounted to 63,500 gallons, whilst the total yield for 1879 exceeded by several millions of barrels that of any previous year. The total quantity of refined petroleum exported from New York during 1879 was 254,701,316 gallons, of which 47,186,757 gallons came to England. The export of crude petroleum, naphtha, and residuum amounted to upwards of 50,000,000 gallons more.

In continuance of some observations made in the last "Month," with regard to dispensing scales and their weights, in presence of the recent Weights and Measures Act, it may be observed that some difficulty will be experienced by the dispenser in keeping the several weights in such a condition that they may be found by the inspector, in his periodical visits, tolerably constant.

With the view of remedying a defect due to the metal of which these weights are made, a defect which must at least apply to the grain series in brass, De Grave is about to introduce this series in aluminum, which' promises to supply a want and meet a recognized difficulty that applies to the metal of which these weights have hitherto been composed. In the heavier weights, from ʒij to ℈ss, the relative loss by oxidation is less appreciable, but nevertheless, a loss does occur, and the same maker proposes to meet this defect by using for this series German silver. The first cost will necessarily be greater than for the same weights made of the usual metal, but this will be a very trifling matter as compared with their greater cleanliness and lesser tendency to change of value from oxidation of their surfaces. Some attention has also been given to the scale beams, which are now being very generally nickel plated.

By a dispenser who has acquired habits of neatness and cleanliness these improvements in appliances for the counter will be hailed with satisfaction and they will be, to a certain extent, compensation for the annoyances to which the recent Act, from its inquisitorial character, must necessarily subject him whilst engaged in his daily occupation.

The prescription, No. 424, regarding which "Vis" asks a question, is very similar to that commented on in the last "Month," but with this difference, that whereas in the former case a basic salt containing iron was thrown down, in consequence of a deficient supply of acid, in this one there is acid. sulph. dil. ordered, in which the quinine should be first dissolved, and the precipitate referred to will not occur. Sufficient dilute sulphuric acid to dissolve the quinine should be used before the quinine is mixed with the tincture of iron. This prescription and that of No. 420 may be studied together by the dispenser, as the difference in result will afford useful matter for reflection.

Iodide of potassium with quinine is a combination that has, on several occasions, previously been referred to. G. H. will find in the Index, under Dispensing Memoranda, references to pot. iodid. and quina. In the prescription, No. 425, the citrate of quinine and iron and iodide of potassium should be dissolved in separate portions of water, and mixed together with an addition of a little mucilage; then lastly, add the sp. ammon. aromat., which, without a previous addition of mucilage, would throw the quinine out of solution and on to the sides of the bottle as a resinous mass. A decomposition will slowly take place, with the formation of what is usually called hydriodate of quinine, but the presence of mucilage will diffuse the quinine on its separation, and retard the other changes referred to.

The mixture, No. 426, will be clear until the tinctures are added, when a slight opacity will take place, resulting mainly from the separation of the resinous matter of the nux vomica, thrown out of the alcoholic tincture on its addition to the water; the mixture will, from this circumstance, be slightly turbid, but the flocculent matter will in a little time subside, and leave the fluid clear. If the tincture of nux vomica be properly prepared, there will be in this mixture at once a certain amount of opalescence, and a flocculent matter will afterwards be deposited.

The ointment of ung. zinci benzoat., No. 427, referred to by C. B., has been very satisfactorily explained in the following week's Journal by several correspondents. The ung. zinci, B.P., should be used, the "benzoat." referring to the benzoated lard with which the ointment is directed to be made, and of which the prescriber may either not have been aware, or he may have intended to emphasize the fact that he wished this ointment to be made with benzoated lard. It is considered that the benzoin has a preservative tendency when combined with lard, and C. B., on referring to the Pharmacopœia will find that some ointments are directed to be made with prepared lard, and others with benzoated lard. The subject merits more consideration that it has as yet received; many medical practitioners strongly object to the use of benzoated lard in making zinc ointment for their prescriptions, and it is stated, from practical experience, that the ointment thus made irritates an abraded surface, whilst the zinc ointment made with prepared lard, in a proper condition, is a very soothing application.

Salicylate of quinine illustrates a remark in the last "Month" on the dispensing difficulties with new remedial agents. In this instance, No. 428, the salicylate of quinine should be rubbed in a mortar with a little mucilage, and diffused through the mixture. It will gradually deposit, and the bottle should therefore be shaken before each dose. The querist in this instance should have stated the different methods of mixing which he had tried in his efforts to make a presentable mixture, the reply could then have been better suited to his particular difficulty.

It has been stated, quite recently, in reply to a dispensing query, that in a combination of tinct. ferri muriat. with acid. phosph. dilut., as in No. 429, a precipitation of ferri phosphas takes place. The remarks of Mr. Watson Will on the "equation" may be read by "Pharmakon" with advantage.

In prescription, No. 430, care must be taken that the acid. phenic. be in crystals; then each one of the ingredients being powdered separately they should be mixed separately. The phenic acid will liquefy and moisten the other powders, the result being, not a powder, as was most probably intended by the writer, but a soft mass, inelegant and unsatisfactory. Sufficient attention is not generally given to the carbolic acid. In the B.P., under carbolic acid, of which phenic acid is the synonym, its characters are described as those of colourless acicular crystals, absorbing moisture on exposure to the air; when, therefore, it is prescribed, either in a powder or in pills, care should be taken that the crystals be used and that they be free from moisture.

Permanganate of potash—in reply to "Oxygen," No. 431,—may, as has already been stated by correspondents, be made into pills with Canada balsam, but cacao butter is to be preferred. With this substance a very nice pill mass can be made, which by careful manipulation may be rolled into pills and afterwards covered with French chalk. The pills are quite white and retain their shape, whilst the permanganate is not decomposed. One of such pills, placed in cold water, in a very few minutes gives out its intense colour to the fluid in which it is immersed.

The manipulation required in No. 432 will be very similar to that of No. 425, though in this there is no ammonia, and consequently there is not that characteristic separation of the quinine to be apprehended. Still there will be a decomposition as regards the pot. iod. and quinæ sulph., as previously indicated, which cannot be altogether prevented, but may be much retarded by the presence of mucilage of acacia.

The prescription, No. 433, presents some difficulties in forming from it an elegant mixture. If the quinine be dissolved in the tinct. ferri acetat., it will be thrown out on the addition of the potassæ citras, and float on the surface of the fluid; thus will be formed an inelegant mixture. But if the quinine be dissolved in just sufficient dilute acid for this purpose, before being added to the tincture, an elegant mixture of a green colour will result. Even from this, on standing, the quinine will to some extent crystallize out on the sides of the bottle, which can be obviated by the addition of a little mucilage to the finished mixture.

The remarks just made as regards the prior solution of the quinine will apply to query No. 434. The quinine will not be fully dissolved in the liq. ferri phosph. magnet., and on standing, most, if not all, the quinine separates and deposits; but if the quinine be previously dissolved in sufficient acid, the separation will not take place. This course may have been adopted by the previous dispenser, who sent out the mixture without any precipitate.

A protest must be entered here against the remarks of a correspondent who suggests learning what was the course adopted by a previous dispenser, and then "following suit." Nothing could be more pernicious; a dispenser should, to the best of his ability, carry out the intentions of the prescriber faithfully, and quite irrespective of any particular course that may have been adopted, for the sake of appearance, by the person who previously dispensed the medicine. The question of the filtration of mixtures needs no more authority than the common sense of the dispenser. The filtration of fluid medicines to make elegant mixtures is a crime; it will in many instances render null and void the best efforts of the medical attendant for the restoration of the patient's health, and will shake the confidence of medical men in a branch of their own profession on which they have been wont to depend for strict accuracy in the preparation of their prescriptions.

PURIFIED OLEIC ACID.*

BY ERNEST C. SAUNDERS.

Since the introduction of the oleates into medicine in 1872, by Professor Marshall, the demand for oleic acid has been continually increasing, and although abundance is to be had of a common quality, pure oleic acid is as much unknown now as before the advent of the oleates into the list of remedial agents. As it is suggested in the Report on the Revision of the U. S. Pharmacopœia that oleic acid should be admitted into the next Pharmacopœia, with the further suggestion that an Acidum Oleicum Purificatum be also introduced, I offer the following formula for the preparation of the latter, which I have used in its present form for about three years. I may first remark that the methods of preparing pure oleic acid given in the various chemical works are in all cases tedious and expensive. With one exception, all that I have seen are based on the fact that oleate of lead is soluble in ether, and lead margarate is insoluble in the same. The exception is in Ure's Dictionary, but as his process is suggested for obtaining the acid from a source (mutton fat) far richer in stearine than in oleine, I shall not notice it. Mr. Charles Rice, in 1873, proposed the purification of crude commercial oleic acid by cooling and expression. One principal objection to this is that commercial oleic acid has a very disagreeable smell, which is not got rid of at all. Besides this, though most of the margaric acid may be taken out, all is not, and while absolute chemical purity is not strictly necessary in a medicine, it is certainly desirable to approach it as nearly as possible when this can be done easily without adding to the expense of the product.

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* Reprinted from *New Remedies*, June, 1880.

The common method of preparing pure oleic acid given in text-books is as follows: Saponify oil, olive or almond preferably, with alkali, decompose with hydrochloric acid, digest the crude acid with half its weight of lead oxide, dissolve in ether, filter, decompose the filtrate with hydrochloric acid, filter again, evaporate the ether, and wash the residue thoroughly with water. This is necessarily a costly process, as it is impossible to prevent the loss of a large percentage of ether, while it is besides very tedious. Having some years ago to prepare a considerable quantity of the acid, I tried to shorten and cheapen the above process. It occurred to me that in white castile soap we have an abundant source of oleic acid, and that it would be cheaper to use it than to saponify the oil myself. I found on experiment that the affinity of margaric acid for lead oxide is stronger than that of oleic acid, and that if margaric acid be added to a solution of oleate of lead in oleic acid, it takes possession of the lead, displacing the other acid. I also found that alcohol of ·820 specific gravity could be substituted for ether, as lead oleate is soluble in it, while lead margarate is not. From these data, I constructed the following process: Decompose a solution of white castile soap with excess of sulphuric acid, separate the oily liquid, and dissolve in it five per cent of the weight of the soap of lead oxide, heating as little as possible, dissolve in alcohol, and filter after twenty-four hours. Decompose the filtrate with hydrochloric acid, wash with water, which causes the complete separation of the oleic acid from the alcohol, and filter. It will be observed that my process differs from the usual one in the use of previously saponified oil, of a much smaller proportion of lead oxide, and a consequently smaller quantity of liquid to separate the margarate of lead, and lastly the substitution of alcohol for ether.

The practical formula is as follows: Cut up 5 pounds of white castile soap, and put it into 20 pounds of boiling water over a fire. Add 10 ounces of sulphuric acid, and boil with constant stirring till two clear layers are formed. Decant the upper layer, shake with five pounds of hot water, and again decant the oily liquid. In it dissolve 4 ounces of lead oxide with a gentle heat, and while hot pour it into 5 pounds of alcohol of ·820, previously heated to 150° F. Let stand twenty-four hours and filter, pressing the residue strongly. To the clear solution add 1 ounce of hydrochloric acid, and shake thoroughly. Then mix with 10 pounds of water, decant the acid, again wash with 10 pounds of water, and filter the oleic acid. The alcohol used is entirely separated from the acid by the water, and can be recovered by distillation. The product will be about 2½ pounds of pure oleic acid, of a pale-yellow colour, and almost inodorous, there being but a faint smell of olive oil. It is of specific gravity ·897 and answers all the tests showing freedom from the solid fatty acid. Precipitated oxide of mercury is freely soluble in it without any decomposition. Continued exposure to the air lowers the freezing point, as Professor Miller states in his 'Elements of Chemistry,' but I do not find that it acquires the brown colour and rancid odour he says it does at the same time.

By putting ½ pound of freshly burned wood charcoal into the alcoholic liquid obtained and allowing it to macerate twenty-four hours before distilling, the alcohol is recovered nearly odourless. With care the loss of alcohol is very slight. I find from my laboratory book that of 40 pounds of alcohol at ·820 used in one operation on 43 pounds soap 35½ pounds were recovered, of course in a diluted state. Benzin cannot be substituted for alcohol, as lead margarate is soluble in it to a considerable degree. In one of my early experiments I found that commercial benzin left in the oil a very persistent smell, which I could not remove. I have since taken advantage of this to prepare purified benzin. Ten gallons benzin mixed with 1 gallon cotton-seed oil, subjected to slow distillation till 9 gallons have come over, yield a benzin which evaporates without leaving any smell. The same oil can be used three times, but then seems to become so impregnated with the impurities of the benzin as to lose its effect.

It will be noticed that I have assumed the solid fat of olive oil to be margarin. I have done it for convenience, not as expressing a decided opinion that it is the correct view.

PODOPHYLLIN.*

BY I. GUARESCHI.

The author has examined the podophyllin of commerce obtained from *Podophyllum peltatum*, and finds it consists of two substances, a resin soluble in ether, and a glucoside which is not soluble in ether. This glucoside is decomposed by the action of emulsin, or when boiled with dilute sulphuric acid; in the latter case, the solution on cooling deposits a white powder, whilst the sugar remains dissolved. The product of the decomposition of the glucoside is soluble in alcohol and also in boiling water, being deposited again as the solution cools; it has not been examined.

When commercial podophyllin is fused with potash and treated in the usual way, it yields a small quantity of a product which seems to contain hydroxysalicylic acid, parahydroxybenzoic acid and pyrocatechol.

The author considers that the glucoside in podophyllin resembles convolvulin and turpethin.

NASAL BOUGIES. BACILLA CUNEIFORMIA NASALIA.

Under these names are described a kind of bougies, used for introduction into the nose. They are from 8 to 10 centimetres long. The shape is cylindrical, but somewhat cone-shaped, having a diameter of about 3 to 4 millimetres at the point and increasing towards the base to 6 to 8 millimetres. The following examples are given in the *Pharmaceutische Zeitung*, vol. xxv., p. 194:—

Carbolized Nasal Bougies.

℞	Gelatinæ albæ	55·0 grams.
	Glycerinæ	30·0 „
	Aquæ destillatæ	20·0 „

Reduce to a gelatinous mass by heating in a closed vessel in a water-bath, and add—

Acidi carbolici puri	0·2 grams.

Pour into glass moulds or moulds made of paraffined paper so as to make fifteen rods, 8 to 10 centimetres long and about 5 millimetres in diameter, and slightly cuneiform. For excessive or fetid discharge from the nose.

Tannin Nasal Bougies.

℞	Acidi tannici	2·0 grams.
	Tragacanthæ	6·5 „
	Radicis althææ	2·0 „

Mix and add—

Glycerinæ	6·0 „
Aquæ destillatæ	3·5 „

Make four cuneiform rods 8 centimetres long. To be moistened before introduced into the nose.

Bacilla cuneiformia zincica.

℞	Gelatinæ albæ	60·0 grams.
	Glycerinæ	40·0 „
	Aquæ destillatæ	20·0 „
	Zinci sulfurici	0·5 „

Mix, s. a., and make twenty cuneiform rods 8 centimetres long.

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* *Gazzetta*, 10, 16—20. Reprinted from the *Journal of the Chemical Society*, July, 1880.

The Pharmaceutical Journal.

SATURDAY, AUGUST 7, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

INTERNATIONAL MEDICAL CONGRESS.

AT the meeting of the International Medical Congress, held last September, at Amsterdam, under the Presidency of Professor DONDERS, of Utrecht, a unanimous desire was expressed that the next meeting should take place in Great Britain in 1881; and we now learn that this desire, having been communicated to the Presidents of the Royal Colleges of Physicians and Surgeons in London, they convened a meeting of delegates from the various Universities, Colleges, and other public bodies of the United Kingdom, including the principal Medical Societies, the British Medical Association, and the Medical Departments of the Army, Navy, and India Office, with the object of obtaining, in this way, a thoroughly national representation of feeling and opinion on the subject.

It appears that a most cordial response was given to this appeal from all quarters, and that at the meeting of delegates thus convened, it was decided to comply with the wish expressed at the Amsterdam meeting, and to hold a congress in London. A general committee of organization was then appointed, together with an executive committee, and a reception committee to carry out the necessary details.

Her Majesty the Queen has graciously given proof of her goodwill towards the cause of medical science and the efforts for its furtherance by allowing the Congress to be placed under her Royal patronage. The Prince of Wales has also shown his interest in the undertaking by according a similar favour. From these and other circumstances it is probable that a large number of distinguished men will be attracted to England from all countries on the occasion, and the attendance of our own countrymen from all parts of the United Kingdom, India and the Colonies will probably be large.

The days of meeting are to extend from Wednesday the 3rd of August to Tuesday the 9th of August inclusive, and the several meetings will be held in the Halls of the University of London, the Rooms of the Royal Society, the Society of Antiquaries, the Astronomical Society, the Linnæan, Chemical and Geological Societies.

Among the sections in which the preceedings of the Congress will be carried on there is to be one devoted to Materia Medica and Pharmacology, and though no official communication has been made to the Pharmaceutical Society on this subject, we have reason for stating that there is a desire on the part of the Executive Committee for the co-operation of the Pharmaceutical Society in some way. This circumstance seems to offer considerable inducement for again taking into consideration the question whether the International Pharmaceutical Congress, already decided upon as to be held in London, cannnot be held simultaneously with the Medical Congress, and if practicable with some such association with the Pharmaceutical section of the Medical Congress as to be beneficial both from a medical and a pharmaceutical point of view. Our readers will perceive that this subject has attracted the attention of the Council, and that it is referred to a committee to deal with as may be desirable.

From the terms of the resolution passed by the Council, on Wednesday, it may be taken as decided that the invitation given by the Council in 1879 is to be repeated for 1881, and we trust that no unforeseen circumstances may arise as was the case on the former occasion to interfere with the successful carrying out of this project for which there seems now to be such a favorable opportunity.

BRITISH PHARMACEUTICAL CONFERENCE.

WE are informed by the Honorary Secretaries that the papers in the following list have already been promised for the Swansea meeting.

1. Further Notes on Petroleum Spirit and Analogous Liquids. A. H. ALLEN, F.I.C., F.C.S.
2. The Detection of Amorphous Quinine in *Ferri et Quiniæ Citras*. J. DE VRIJ, Ph.D.
3. Note on the Presence of Arsenic in Tincture and Solution of Perchloride of Iron. F. W. FLETCHER, F.C.S.
4. The Gravimetric Estimation of Minute Quantities of Arsenicum. F. W. FLETCHER, F.C S.
5. Notes on the Essential Oil of Buchu Leaves. Professor FLÜCKIGER, Ph.D.
6. Notes on the Constitution of Peppermint Oil. Professor FLÜCKIGER, Ph.D. and J. B. POWER, Ph.D.
7. A Sample of Cayenne Pepper. T. GREENISH, F.C.S., F.R.M.S.
8. Note on Indian Henbane. T. GREENISH, F.C.S., F.R.M.S.
9. Note on the Restoration of Discoloured Syrup of Iodide of Iron. T. B. GROVES, F.C.S.
10. The Cultivation of Cinchona Calisaya. J. E. HOWARD, F.R.S.
11. Observations in Pharmacy. G. A. KEYWORTH, F.C.S.
12. The Green Extracts of the Pharmacopœia. W. A. H. NAYLOR, F.C.S.
13. New and Unofficial Pharmaceutical Preparations. C. SYMES, Ph.D.
14. Report on Commercial Specimens of Sal Volatile and Chloric Ether. J. C. THRESH, F.C.S.
15. The Nature of the Substance in Cinnamon Bark which possesses the Power of Decolorizing Iodine. J. C. THRESH, F.C.S.
16. Report on the Strength of Commercial Specimens of *Aqua Lauro-Cerasi*. J. WOODLAND, F.L.S., F.C.S.
17. The Strength and Purity of the Alkaline Solutions of Potash and Ammonia met with in Pharmacy. J. WOODLAND, F.L.S., F.C.S.
18. Report on the Aconite Alkaloids. C. R. A. WRIGHT, D.Sc., F.I.C., F.C.S.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, August 4, 1880.

MR. THOMAS GREENISH, PRESIDENT.

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present—Messrs. Andrews, Atkins, Bottle, Churchill, Frazer, Gostling, Hampson, Hills, Mackay, Radley, Robbins, Sandford, Savage, Squire, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

Mr. ANDREWS said one of the Local Secretaries or Superintendents told him he did not know whether he was appointed until July, although the voting papers were sent in in May.

The SECRETARY said the election did not take place until July.

Mr. ANDREWS said the gentleman referred to had superintended a local examination, although not formally elected.

The SECRETARY said he continued to hold office as Superintendent until July, from his previous appointment.

NOMINATION OF A MEMBER OF COUNCIL.

The first business was to nominate a gentleman to fill the vacancy caused by the resignation of Mr. Shaw.

Mr. BOTTLE begged to nominate Mr. Edward Northway Butt, 13, Curzon Street, Mayfair. He admitted that in ordinary circumstances it would appear to be the duty of the Council, when a country member resigned, to nominate one from the same locality; but in the present case there were reasons for not following that course. In the first place it had in Mr. Symes a most able representative, not only of Liverpool, but, as Mr. Shaw himself had been, of the interests of the Society and the trade at large. Then the question arose whether it should not seek for a country member elsewhere; but on looking round it appeared that the northern counties were already very effectively represented, and were it desirable to choose a country member, he, for one, should be disposed to seek for one in the West of England; but on the present occasion it seemed to him there were special reasons for choosing a member in London. The position which the Society occupied since the recent decision in the House of Lords would probably impel them at no distant date to seek an amendment of the law, and in that view it was desirable to strengthen the numbers of members of Council residing in London, not only for the purpose of advising with the President and Vice-President as occasion might arise, but also to attend at the House of Commons night after night, when the Bill was passing through it, in order to watch its progress and prevent its being mutilated or added to in a sense that was not desirable. Again, when the present Pharmacy Act was first drawn it contained a clause to the effect that only seven country members should occupy seats on the Council. At that time Mr. Reynolds, of Leeds, wrote to him and asked him to endeavour to get that number enlarged to nine; but on considering the matter, he saw no reason why any limit should be imposed at all, and proposed accordingly that the restriction should be struck out. He then pledged himself that the country members would see that it was to their interest to have at all times an excess of London representatives; but as time went on and facilities had been afforded for country gentlemen to attend not only the meetings of the Council, but those of committees, it had come to pass that London, instead of possessing two-thirds, only possessed about one-third of the representation. He would not say anything against that; but remembering the readiness with which his proposal was received thirteen years ago, when he asked that the number of seats occupied by country members should not be limited, he hoped his present suggestion would be received with equal unanimity, and that it would be seconded by some of his country brethren.

Mr. SAVAGE seconded the motion.

Mr. RADLEY had much pleasure in supporting it.

Mr. HAMPSON quite agreed with the remarks which had fallen from Mr. Bottle, and had not a word to say against Mr. Butt; but on the other hand he thought they should endeavour as far as possible to follow the indications given by the votes at the recent election. On that ground he begged to propose Mr. Spink, of Westminster.

This nomination not being seconded, the motion for the election of Mr. Butt was put and carried unanimously, and the President thereupon declared him duly elected.

On the motion of Mr. BOTTLE it was resolved—

"That the name of Mr. Butt be added to the Pharmacy Act Amendment Committee, and also to the Benevolent Fund Committee.

The following, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Bancroft, James.
Barnes, James William.
Elborne, William.
Fazan, Charles Herbert.
Fowler, William.
Hardie, James Miller.
Hardwick, Arthur.
Hooper, David.
Price, Robert John.
Slicer, Walter.
Smith, John Ord.
Taylor, Fred.
Thornton, John.
Wyatt, Charles Frederick.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Bancroft, James	Halifax.
Hardie, James Miller	Dundee.
Hooper, David	London.
Price, Robert John	London.
Smith, John Ord	Scarborough.

Chemist and Druggist.

The following registered chemist and druggist, who was in business on his own account before August 1st, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society:—

Burgess, Wallett James	London.

ASSOCIATES IN BUSINESS.

The following, having passed their respective examination, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Hosie, John	Rangoon.
Madeley, Edward Stanbury	London.
Rees, Harding	South Norwood.

Modified.

Barker, Robert	Mold.
Gall, Frederic	Carshalton.

ASSOCIATES.

The following, having passed the Minor examination, and tendered (or paid, as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Biddles, William Byron	Reading.
Crompton, Henry	Bury.
Fentiman, Charles Henry	London.
Gibson, Atkin Brewster	Grantham.
Grover, Sydney	Lower Norwood.
Hamnett, Thomas	London.
Harrison, William	Wisbeach.
Hopkins, John Henry	Leicester.
Jones, Samuel	Flint.
Livesey, James Thomas	Preston.
Matthews, Charles William	London.
Nettleship, Thomas William	Bawtry.
Pearce, Thomas Ellery	Tavistock.
Powell, Samuel John	Swansea.
Preston, Henry	Mansfield.
Puntan, H. H. Cruikshank	Turriff.
Radford, James Alfred	Birmingham.
Reid, William	Aberdeen.
Roper, Robert Francis	East Stonehouse.
Routly, John	Brighton.
Slater, William Martin	Ipswich.
Taberham, Frederick, William	Wells.
Thomas, David Robert	Aberystwith.
Wilson, Thomas Whiting	Harrogate.
Wilson, William Joseph	Oxford.
Williamson, James	Ash.
Woolcott, John Newton	Sidmouth.
Woollings, Frank	London.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Bell, John Henry	Windsor.
Byass, Robert	Hull.
Dobb, Thomas	Sheffield.
Eastland, John	Margate.
Farrage, William Thomas R.	Rothbury.
Hasler, Joseph	Blackburn.
Haynes, Joseph Alfred	Fairford.
Hill, Edward	Lower Tottenham.
Jones, George Henry	Brighton.
Jones, William Alexander	Stoke-on-Trent.
Layman, Ernest Blakesley	Anerley.
Llewellyn, Lewis Herbert	Shrewsbury.
Mossop, Samuel	Ashton-under-Lyne.
Parker, Edwin	Stoke-on-Trent.
Pullan, Herbert Newman	Low Harrogate.
Reynolds, Ernest James	Milton next Sittingbourne.
Saltmarsh, Mark Alfred	Deal.
Sant, Esdras	Pontypridd.
Sharp, Stephen	Heywood.
Sherburne, John Chester	London.
Spong, John Fuller	Leeds.
Stacey, Ernest Lloyd	London.
Stiles, Theodore Mayo	Poole.
Thomas, John Griffith	Neath.
Tillett, Arthur John	Market Rasen.
Turnbull, William	Newcastle-on-Tyne.
Turner, John F	Ramsgate.
Wake, George	Howden.
Wilkinson, Thomas	Crook.
Willcocks, Arthur Squire	Portsea.
Woodcock, Page Hornor	Norwich.
Woods, Joseph James Birkett	Tunstall.
Wyatt, William	Mansfield.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The Council then went into committee to consider the report of the deputation to the Board of Examiners in Scotland.

On resuming, it was resolved that the report be received, and that the thanks of the Council be given to the deputation for the valuable information furnished.

WEIGHTS AND MEASURES ACT.

Mr. **Savage** asked leave to state what had been done in Brighton in reference to this Act, having on a former occasion informed the Council that the Town Council did not intend to put the Act in force. Since then an intimation had been received that it must be enforced, and a meeting of the General Purposes Committee was held to consider how it should be done. The result was that the inspector was to attend at the Town Hall on certain days for the purpose of inspecting weights and measures sent down to him, for which he was to be paid by the Corporation, so that chemists and druggists would be put to no expense. All weights and measures would have to be stamped before Christmas next. At first it was decided that all inaccurate measures should be broken, but it was afterwards resolved not to insist on this, as the measures might be useful to students or others, but that they should have a special mark put upon them, and if they were found in use a penalty would be imposed.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was received and adopted, and sundry accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£20 to a former associate and member in distressed circumstances.

£15 to a registered chemist and druggist, aged 78, in distress, owing to the failure of a banking company.

£15 for the education of the orphan son of a registered chemist and druggist.

The report and recommendations were received and adopted.

Mr. **Atkins** asked how the Isherwood children were going on.

The **Secretary** said he believed they were all doing very well.

LIBRARY, MUSEUM AND LABORATORY.

The Librarian's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
June . .	Day . .	291	20	5	11
	Evening	165	14	1	7

Circulation of books.	Town.	Country.	Total.
No. of entries . . .	158	157	315
Carriage paid		£2 1s. 6d.	

The following donations to the Library had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Treumann, C., Beiträge zur Kenntniss der Aloe, 1880.

Wenckiewicz, B., Das Verhalten des Schimmelgenus Mucor zu Antisepticis und einigen verwandten Stoffen mit besonderer Berücksichtigung seines Verhaltens in zuckerhaltigen Flüssigkeiten, 1880.

From Professor **Dragendorff**.

Ronalds, Sir F., Catalogue of Books and Papers relating to Electricity, Magnetism, etc., edited by A. J. Frost, 1880.

— Biographical Account of Sir F. Ronalds, by A. J. Frost, 1880.

From the Society of Telegraph Engineers.

Macé, M., Essai sur l'Origine et la Constitution des Etres et Objets de la Nature, 1880.

From the Author.

Squibb, E. R., On the Relations of the Medical Profession to the Trade Interests of the Materia Medica, and Note on Pepsin, etc. [1880].

From the Author.

Massachusetts College of Pharmacy, 14th annual catalogue, 1880.
From Mr. B. F. Davenport.

White, J. W., Salicylic Acid in Yellow Fever [1880]. From the Author.

Commentar zur österreichischen Pharmacopoe, von F. C. Schneider und A. Vogl, 1880, Lief. 5.
From Professor Vogl.

American Pharmaceutical Association, Proceedings of Third Meeting, 1854.

— Proceedings of Twenty-seventh Meeting, 1879.
From the Association.

The Committee recommended the purchase of the undermentioned works for the Library:—

British Skin Hospital Pharmacopœia, 2nd ed., 1880.

Britten, J., and R. Holland, Dictionary of English Plant Names, 1878–9, and continuation.

Hansen, A., Die Quebracho-Rinde, 1880.

Miller, W. A., Elements of Chemistry, 5th ed., 1880, pt. 3.

Rennie, J., New Supplement to the Pharmacopœias, 3rd ed., 1833.

Tuson, R. V., Veterinary Pharmacopœia, 3rd ed., 1880.

The Committee also recommended that the Librarian do attend the annual meeting of the Library Association, to be held in Edinburgh at the end of September or beginning of October.

The Curator's report had been received, and included the following particulars:—

	Attendance.	Highest.	Lowest.	Average.
June . .	Day . .	24	1	12
	Evening	8	1	3

The following donations to the Museum had been received, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Herbarium specimen of the Rose of Jericho (*Anastatica hierochuntina*).
From Mr. W. Jackson, Crediton.

Fresh specimens of biennial Henbane.
From Messrs. Battley and Watts.

Specimens of unnamed South American Drugs.
From Messrs. Wyleys and Co., Coventry.

Specimens of Nepal Cardamoms; Pods of *Prosopis siliquastrum*; Roots of *Ionidium Ipecacuanha.*
From Messrs. Geo. Curling and Co.

Specimens of Indian Atturs or Essential Oils.
From Professor Archer, Edinburgh.

A Kneading and Mixing Machine.
From Mr. Pfleiderer.

Specimens of perfect crystals of Sulphate of Copper and Alum. From Mr. W. Read, Landport.

The Curator reported that he had distributed numerous specimens of duplicate Indian Drugs to the following:—

The North British Branch.

The Leicester Chemists' Assistants' Association.

The Liverpool Chemists' Association.

To the Materia Medica Museums of University Hospital, St. George's Hospital and London Hospital.

To the Botanical Museum of St. Bartholomew's Hospital.

Professor Bentley.
" Bommer, of Brussels.
" Davidson, of Aberdeen.
" Dragendorff, of Dorpat.
" Flückiger, of Strassburg.
" Herlandt, of Brussels.
" Oberdorffer, of Hamburg.
" Planchon, of Paris.
" Soubeiran, of Montpellier.
Dr. Vogl, of Vienna.
Herr Dittrich, of Prague.

The Council went into Committee to consider the report. On resuming, the report and recommendations were received and adopted.

It was also resolved that a letter from Professor Attfield, with regard to the Society's School, be entered on the minutes.

GENERAL PURPOSES.

The report of this Committee included the usual report from the Solicitor as to the progress of cases placed in his hands. In the case of Wright, of Liverpool, and that of Copping, of Manchester, the amount of penalty and costs had been recovered.*

The Secretary also reported on several cases of alleged infringement of the Act, in some of which the Committee recommended that proceedings be commenced.

The Committee had also received the reports from the Professors as to the prize examinations, and had opened the motto envelopes to ascertain the names of the successful competitors.

The reports were to the following effect:—

Chemistry and Pharmacy.

In the examination for the bronze medal and certificates there were five competitors, three of whom obtained respectively 86, 78 and 75 marks out of 100. In the examination for the silver medal and certificates, seven papers of considerable merit had been received. The conduct of the class throughout the session had been highly satisfactory.

Botany and Materia Medica.

In this examination the Professor reported that the average of the marks obtained had been high, 92 being obtained by the most successful competitor. The same remarks applied to the examination for the ten months' course, in which six candidates were worthy of special distinction. The good conduct, regularity of attendance, punctuality, diligence and progress of the students, had been highly satisfactory.

Herbarium Prize.

For this prize there were five competitors. The first collection contained 880 specimens and was of great merit; as regards variety of ferns, the best ever submitted. Mr. Drew's collection consisted of about 480 specimens and Mr. Leech's of 420. The latter, however, was slightly superior in arrangement and preservation, and the two were therefore placed equal. A fourth collection contained 334 specimens and was well worthy of a certificate.

Practical Chemistry.

For this examination seventeen candidates presented themselves, all of whom came through it with credit, and eight were worthy of special mention. A copy of the questions was appended to the report.

Council Examination Prizes.

In this examination there were nine competitors, all of whom had been examined in London.

The report of the Committee included a list of those to whom it recommended that prize awards should be made.

The Solicitor attended the Council and reported that Sir John Holker had returned his brief in the case of the Society *v.* the London and Provincial Supply Association, with an expression of his great regret that other engagements had rendered impossible his presence at the bar of the House of Lords, to take part in the argument.

The Council went into committee to consider the legal portion of the report as usual.

On resuming, the report and recommendations of the Committee were received and adopted.

PRIZE AWARDS.

The following awards were made on the recommendation of the General Purposes Committee:—

Chemistry and Pharmacy.

[Five months' course.]

Bronze Medal....................	Thomas Hart.
Certificates of Merit	John Henry Chaplin. Ernest Frederick Salmon.

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* See *ante*, x., 1051, and xi., 39.

[Ten months' course.]

Silver Medal	William Fowler.
Certificates of Honour	Robert Wright. John Thomas. William Elborue. David Hooper.
Certificates of Merit	Edwd. Chas. Jas. Davies. Wm. Hodgkinson Jackson

Botany and Materia Medica.

[Five months' course.]

Bronze Medal	John Henry Garrett.
Certificates of Merit	Alfred Hornby. John Henry Chaplin. Thomas Hart.

[Ten months' course.]

Silver Medal	David Hooper.
Certificates of Honour	William Elborne. Equal. William Fowler. Equal. John Henry Garrett. Equal. Robert Wright.
Certificate of Merit	John Thomas.

Practical Chemistry.

Silver Medal	David Hooper.
Bronze Medals	Robert Wright. John Thomas.
Certificate of Honour	Thomas Burrell.
Certificates of Merit	Wm. Hodgkinson Jackson John Henry Chaplin. Thomas Hart.

Botanical Prize.

Silver Medal	John Hutchinson.
Bronze Medals	Equal. Walter Clark Drew. Equal. John Henry Leech.
Certificate of Merit	James Thomas Bays.

Council Examination Prizes.

Pereira Medal (silver); and Books value £5, presented by Mr. T. H. Hills.
David Hooper.

Pharmaceutical Society's Medal (silver); and Books value £3, presented by Mr. T. H. Hills.
Henry William Drew.

Pharmaceutical Society's Medal (bronze); and Books value £2, presented by Mr. T. H. Hills.
William Fowler.

PHARMACY ACT AMENDMENT.

The VICE-PRESIDENT thought it would be desirable to pass a resolution with reference to the recent decision of the House of Lords. He would therefore move—

> "That the Special Committee appointed to consider improvements in the Pharmacy Act, 1868, be requested to take into consideration the recent decision of the House of Lords, in the appeal case "Pharmaceutical Society *v.* The London and Provincial Supply Association," and its probable effect on the future of pharmacy, and to report to the Council any course they might think it desirable this Society should adopt."

He had originaly drawn the motion requesting the Committee to report to the President, instead of the Council, in case it might be deemed advisable to take any immediate action, but that question he would leave to the decision of the Council.

Mr. FRAZER said he should object to any step being taken without full consideration.

Mr. HAMPSON seconded the motion, but thought all necessary purposes would be answered if the Committee reported to the Council in the ordinary way. It would be impossible to move rapidly; everything must be done with due deliberation. They must certainly not rest content with the present condition of things, and he hoped they would all feel a strong determination to do the best they could under the circumstances. The recent decision was not only a blow against pharmacy but also against the medical profession.

Mr. SYMES supported the resolution.

Mr. ATKINS thought there could not be two opinions about the desirability of the Committee considering this matter. He should support the resolution not only on the grounds mentioned, but because there was considerable discontent amongst medical men as to the existing state of the law, there being nineteen licensing bodies at present.

Mr. GOSTLING also supported the resolution. They ought to take the matter into most serious consideration, not only in their own interests but in the interests of the public.

The motion was then agreed to unanimously.

HOUSE.

The report of this Committee was adopted. It simply recommended the payment of certain accounts for work done to the premises.

JACOB BELL MEMORIAL SCHOLARSHIPS.

The Committee appointed to award these scholarships subject to the approval of the Council reported that the examination was held on July 6, when nineteen candidates competed, viz., in Birmingham, 1; Bristol, 2; Canterbury, 1; Exeter, 1; Leeds, 2; Lincoln, 1; London, 10; Peterborough, 1.

The Committee called attention to the exceedingly satisfactory results of the competition. In many previous years it had been a matter of regret that the number of competitors had been very small. The number on this occasion had been altogether unprecedented, and not only so, but the papers returned had been of very high average merit; no less than nine of the competitors having obtained more than the number of marks necessary to obtain a scholarship.

Under these special circumstances the Committee recommended that as only two scholarships are awarded, the mottoes of the other seven competitors who have distinguished themselves be published in the order in which they stand, as a recognition of the general merits of their papers.

The mottoes adopted by the two candidates who had obtained the highest number of marks were "*Ignota tentare*" and "*Ne quid nimis.*" The Committee having ascertained that those mottoes had been respectively adopted by—

Frederick Charles Bird
and
John Oldham Braithwaite,

recommended that the scholarships for 1880-81 be awarded to them.

The Council received and confirmed the award of the scholarships by the Committee and also resolved to publish, alphabetically, the names of the seven candidates who stood next in order of merit. The names are as follows:—

Edward Baily.
William Edward Gillson Jackson.
Joseph Pemberton.
Edward John Wall.
Frederick Walmsley Warrick.
Francis Watts.
Robert Wright.

SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

The following list of Superintendents and Deputy-Superintendents of written examinations for the ensuing year was agreed to:—

Aberdeen	Davidson, Charles.
Birmingham	Southall, William.
Brighton	Gwatkin, James Ross.
Bristol	Stroud, John.
Cambridge	Deck, Arthur.
Canterbury	Bing, Edwin.

Cardiff	Hollway, Albert Brown.
Carlisle	Thompson, Andrew.
Carmarthen	Davies, Richard Morgan.
Carnarvon	Lloyd, William.
Cheltenham	Smith, Nathaniel.
Darlington	Robinson, James.
Douglas, Isle of Man	Breary, William A.
Dundee	Hardie, James.
Edinburgh	Mackay, John.
Exeter	Delves, George.
Glasgow	Kinninmont, Alexander.
Guernsey	Arnold, Adolphus.
Hull	Bell, Charles Bains.
Inverness	Galloway, George Ross.
Jersey	Ereaut, John, jun.
Lancaster	Bagnall, William Henry
Leeds	Reynolds, Richard.
Lincoln	Maltby, Joseph.
Liverpool	Symes, Charles.
London	Taylor, George Spratt.
Manchester	Wilkinson, William.
Newcastle-on-Tyne	Martin, Nicholas Henry.
Northampton	Bingley, John.
Norwich	Sutton, Francis.
Nottingham	FitzHugh, Richard.
Oxford	Prior, George Thomas.
Peterborough	Heanley, Marshall.
Sheffield	Ward, William.
Shrewsbury	Cross, William Gowen.
Southampton	Dawson, Oliver Robert.
Truro	Percy, Thomas Bickle.
Worcester	Virgo, Charles.
York	Davison, Ralph.

DEPUTY-SUPERINTENDENTS OF WRITTEN EXAMINATIONS.

Aberdeen	Kay, James Petrie.
Birmingham	Churchill, William John.
Brighton	Savage, William Wallace.
Bristol	Tucker, Robert Lewis.
Cambridge	Church, Henry James.
Canterbury	Amos, Daniel.
Cardiff	Saunders, William Josiah.
Carlisle	Hallaway, John.
Carmarthen	Davies, R. Morgan, jun.
Carnarvon	Hughes, Richard.
Cheltenham	Barron, William.
Darlington	Hutchinson, Rev. E.
Douglas, Isle of Man	Brearey, Arthur W.
Dundee	Kerr, Charles.
Edinburgh	Ainslie, William.
Exeter	Lake, John Hinton.
Glasgow	Davison, Thomas.
Guernsey	Collenette, Adolphus.
Hull	Baynes, James.
Inverness	Galloway, George.
Jersey	Ereaut, John.
Lancaster	Hall, William.
Leeds	Smeeton William.
Lincoln	Battle, John Scoley.
Liverpool	Sumner, Robert.
London	Bremridge, Richard. Knapman, John W. Holmes, Edward M.
Manchester	Wilkinson, George
Newcastle-on-Tyne	Stuart, Charles Edward.
Northampton	Mayger, William W.
Norwich	Corder, Octavius.
Nottingham	Rayner, John.
Oxford	Thurland, Thomas Henry.
Peterborough	Buckle, George F.
Sheffield	Maleham, Henry.
Shrewsbury	Cross, W. Gowen, jun.
Southampton	Spearing, James.
Truro	Fiddick, Thomas.
Worcester	Lunn, Thomas.
York	Sowray, Joseph.

REPORT OF EXAMINATIONS.

July, 1880.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major, (8th)	10	5	5
„ (9th)	11	2	9
„ (13th)	7	6	1
	— 28	—13	—15
Minor, (8th)	13	3	10
„ (9th)	15	4	11
„ (13th)	18	5	13
„ (14th)	26	10	16
„ (15th)	26	10	16
„ (16th)	23	14	9
	—121	—46	—75
Modified, (8th)	1	0	1
	150	59	91

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major, (13th)	2	1	1
Minor, (13th)	9	4	5
„ (14th)	9	6	3
„ (15th)	10	6	4
	—28	—16	—12
Modified, (15th)	2	1	1
	32	18	14

Preliminary Examination.

Candidates.		
Examined.	Passed.	Failed.
341	167	174

3 certificates in lieu of the Society's examination had been received:—

University of Cambridge	1
University of Glasgow	1
University of Oxford	1

The Council then went into committee during the perusal of a letter bearing on the subject of the examinations, which had been sent to the President with a request that it might be read to the Council.

REPORTS OF BENEVOLENT FUND COMMITTEE.

Mr. SYMES moved in accordance with a notice:—

"That the report of the Benevolent Fund Committee be read in a more condensed form than hitherto."

He had always held that it was unnecessary the Council should spend so much valuable time in going again over details which were examined in Committee. He did not begrudge time being spent on important matters, but when he saw matters of great importance hurried over because the Council were getting towards the end of the day, and that it had been brought to the end of the day by interposing matters of routine which had been already fully dealt with, he thought if only a matter of ten minutes could be saved it would facilitate business and be worth doing. He would suggest that the only details given should be the name and address and age of the candidate, with previous occupation, if any. When they were read if any member were interested in any special case, he would ask some further questions about it, as had been done hitherto; but in the majority of cases the four or five particulars he had mentioned would be ample.

Mr. RADLEY thought the Council might have some sympathy with this motion though it might not agree with the exact restrictions named. If they were expressed in general terms without laying down an absolute rule, it would be quite sufficient. Long letters need not be read, or any minute detail, but the Council must not go too far in the direction of abridgment.

Mr. WILLIAMS said the minutes of this Committee were made as lengthy as they were for purposes of future reference. The question arose who was to have the responsibility of cutting down the real minutes. It was rather a serious matter, and one involving a principle, and he thought the Council should have the reports of all Committees accurately presented to the Council. There might be some mere matters of routine included; but as the reading did not occupy more than ten minutes, and sometimes not more than three, he thought it was a pity to give up a great principle without some better reason than they had yet heard given. He would ask Mr. Symes to reconsider the matter.

Mr. **Symes** said the principle had been broken through already in several cases, matters of detail having been passed over in reading the reports.

Mr. **Williams** said it was competent to the Council at any time to authorize the omission of matters of detail being read, but that was very different to hurriedly laying down a general rule.

Mr. **Mackay** said no member of the Council was more desirous of saving time than he was, but at the same time he should be very sorry to find the minutes of the Benevolent Fund Committee shortened in any way. It was one of the most important branches of the Society's work, and though the Committee was a large one, and was generally well attended, still there were something like ten members who were not on the Committee, and to whom it would be a source of gratification to hear the minutes read. He should be obliged to vote against the motion.

Mr. **Savage** took it the report would appear as usual in the book; it would be only shortened in the reading.

The **President** said he should be sorry to see the records of any Committee cut down at all. At the same time there was some reason in Mr. Symes's motion, and it might be understood, now that the matter had been ventilated, that in reading these reports some extraneous matters might, at the discretion of the President, be left out, but he deprecated any resolution being passed on the subject.

Mr. **Symes** said, if it were accepted as a principle, in deference to the view of the President, he was prepared to withdraw the resolution, but the fact was that, when he first made the suggestion, he was over-ruled, and told he could not speak to it unless he proposed a resolution, and now he put it in the form of a resolution, he was told the Council ought not to make a hard and fast line, but it ought to be merely a suggestion, so that he did not exactly know which was right. In reading the report of the Library, Museum and Laboratory Committee, that day, the Secretary, very properly no doubt, passed over certain lists, which he said would be published in the Journal.

The **President** said they were lists of books, etc., which were all published *in extenso* in the Journal.

Mr. **Symes** said, on the understanding that his suggestion would be adopted, he should be happy to withdraw the motion.

INTERNATIONAL PHARMACEUTICAL CONGRESS.

Mr. **Hampson** drew attention to the fact that the International Medical Congress would meet in London next year, and he saw that one of the sections of the Congress was Materia Medica and Pharmacology. Now, in 1874, the Council passed a resolution that the International Pharmaceutical Congress should be invited to hold their next meeting in England. He thought that it would be very desirable that the Pharmaceutical Congress should be held about the same time that the Medical Congress would be held, and he moved that another invitation should be sent.

The **President** said as he was the delegate sent to the Congress at St. Petersburg, he could perhaps give some information on this subject. He gave the delegates present on that occasion an invitation, subject to its being approved by this Council, that the next meeting should be held in London, and it was understood that that would take place in five years, which would have been in 1879, but owing to the war in which Russia was engaged and other circumstances, it was found impossible to have a satisfactory meeting here at that time, and he was advised by several distinguished foreigners not for the present to issue the invitation; but in the early part of this year a paper was sent to Mr. Sandford, as President, in connection with the International Medical Congress, which he was good enough to forward to him, and one or two other papers had since been sent by the Medical Congress to the President of this Society. It occurred to him that it would be a very good opportunity to have the International Pharmaceutical Congress, in London, at the same time as the International Medical Congress next year. That was exceedingly desirable, as so many medical men from the continent, taking much more interest in pharmaceutical matters than as a rule medical men in England did, would be over here attending the Medical Congress, that the Pharmaceutical Congress should be held at the same time.

Mr. **Hills** said the President of the College of Physicians mentioned the matter of the Medical Congress to him in May last, and asked him if the Pharmaceutical Society would get up an Exhibition of Materia Medica, etc. Mr. Hills replied that the Society would be most happy to do so, and suggested that the Exhibition should take place at the Society's house, Bloomsbury Square. Mr. Hills mentioned the subject to the late President, Mr. Sandford, but did not know whether any official notice was taken of it.

Mr. **Sandford** said there was not.

The **President** said that medical men were entering with great spirit into this matter, and he thought it would be an excellent opportunity to hold the Pharmaceutical Congress. He knew there were many eminent men abroad who would only be too glad of the opportunity of visiting England on such an occasion. It occurred to him that the Council might affiliate the International Pharmaceutical Congress with the Medical Congress. One principal subject, and the only one in which English pharmacists had any immediate interest at St. Petersburg, was an International Pharmacopœia, which as it was thought a great deal of on the continent, though it did not seem to be made much of here, would be probably one of the chief points of discussion.

Mr. **Williams** asked if there would not be a danger of one congress clashing with the other.

The **President** thought there would not be the slightest danger of this.

Mr. **Hills** suggested that the best plan would be for the President to see the President of the College of Physicians, and in that case he would be happy to accompany him, and to make any preliminary arrangements.

It was then moved by Mr. **Symes**, seconded by Mr. **Hampson**, and carried unanimously:—

> "That the Library, Museum and Laboratory Committee be requested to make arrangements for the reception of the International Pharmaceutical Congress on the occasion of their visit to London in August, 1881."

THE PHARMACEUTICAL CONFERENCE.

It was resolved, as last year, that those members of the Council, who could make it convenient to attend the Conference at Swansea, be appointed delegates.

Mr. **Symes** suggested that many valuable specimens for the Museum might be obtained in Swansea and the neighbourhood, if someone would undertake to collect them.

The **President** said he had heard from Mr. Holmes that he was very much indebted to Mr. Frazer for his assistance in collecting specimens for which he had been sent to Glasgow, and that the Museum would be very much enriched by those which he would bring him.

The School of Pharmacy.

The Council went into committee to consider a letter from Professor Redwood, with regard to certain proposed improvements which he proposed to introduce into his course of lectures.

On resuming, it was resolved unanimously that Professor Redwood's suggestions be approved.

The Sale of Spirits Bill.

Mr. **Sandford** reported that he had seen the Solicitor to the Inland Revenue Board who had promised that he would get the word "such" introduced into the Bill in the clause to which reference had been made on a former occasion. Since then he had seen a notice on the paper by Lord Frederick Cavendish to introduce the word.

The **Secretary** said the Bill had been considered in Committee, and stood on the paper for to-morrow.

The Pharmaceutical Congress at Breslau.

On the motion of the **Vice-President**, seconded by Mr. **Williams**, it was resolved that:—

"The Editor and Sub-Editor should attend the Annual Meeting of the German Pharmaceutical Association to be held at Breslau in September."

The September Council Meeting.

The **President** reminded the country members of the Council that it was not absolutely necessary for them to attend in September, as it was only requisite to form a quorum of seven to get through the formal business.

Erratum.—Page 62, column 2, line 34, *for* Mears, Henry, Eastover, *read* Mears, Henry, Bridgwater.

Parliamentary and Law Proceedings.

Important Case under the Sale of Food and Drugs Act.

At the Stockport Police Court, on July 21, several chemists and druggists and grocers of Stockport appeared to answer an information charging them, under the Sale of Food and Drugs Act, with having sold sweet spirits of nitre, not of the nature, substance and quality of the article demanded by the purchaser.

The prosecution was conducted by the Town Clerk on behalf of the corporation, and Mr. Henry Glaisyer appeared to defend certain of the cases on behalf of the Chemists and Druggists' Trade Association of Great Britain, instructed by the Secretary of that body.

The case of Mr. Bennett, chemist and druggist, was taken first, the information charging him that on the 3rd day of June, at Stockport, he unlawfully sold to the prejudice of one Jacob Marshall, the purchaser, an inspector of nuisances for the said borough, a certain drug, to wit, sweet spirits of nitre (spiritus ætheris nitrosi), which was not of the nature, substance and quality of the article demanded by such purchaser, inasmuch as the said sweet spirits of nitre contained only 1·15 per cent. of nitrous ether, and was of the specific gravity of ·844, whereas the quantity of nitrous ether should have been 3 per cent., and the specific gravity ·845 or thereabouts.

Inspector Marshall proved the purchase and the division of the sample into three parts, one of which he delivered to the public analyst next day, whose certificate was as follows:—

"I, the undersigned, public analyst for the borough of Stockport, do hereby certify that I received on the 4th day of June, 1880, from you, a sample of sweet spirits of nitre for analysis, marked B, No. 2, June 3, 1880, and have analysed the same, and declare the result of my analysis to be as follows:—I am of opinion that the said sample contained the parts as under, 1·15 per cent. nitrous ether; specific gravity, ·844. *Observations.*—Spiritus ætheris nitrosi, according to the British Pharmacopœia, should have a specific gravity of ·845, and contain not less than 3 per cent. of real nitrous ether."

On cross-examination by Mr. Glaisyer, the inspector said that defendant told him, after he had paid for the sweet spirits of nitre and divided the sample, that it was not the British Pharmacopœia preparation; and though he did not understand the meaning of the term at the time, he had since ascertained what was meant.

William Lees, the dispenser at the Stockport Infirmary, said he had a good deal to do with drugs The popular name of spiritus ætheris nitrosi was spirit of nitre or sweet spirits of nitre; and, in his opinion, if anyone went into a shop and asked for a preparation by any of those names he should get spiritus ætheris nitrosi made according to the British Pharmacopœia. He would expect to find in it about 3 per cent. of nitrous ether; and would not be satisfied if it contained only 1·15 per cent. Witness said he was not a qualified chemist.

Oswald Wilkinson said he was public analyst for the borough of Stockport. On the 4th of June he received a bottle of sweet spirits of nitre similar to that produced by Inspector Marshall. He analysed the sample, and delivered his certificate to the inspector personally. That sample only contained 1·15 per cent. of real nitrous ether. He should not consider that a person buying sweet spirits of nitre would get what he wanted if he obtained an article containing only 1·15 per cent. of nitrous ether.

By the Chairman: 3 per cent. of nitrous ether is a fair proportion; it should not be less. The specific gravity of the sample was ·844 instead of ·845.

Examination continued.

The specific gravity may be kept up by adding rectified spirit. The preparation sold contained rather more than 50 per cent. less nitrous ether than it should contain.

Cross-examined by Mr. Glaisyer.

You say you are the public analyst; what training have you had?—Principally at Owens College, Manchester.

How long were you there?—Six sessions.

Have you any knowledge of drugs?—Yes.

What knowledge?—Both practical and theoretical.

Have you ever been in a pharmaceutical school?—No.

What knowledge have you of drugs then, Mr. Wilkinson? –I do not quite understand you; I have both theoretical and practical knowledge.

What practical knowledge?—I know what they ought to be, and have often tested them.

Have you frequently tested the preparations mentioned in the Pharmacopœia?—Most of them.

Have you frequently tested this preparation?—No; I have never tested it before.

Do you say you have never tested this preparation before?—I have not.

Therefore you never tested this preparation at Owens College?—No.

Have you had any other training besides what you got at Owens College?—No; except studying chemistry at school.

How long have you been appointed analyst to this borough?—This is the third year.

Do you know the history of this drug?—Yes.

Tell me what you know about it?—I profess to know all about it; if you ask me a question I will answer you.

When was spirits of nitre first heard of?—I cannot say.

When was it first mentioned in the Pharmacopœia?—Do you mean in the British Pharmacopœia?

In any pharmacopœia?—I have seen it as far back as 1851.

Any further?—Well, I cannot say.

Do you find sweet spirits of nitre in the 1851 Pharmacopœia?—Do you mean the British Pharmacopœia?

Do you find it either in Latin or in English in the 1851 Pharmacopœia?—I cannot swear to it.

Have you the words sweet spirits of nitre either in English or Latin in any Pharmacopœia? –I will not swear anything about the Pharmacopœias.

Is it in the London Pharmacopœia?—I believe it is.

In what year?—I do not know.

If I tell you it is in the 1746 Pharmacopœia, you will not contradict me?—No.

And if I tell you it is the only Pharmacopœia it is in, will you contradict me?—No.

How do you know that this preparation should contain 3 p. c. of nitrous ether, how did you ascertain that?—From the British Pharmacopœia and from other good authorities.

Where does the British Pharmacopœia give you that information?—I have not the British Pharmacopœia.

Mr. Glaisyer: Here is the British Pharmacopœia. (Book handed to witness).

Chairman of the Bench: What edition is that?

Mr. Glaisyer: It is the reprint with additions made in 1874, printed in 1877.

Witness: I do not see it says 3 per cent in this Pharmacopœia; it is in the other Pharmacopœias, I believe.

Mr. Glaisyer: Have you one that shows it?—No.

Chairman of the Bench: Does that book give you the composition of the article?

Witness: Yes, but it does not give the percentage of nitrous ether, it gives the preparation of the article and its character and tests.

Cross-examination continued.

Does it state in the characters and tests that the article should contain 3 per cent. of nitrous ether?—No.

Then as to other Pharmacopœias, can you mention one giving that percentage?—I believe the Edinburgh does.

When was the Edinburgh published?—I cannot say. I do not know. I do not profess to know anything about the date of Pharmacopœias.

How do you know then that it should contain 3 per cent., you do not find it in the British Pharmacopœia, and you have not produced a single authority for making that statement?—But I can.

State your authority?—Dr. Dupré, if you think him an authority.

In what work of Dr. Dupré's do you find that?—I can point to an article in the *Analyst* for July, 1879—book produced from which witness read—"According to my experience we may consider a product containing 3 per cent. of nitrous ether as fairly representing the British Pharmacopœia preparation, and further in judging of the purity or otherwise of any given sample of spiritus ætheris nitrosi, B.P., the particular method of manufacture adopted in the preparation of the sample is of course perfectly immaterial; as long as it fairly corresponds in strength to the B.P. standard, it must be considered as of the nature, substance and quality demanded, however produced."

What evidence does Dr. Dupré give of 3 per cent. being the standard?—He says a product containing that proportion of nitrous ether fairly represents the British Pharmacopœia preparation, and that proportion is generally recognized by other chemists.

What evidence have you that 3 per cent. is to be taken as a standard?—Dr. Dupré says we may consider a product containing 3 per cent. of nitrous ether as fairly representing the B.P. preparation.

Chairman of the Bench: Have you found other samples to contain that percentage?

Mr. Glaisyer: This is the first sample he has analysed, he has stated that in evidence. Why do you accept Dupré as an authority?—He is a good authority, recognized by chemists.

Do you know that Dupré ordered a prosecution for this article and lost his case?—Yes, some time ago.

You can give no reason why you adopt his authority except that you believe in him?—He says that it ought to give 6 per cent.; that leaves a margin of 3 per cent.

Where does he say 6 per cent?—In the paper in the *Analyst* to which I have referred, he says if properly prepared the distillate would contain about 6·5 per cent.

I do not see the words "if properly prepared;" Dr. Dupré says if all the nitric acid employed were used up in the formation of nitrous ether, the proportion contained in the finished product, if 2 pints of spirit are added to the 15 ounces of distillate, would amount to about 6·5 per cent. But ought you to use up all the nitric acid employed?—It is not necessary, it depends on the quantity used.

Are you not ordered by the British Pharmacopœia to take certain quantities of each ingredient to make the preparation therein ordered, and are you to use all the nitric acid ordered?—It depends on the proportion taken.

Are the quantities not stated in the British Pharmacopœia?—Yes, I believe so.

The quantity of nitric acid is 3 fluid ounces; are you to use up the whole of that quantity?—Perhaps.

Are you to use up the whole quantity of nitric acid?—I do not say that.

If you are making the British Pharmacopœia preparation are you not bound to take the quantities mentioned in that Pharmacopœia?—Yes, I stand by that.

Then having taken 3 fluid ounces of nitric acid for making spirits of nitrous ether, are you bound to use up the whole of that acid?—I will not swear to it.

You come here as a scientific witness. Do you know or do you not know?—I do not know.

Chairman of the Bench: You appear to be examining this witness as to the manufacture of the article.

Mr. Glaisyer: He has stated on his certificate that spirits of nitrous ether should contain 3 per cent. of nitrous ether, he then states that this conclusion is based on the authority of Dr. Dupré, and, as far as I understand it, Dr. Dupré's argument stands or falls on this one particular, whether all the nitric acid employed was used up.

Can you mention any other authority besides Dr. Dupré?—I have seen it stated in pharmaceutical works.

Can you give me the names, because anyone can talk in general terms?—Yes, Squire's 'Materia Medica.'

Have you that book with you?—No, I have not, but we can fetch it from the infirmary.

Mr. Glaisyer: I shall be glad to see any recognized authority in which you can show it to me.

Magistrates' Clerk: Will you read the last paragraph, page 294 of the British Pharmacopœia?

Witness read as follows:—"Characters and tests.—Transparent and nearly colourless, with a very slight tinge of yellow, mobile, inflammable, of a peculiar penetrating apple-like odour, and sweetish cooling sharp taste. Specific gravity ·845. It effervesces feebly or not at all when shaken with a little bicarbonate of soda. When agitated with solution of sulphate of iron and a few drops of sulphuric acid it become, deep olive-brown or black. If it be agitated with twice its volume of saturated solution of chloride of calcium in a closed tube, two per cent. of its original volume will separate in the form of nitrous ether and rise to the surface of the mixture."

Mr. Glaisyer: My edition of the British Pharmacopœia, which is the third reprint made with additions in 1874, states: "If it be agitated with twice its volume of saturated solution of chloride of calcium in a closed tube, two per cent. of its original volume will separate in the form of an ethereal liquid and rise to the surface of the mixture." The words ethereal liquid are used instead of nitrous ether.

Magistrates' Clerk: What does that 2 per cent. mean?

Witness: It means that 2 per cent. of nitrous ether will rise to the surface.

Mr. Glaisyer: The witness does not rely on the tests of the British Pharmacopœia.

Witness: I do not rely on that test altogether.

Cross-examination continued.

Do you rely on 3 or 2 per cent.?—I took 3 per cent. I will swear to about 3, nearer 3 than 2.

Less than 3 then possibly?—I will say 3. I will take Dr. Dupré's authority.

Why did you say more than 2?—Because it only says about 3.

The Pharmacopœia does not say about 2, the words are 2 per cent?—It says 2 per cent. of its original volume. The question is, what was the original volume.

Chairman of the Bench: Is the Court to understand that 2 per cent. is the whole of the nitrous ether contained in this preparation?

Mr. Glaisyer: No, sir. The Pharmacopœia does not even state that it contains that quantity of nitrous ether; perhaps the witness will read what the Pharmacopœia does state.

Witness read as follows:—"If it be agitated with twice its volume of saturated solution of chloride of calcium in a closed tube, 2 per cent. of its original volume will separate in the form of nitrous ether and rise to the surface of the mixture."

Mr. Glaisyer: Is that book from which you have just read the third reprint of the British Pharmacopœia with additions made in 1874?—No.

Mr. Glaisyer: There is a third reprint of the book, printed in 1877. Will you now read from that?

Witness reads:—"If it be agitated with twice its volume of saturated solution of chloride of calcium in a closed tube, 2 per cent. of its original volume will separate in the form of an ethereal liquid and rise to the surface of the mixture."

Town Clerk: We have put in and proved a copy of the *London Gazette* for June 14, 1867, authorizing the republished edition of the British Pharmacopœia, the work on which this case must be decided, and it states that "2 per cent. of ethereal liquid will rise to the surface on the application of this test."

Cross-examination continued.

Did you test what rose to the surface in this case?—No.

How did you find 1·15 per cent. to be present then?—I worked by Dupré's method.

You did not work by the British Pharmacopœia test then?—I tried it, but it did not yield what it ought.

We are now talking about Bennett's case.—I did not apply the test of the Pharmacopœia in that case.

What test did you apply?—Dr. Dupré's method.

Was this article nearly colourless?—Yes.

With a very slight tinge of yellow?—Yes.

Was it mobile?—Yes.

Was it inflammable?—I believe so.

Did you test it?—I think not.

Had it a penetrating apple-like odour and sweetish, cooling, sharp taste?—I will not swear it had not.

What was the specific gravity?—·844.

What do you say it ought to be?—·845.

Then you would not quarrel with its specific gravity?—I do not say that.

Is there any practical difference between these two specific gravities?—Certainly.

Is there any important difference?—I should say no, certainly not.

Did it effervesce feebly or not at all when shaken with a little bicarbonate of soda?—Slightly.

Then it answered the test in that particular?—Yes.

When agitated with solution of sulphate of iron and a few drops of sulphuric acid did it become of a deep olive-brown or black?—It became an olive-brown.

Did you, in this particular case, apply the next test, agitation with solution of chloride of calcium?—I did not.

Then you cannot say what percentage of ethereal liquid or nitrous ether it would have shown by that test?—Not according to that test.

You are directed to test in a certain way, and you have not done so?—I have done it by a better way.

You say you did not apply the test ordered by the British Pharmacopœia?—I was not ordered to apply the tests of the British Pharmacopœia.

So far as you did apply those tests, the article answered to them. By what test did you ascertain the percentage of nitrous ether?—By Dr. Dupré's.

Tell me what it was?—I took 10 cubic centimetres of what was purchased as sweet spirits of nitre, and treated it with 1½ gram of solid caustic potash. This was put in a flask and closed, and frequently agitated, and left to stand for two days tightly corked. The contents of the flask were then washed out into a platinum basin carefully, with 50 cubic centimetres of water, and evaporated to a third of its bulk, then made up to 300 cubic centimetres with water containing 50 cubic centimetres of sulphuric acid of 1 to 4 strength. One hundred cub. cent. of this was taken and heated with standard solution of permanganate of potash of known percentage; that was the way I determined the nitrous ether.

Mr. Glaisyer: If you had gone on adding permanganate of potash would the solution not still have continued to decolorize?—Very slightly after a given time.

Mr. Glaisyer: But does not Dr. Dupré admit that it would?—I am not sure about that.

Mr. Glaisyer: Are not his words "the solution still continues to decolorize permanganate, though but slowly, and much more will have to be added before the coloration becomes permanent?"—I think so.

Then where is the trustworthiness of this method to give the quantity of nitrous ether present, if it goes on for ever?—It only goes on for a certain time.

How long did it continue to decolorize?—For five minutes. I satisfied myself the reaction was complete.

Does Dr. Dupré give any proof that this is a good test?—He has had it printed and I think that sufficient.

He does not say it can be relied on, does he?—I cannot remember every word of this article.

If I say he does not, will you believe me?—No.

Then read it.—He says: "No doubt other substances are oxidized as well, and the process indicates more nitrous ether than is actually present; but, as the error is on the side of leniency, it is perhaps an advantage rather than otherwise."

Cross-examination continued.

The summons charges the defendant with having prejudiced the purchaser. I want to know whether he was prejudiced?—I should say he was if the article did not contain the proper proportion of nitrous ether.

Do not you know that there is another preparation known as spirits of nitre?—I believe there are several.

Do not you know there are others in common use?—Yes, I believe so.

Will you mention any characteristics that characterize any of them?—I cannot.

Do the words sweet spirits of nitre appear in the British Pharmacopœia?—I believe not, but it is the same thing as spiritus ætheris nitrosi.

You state that: you have no proof of it, have you?—No.

What was the origin of the name of sweet spirits of nitre?—I could not swear, except that it was originally made from nitre and that it had a sweet taste, and that it is ordered in the London Pharmacopœia under that name.

Edward Rayner said he was a Doctor of Medicine, had studied chemistry at Owens College, and at Paris and Heidelberg. In his opinion the certificate given by the analyst in this case would not represent a fair sample of sweet spirits of nitre. If a person bought an article similar to the one analysed he would not get what he was entitled to receive. Spirits of nitrous ether was called by many names,—sweet nitre, sweet spirits of nitre, spirits of sweet nitre and other names. Sweet spirit of nitre of the British Pharmacopœia should contain more than 2 per cent. of nitrous ether. The medicinal value of sweet spirit of nitre was diminished by the absence of nitrous ether.

Cross examined by Mr. Glaisyer.

Why do you say the sample in question would not be a good one?—Because it does not come up to the standard of the British Pharmacopœia.

What is that standard?—It should contain at least 2 per cent. of nitrous ether.

Where do you get that from?—The Pharmacopœia.

The Pharmacopœia does not state that, it says 2 per cent. of ethereal liquid.—I take the official Pharmacopœia where the words nitrous ether are used.

The British Pharmacopœia states "that if it be agitated with twice its volume of saturated solution of chloride of calcium in a closed tube, 2 per cent. of its original volume will separate in the form of an ethereal liquid and rise to the surface of the mixture," but taking the Pharmacopœia you have referred to, of which my Pharmacopœia is a reprint, that even does not say it is nitrous ether that rises to the surface, but that 2 per cent. of its original volume will separate in the form of nitrous ether. Are you prepared to say it is nitrous ether that rises to the surface?—It is not pure nitrous ether.

What would be the other ethereal substance that would rise to the surface with the nitrous ether?—I am afraid I cannot say.

Would there be aldehyd present?—I should think so.

In what proportion?—I do not know.

Mr. Glaisyer: In this case the defendant, Mr. Bennett, is charged under the 6th section of the Sale of Food and Drugs Act, with having sold this drug to the prejudice of the purchaser and for having sold a drug not of the nature, substance and quality of the article demanded. We have heard, in the evidence of the inspector who made the purchase, that he asked for sweet spirits of nitre. Now, sweet spirits of nitre is a household medicine which has been in use for very many years and is well known throughout the whole country by that name. It is a preparation distinct from the spirits of nitrous ether of the British Pharmacopœia, prepared by a different formula. The product of the distillation of the various ingredients used in the manufacture of sweet spirits of nitre, properly so called, will show a specific gravity of ·850 and I shall prove, on the evidence of Professor Attfield, that the specific gravity of the sealed sample of the article was ·850 and I shall be able easily to account to you for the discrepancy between the specific gravities found by the professor and the public analyst. The spirit of nitrous ether which is alluded to in the summons, as being synonymous with sweet spirits of nitre, is a totally distinct preparation from that which the defendant has sold, and, as I contend, properly sold under the term sweet spirits of nitre. Spirit of nitrous ether is a medicine largely prescribed by the medical profession and the directions for its manufacture occur in the British Pharmacopœia, published in 1867, and since reprinted three times by direction of the Medical Council. In the last reprint, dated 1877, the name sweet spirits of nitre does not occur even as a synonym for spirits of nitrous ether. The Town Clerk contended that we were bound to supply medicines prepared in accordance with the British Pharmacopœia in all cases. That work is prepared, as one gentleman on the bench is aware, under the Medical Act, 1858, which enacts that the General Council shall cause to be published under its direction a book containing a list of medicines and compounds, and the manner of preparing them, together with the true weights and measures by which they are to be prepared and mixed, and containing such other matter and things relating thereto as the General Council shall think fit, to be called the British Pharmacopœia, and the General Council shall cause such Pharmacopœia to be altered, amended, and republished, as often as it shall deem necessary. Then as to the object of the Pharmacopœia, the preface distinctly states that it has for its object "not so much the selection as the definition of substances which the physician prescribes, and which are required to be kept at one safe and uniform standard of strength and composition, some remedies may have been retained in it which have ceased to be in general use, and others introduced the value of which, although well attested, has not yet been generally recognized." Therefore the Pharmacopœia is the index or the dictionary by which chemists interpret the prescriptions of medical men. For that purpose it is published and for that purpose it should be used. But I submit that we are not to be drawn here on summonses charged with prejudicing the purchaser because we sell to him an article which, although not contained in the Pharmacopœia, is well known throughout the whole country as a useful household remedy. We are not by any Act of Parliament bound to that Pharmacopœia for our preparations, except in one particular, and that is when by the Pharmacy Act we are bound to observe the formularies of the British Pharmacopœia when preparing medicines mentioned therein. But that Act does not prohibit us from selling other medicines not contained in the Pharmacopœia. There are many most valuable remedies not mentioned in the Pharmacopœia which are sold in very large quantities. These are not contained in the Pharmacopœia because they are rarely if ever prescribed by medical men, and they therefore obviously have no place in a book which is the dictionary by which the chemist interprets what the medical man requires. The prosecution, on the other hand, insists upon our selling only the spiritus ætheris nitrosi of the British Pharmacopœia, and we are charged with fraud and with selling a spurious article to make additional profit, and that we have, by selling it, brought ourselves within the meaning of the section. We say that the old preparation called sweet spirits of nitre of the specific gravity of ·850, may be legally made and legally sold. It has been known for more than a century, and I shall show, by the custom of the trade, that whereas the public are well satisfied with the old preparation, they are not satisfied with the new one, they will not have sweet spirits of nitre superseded by the spirits of nitrous ether of the British Pharmacopœia. They complain of its taste, they complain of its appearance, they complain of its smell, and in proof of this I shall call before you the defendant, who will say that within his own knowledge, when he has sold the British Pharmacopœia preparation, it has been brought back to him by the customer to whom he has supplied it, with a request that the old preparation may be given to him instead. I shall also prove by the evidence of representatives of large wholesale houses that where one gallon of the British Pharmacopœia article is supplied, they supply 30 gallons of the old preparation. I shall call before you townsmen of your own who will prove that when they were in business, people would have the old preparation and not the new one. I shall call Professor Attfield who will describe the process of manufacture of both articles, and will also give you particulars as to the samples sent to him, and will report that he found the sealed sample in this case to be a good sample of sweet spirits of nitre.

H. C. Bennett, the defendant, said he was a chemist and druggist in business in Stockport. He had been in business here nearly three years. Witness recollected the inspector coming to his shop. He asked for 4 ounces of sweet spirit of nitre, and paid 1*s.* 4*d.* for it. Witness served him with the article commonly sold as sweet spirits of nitre. That article was in constant request by the public. He had supplied the British Pharmacopœia preparation to his customers, and it was constantly brought back, complaint being made about it; in every case customers complained of it being too strong, of its burning their throats, and its unpleasant smell, and they said they did not like it so well as the old preparation.

Magistrates' Clerk: Is it taken in the same state as you sell it?—It is usually diluted with water, but in some instances it is taken as sold.

Examination continued.

If a prescription were presented to you containing the words spiritus ætheris nitrosi, what would you dispense?—The British Pharmacopœia preparation.

You keep both preparations in stock then?—I do.

From whom and when did you purchase the nitre sold in this case?—From Messrs. Evans, Sons and Co., Liverpool, in May last.

Did you supply it in precisely the same way as you received it?—In precisely the same condition.

Cross-examined by the Town Clerk.

What is the difference in the price of these preparations?—The price is 3*s.* and 3*s.* 4*d.* per pound respectively.

You say people have asked you for sweet spirits of nitre, that you have supplied them the British Pharmacopœia preparation and they have brought it back?—Yes.

Why did you give them the British Pharmacopœia preparation unless you were satisfied in your own mind that

that was the proper thing to sell?—I thought the British Pharmacopœia was the better form of the two.

Do you make a difference in the price?—No.

Do you think the British Pharmacopœia preparation is the more beneficial of the two?– No.

Magistrates' Clerk: But you say in your opinion that of the British Pharmacopœia is made by a better form, must it not consequently be a better preparation?—I think the British Pharmacopœia nitre is a superior article in one sense, but not in another.

Magistrates' Clerk: But if the British Pharmacopœia preparation is superior, the other article must be inferior.

Re-examined by Mr. Glaisyer.

Your reason for selling sweet spirits of nitre of a specific gravity ·850, prepared by the old form, is that your customers will not have the other?—Yes.

Then you must either sell that article or go without their custom?—Yes.

Have you recently attempted to supply the British Pharmacopœia preparation when sweet spirits of nitre was asked for?—No; I gave it up some time since, people would not have it.

Professor Attfield, F.R.S., examined by Mr. Glaisyer.

What, in your opinion, is sweet spirits of nitre?—There are two distinct varieties of sweet spirits of nitre. Medical men and pharmacists know that there are two varieties, viz., the article named in the British Pharmacopœia, spiritus ætheris nitrosi or spirits of nitrous ether, and that made from materials stated in older Pharmacopœias. They are both prepared in similar apparatus, but from somewhat different materials. The British Pharmacopœia variety is made from four materials, spirits of wine, nitric acid, copper and sulphuric acid. The older variety is made from spirits of wine and nitric acid only. The older variety is made with materials mentioned in the Pharmacopœias of 1809, 1836 and 1851, and in these three Pharmacopœias, the ingredients ordered are the same, the proportions of the ingredients are also practically the same, and the process is practically the same; but the product, as obtained by makers who use this old process, is a better product than that described in those Pharmacopœias.

Please give me the reason for that?—The three old Pharmacopœias I have mentioned direct that a certain proportion of product be obtained, and if that proportion only is obtained then the product is very little better than spirits of wine, but if the makers "draw over," as they call it, a larger product, then that product is far superior in medicinal properties to the products mentioned in the Pharmacopœias. The product described in the three old Pharmacopœias would be of a specific gravity of ·834; the improved product obtained by the makers using that old process but drawing over more than is therein ordered would have a specific gravity of ·850. To my knowledge there is a large demand for this article, and I think it would be a serious matter if, the supply being stopped, chemists were prohibited from retailing an article for which there is a legitimate public demand.

Reverting to the case now under the consideration of the bench, did you receive a sealed sample of the sweet spirits of nitre in question?—I received on the 5th July from Mr. Bennett, the defendant in this case, the sealed sample referred to, it was marked "B. No. 2. 3. VI. 80." I analysed the contents of the bottle and compared it with samples made by myself.

What was the result of your comparison?—The article sold was quite as good as my standard samples. It was a good sample of sweet spirits of nitre. It was as good in appearance, flavour, and odour, and answered as well to tests and in the matter of specific gravity.

What did you find the specific gravity to be?—The specific gravity was ·850, as in my opinion it should be if the maker knows his business.

The analyst says he found the specific gravity to be ·844, can you account for that?—I heard the analyst's evidence and consider that he obtained figures which were too low, because the temperature at which he operated was too high. It should have been 60° Fahr. instead of 64½.

Would that account for the difference in the specific gravity found by the borough analyst and yourself?—It would do so partly, but, secondly, I consider he worked on too small a quantity.

Then as regards the percentage of nitrous ether, the borough analyst says in his certificate that sweet spirits of nitre should contain 3 per cent. of nitrous ether?—No one knows what the percentage should be, there is no standard, no recognized standard of any kind.

Chairman of the Bench: That is to say, according to different authorities, it varies from two to five, or even I suppose seven per cent., for I see in a new American work on materia medica, Dr. Wood, one of the best authorities, states that it should contain seven per cent.

Witness: There is no means of ascertaining the quantity of pure nitrous ether contained in a sample of sweet spirits of nitre. One of the Pharmacopœia tests provides for the separation of a certain fluid "in the form of nitrous ether," or, as amended in a reprint, "in the form of an ethereal fluid." To my knowledge that alteration was made because the liquid, first stated to be "nitrous ether," was admitted by the authorities issuing the Pharmacopœia to be something besides "nitrous ether." The ethereal fluid separated is not pure nitrous ether. My own experiments have shown that not half of it is nitrous ether.

Examination continued.

Is there any satisfactory way of ascertaining the quantity of nitrous ether present in a given sample of spirits of nitre?—I have tried all the processes yet proposed, including the one employed by the borough analyst. Not one is trustworthy. I have tried to devise a good process, and have failed. The chief weak points in the process named by the analyst are those admitted by himself, and referred to by Dr. Dupré: there is no moment when the action of the colour test can be said to stop, and other constituents interfere and may give too high a result. The statement, relied on by the borough analyst, that 3 per cent. of nitrous ether is the standard proportion sweet spirits of nitre should contain is a mere opinion, and, like Dr. Dupré's process, not founded on any published experiments on pure solutions of nitrous ether.

The analyst says that by the process he adopted he found 1·15 per cent. of pure nitrous ether present. Would the test mentioned in the Pharmacopœia include any other ethereal substance that happened to be present?—Yes. I do not place any reliance on the process by which the analyst obtained his percentage of nitrous ether. There might have been more there or less; the process is untrustworthy.

Chairman of the Bench: Is the specific gravity any satisfactory means of forming an opinion on spirits of nitre?

Witness: The specific gravity is an indication as to which of the two varieties a particular sample may be.

Even specific gravity would vary?—Undoubtedly.

Old preparations would not, of course, give the same results as those recently prepared?—Certainly not.

Age would alter the results?—Yes; the preparation is unstable and to that extent it is unsatisfactory whether made by the old or the new process, but neither the maker nor the seller can be responsible for that.

Examination continued.

Now, as to the variation in percentage of nitrous ether being to the prejudice of the purchaser?—Medical authorities are not agreed as to the exact substance or substances to which the medicinal properties of spiritus ætheris nitrosi are due. They may be due to nitrous ether, to aldehyd, to other ethereal bodies, or to a combination of these substances.

Cross-examined by the Town Clerk.

How is sweet spirits of nitre described in the old Pharmacopœias?—The words sweet spirits of nitre first came officially from the Pharmacopœia of 1746. It is written in Latin and the name is spiritus nitri dulcis.

You said there were two varieties. Is not one of these described in the Pharmacopœias as spiritus ætheris nitrosi?—Spiritus ætheris nitrosi, B.P., is the modern variety of sweet spirits of nitre, which the majority of the public do not like.

Magistrates' Clerk: Is there any other Latin name now in use except that of the British Pharmacopœia, because the defendant stated in his evidence that he dispensed the British Pharmacopœia article when spirits of nitre was ordered in a physician's prescription; he went further than that, and said that he had tried to sell the British Pharmacopœia preparation to his customers; now why did he adopt that course unless he thought it would be necessary for him to adhere to the new Pharmacopœia?

Witness: I think he was right in so doing. Druggists desire to be loyal to new Pharmacopœias. But if the public will not have preparations therein ordered, then druggists, in my opinion, are quite within the law in selling the article which the public does demand.

Chairman of the Bench: The Court is quite satisfied in its mind that Mr. Bennett loyally adhered to the British Pharmacopœia in dispensing physicians' prescriptions.

Witness: Yes, but beyond that he has, and I believe all druggists have tried, not only to dispense, but to sell in retail trade the British Pharmacopœia spirits of nitre. Many of them, however, have given up the endeavour because the public will not have the new variety.

Chairman of the Bench: We are to understand, I think, that the old mode of preparation was in use until the new Pharmacopœia was issued by the authority of the Medical Council, and that the mode of preparation was then altered.

Cross-examination continued.

You mentioned three Pharmacopœias, what are they?—They are the official London Pharmacopœias, such books as are used by all medical practitioners in England.

Until abolished by the recent Pharmacopœia, I suppose?—They are not in every sense abolished, they remain as authorities for the medicines contained in them.

Did you test the sample in question by all the tests mentioned in the British Pharmacopœia?—I did not, because some of those tests are untrustworthy.

Then you say it is impossible to find out whether this article is pure or not?—I say it is impossible according to the present state of our knowledge to ascertain what proportion of pure nitrous ether is in it.

What proportion of nitrous ether do you say it should contain?—I do not know, no one knows there is no standard.

Mr. Walthew: With regard to the article in question, did you find it equal to the one you made yourself, and that you considered pure?—I did, sir.

Then further, do you consider the article which you have been speaking of detrimental to health?—Most certainly not.

Is it inferior in quality?—It is not.

Pure according to all known tests?—Yes.

Cross-examination continued.

How did you prepare your pure samples?—Some according to the process mentioned in the old Pharmacopœias, and some according to the new Pharmacopœia.

What did you find the specific gravity to be?—The specific gravity of the preparation made according to the old formula was ·850——

Yes, but the specific gravity mentioned in the recognized British Pharmacopœia is ·845. Is the specific gravity no test of its goodness?—To a certain extent.

Do its medicinal properties depend on the quality of nitrous ether it contains?—In a measure, probably.

Do you also attribute the medicinal powers of this preparation to other ingredients than nitrous ether?—I do.

What authorities can you give for that?—I have not books here that will show you, but I can assure you authorities differ as to the source of the medicinal properties of sweet spirits of nitre.

Magistrates' Clerk: Supposing the analyst had told you in this case that the result of his analysis had been to find only ·77 per cent. of nitrous ether, and that the specific gravity of the sample was scarcely ·840?—I should have said that I placed no reliance on his figures showing the percentage of nitrous ether, and secondly that the analyst had made a mistake in the specific gravity, because he did not take it at the temperature ordered by the Pharmacopœia.

Would a difference of 4½° in the temperature of the liquid at which a specific gravity was taken materially interfere with the result?—That and working on too small a quantity would fully account for the difference between the borough analyst's figures and mine.

But can you alter a specific gravity?—Yes, you can increase or decrease the specific gravity of a liquid by departing from the proper temperature.

Then specific gravity is no test to go by?—Specific gravity is an indication of the relative weight of a preparation, and as the specific gravity when properly taken was right in this case, it is so far an indication that the defendant's article was pure.

What quantity did you take for the experiments?—Twenty-five grains, all that the inspector gave to the defendant.

So that if he used too small a quantity you did the same?—Not so, he used only a fifth as much as I did.

Why should he make an error in using a small quantity?—Because the smaller the quantity the more is the personal error of observation multiplied in referring the result to 1000; hence commonly 1000 grains are used when that quantity can be had.

Re-examined by Mr. Glaisyer.

You were asked a question by the magistrates' clerk as to what you would say of a sample containing only ·77 per cent. of nitrous ether and of a specific gravity of ·840. Now, can you state with regard to the sample in question that it answered the tests which you applied to it in comparison with what you manufactured yourself?—I do, and it was equally good, and its specific gravity was ·850.

Then the certificate of the analyst on that sample is incorrect?—Yes.

Charles Umney, a partner in the firm of Messrs. Wright, Layman and Umney, of Southwark Street, London, said his firm made, amongst other things, spiritus ætheris nitrosi. They made it of a specific gravity of ·845, and another variety of sweet spirits of nitre of a specific gravity ·850. He agreed with what Professor Attfield had stated as to the process for making this preparation, and with the conclusions at which he had arrived.

You say you prepare both varieties; then of course you sell both varieties?—We prepare and sell both. The old preparation of specific gravity ·850 was in very much greater demand than the other, and unquestionably in a densely populated district the demand would be ten times greater for the one than the other. There is a difference in flavour, colour and odour.

Cross examined by the Town Clerk.

You describe both your varieties as spiritus ætheris nitrosi?—On price currents Latin terms are used. That would not always be interpreted strictly.

Do you know that manufacturers charge a different price for the two preparations, and that the British Pharmacopœia article is more expensive than the other?—Manufacturers should obtain a better price for the British Pharmacopœia preparation, because the process of manufacture is somewhat complicated, and not free from danger when it is made in large quantities, and consequently manufacturers do charge more for this preparation; but the actual difference is not more than 3*d.* or 4*d.* per pound, say one farthing per ounce wholesale.

Re-examined by Mr. Glaisyer.

Are you now wholly unconnected with this case except as a witness?—I am. It matters nothing to me as a manufacturer as to which way this case may be decided, we only make what the public require.

Michael Conroy, manager for Messrs. Evans, Sons and Co., stated that the firm supplied defendant with sweet spirits of nitre in May last: the specific gravity of the article was ·850.

Do you make more than one preparation of spirits of nitre?—Yes; we make sweet spirits of nitre of a specific gravity ·850, and we also make the spirits of nitrous ether of the British Pharmacopœia.

For which have you the larger demand?—We probably manufacture from 120 to 130 gallons per week of the old preparation compared with 3 or 4 gallons of the British Pharmacopœia preparation.

Do you sell the old preparation because you make more profit out of that?—We make less profit per gallon by that article.

Daniel Woolley, pharmaceutical chemist carrying on business at 2, Millgate, Stockport, stated that he had been in business there since 1844. Had sold as sweet spirits of nitre from that time to the present the old preparation, specific gravity ·850. Kept the British Pharmacopœia preparation and used it when ordered in prescriptions. From his experience a customer, asking for sweet spirits of nitre, wanted to have the ·850 nitre, and would not have the other.

Harvey Lowndes, pharmaceutical chemist, 7, Hall Street, Stockport, had carried on business as a chemist in the town from 1842 until 1876: supposing a person asked for sweet spirits of nitre, would supply him with the ·850 preparation.

R. M. Sumner, a partner in the firm of Messrs. Sumner and Co., wholesale druggists and manufacturers, at Liverpool, said he was wholly unconnected with this case except as a witness. He made and sold both the preparations of sweet spirits of nitre. Sold by far the larger quantity of ·850 nitre, ordinarily known as sweet spirits of nitre.

Cross-examined by the Town Clerk.

Do you supply hospitals?—Yes.

What do you send to them?—The specific gravity is usually specified on the order.

Mr. Glaisyer: That's my case. May I ask the bench if they will require to ask Professor Attfield any further questions, as he wishes to catch his train to London.

Chairman of the Bench: I think not. I am sure he has given his evidence very clearly and concisely.

The Magistrates retired, and on their return into Court the Chairman said: The Court think the weight of evidence is in favour of the defendant, and, therefore they dismiss the case.

Mr. Glaisyer applied for costs.

The Magistrates' Clerk (to the Town Clerk): Then you withdraw the cases against Eyre, Cooper, Thornwaite and Appleby.

The Town Clerk: Yes; there being a difficulty in selecting, the committee took out a number of summonses, not that they were anxious for a number of convictions, but that they did not wish to be invidious.

Dr. Downs: In regard to the application for costs, the Magistrates must, as well as they can, protect the expenses of the county.

Magistrates' Clerk: Are not you bound, under a certain analysis, to institute proceedings?

Town Clerk: I think we are.

Magistrates' Clerk: In spirits and milk there is no option whatever, there is no alternative but to institute a prosecution; and if it is so as regards drugs, it is a sufficient justification for a prosecution.

Mr. Glaisyer (referring to the Act): It is optional.

The Chairman: The Court is of opinion that any prosecution in such cases is equally for the benefit of the chemists and druggists as for the public; and as this is a test case we must restrict the amount of the costs to be allowed, and we think £10 a good allowance under those circumstances. This, however, must not be taken as any precedent in this Court for allowing costs in future.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[435]. Can you inform me the best mode of incorporating "eserine sulphate" with lard or vaseline into a smooth ointment? It is too costly to experiment upon.

J. J.

[436]. Would any experienced dispenser kindly say what excipient he has found to be the best for making up small quantities of pulv. ext. coloc. co. or of the pulv. pil. coloc. co. into a mass for pills? Water, syrup, glycerine, tragacanth, paste, have all been tried, but with these excipients the pills either become so hard as to be insoluble or in a very short time lose their shape.

TYRO.

[437]. P. T. W. will be glad to know what colour the ointment in the following prescription should be:—

℞ Zinci Oxydi	gr. 40.
Acidi Carbolici	gr. 10.
Ung. Hyd. Nitratis	ʒiv.
Ung. Benzoat.	ʒiv.
Ol. Lavand.	♏xx.

M. ft. ung.

P. T. W., who was informed by the physician who prescribed it that it should be yellow, found upon mixing by heat it became a dark slate colour. He then rubbed the ingredients together on the slabs, producing a light grey coloured ointment, which in the course of half an hour assumed the tint obtained in the first process. He used ung. zinci, B.P., in place of the zinci oxid. and ung. benz.

[438]. Can any reader inform me of a better excipient for pepsine pills than glycerine.

NEMO.

Correspondence.

"*Student*."—The provisions of the Act apply only to Great Britain.—For some particulars as to the condition of pharmacy in South Africa, see vol. x., pp. 300 and 340.

Associate.—See the Journal for June 19, p. 1031.

J. H. Dingle.—(1) *Cladonia uncialis*. (2) *Stereocaulon corallinum*. (3) *Sphærophoron corralloides*. (4) *Cladonia rangiferina*. (5) *Lecanosa tartarea*. (6) *Cladonia furcata*.

R. L. G.—Our disability in respect to the name is as great as your own.

J. H. Edward.—The ingredients of the mixture could not be separated as chlorides. See Fresenius', 'Quantitative Chemical Analysis,' for method for separating gold from platinum.

D. Grant.—We do not think the object can be obtained by any means short of a surgical operation.

COMMUNICATIONS, LETTERS, etc., have been received from Dens, T. Ronchetti, M. L. R., G. Wilkinson, W. K. G., Locum Tenens, P. H. Davies, T. W., Professor Landerer, W. F. Haydon, H. T., H. R. Arnold, Enquirer, Apprentice, R. C. H., Embryo.

The length of the report of the Stockport case compels us to defer until next week the publication of a number of other communications.

PAPAINE.[*]

BY A. WURTZ.

In a former paper[†] the author described, in conjunction with Dr. Bouchut, a ferment which they had prepared by precipitating with alcohol the aqueous portion of the milky juice of *Carica papaya* after the formation of a coagulum, and to which they gave the name "papaïne." It was at the same time stated that it appeared probable that a fresh quantity of papaïne was formed by the action of water upon the coagulum. In the present paper M. Wurtz describes the experiments undertaken with the object of settling this and other points.

125 grams of papaw juice obtained by incision of the green fruit were filtered and the residue pressed. The solution precipitated by alcohol yielded 0·89 gram of a papaïne very rich in ash, and containing—deduction being made of the ash—45·62 per cent. of carbon and 6·72 per cent. of hydrogen.

The pressed pulp was triturated in a mortar with 125 grams of water, and after twenty-four hours thrown upon a filter. The residue upon the filter was triturated with a fresh quantity of 90 grams of water. The two liquors, concentrated in a vacuum with the addition of a few drops of prussic acid, yielded 2·3 grams of papaïne. After these two washings, the pulp, already much reduced, was submitted to two fresh washings with water (first with 142 c.c. and then with 150 c.c.), and the liquors, united and concentrated in a vacuum, still yielded 1·1 gram of papaïne, being a larger proportion than yielded by the original juice. This papaïne, which digested fibrin energetically, contained (deduction being made for ash) carbon, 49·77, and hydrogen, 7·21 per cent. It therefore presented a composition differing from that of the ferment dissolved in the original juice.

After these four washings, the white pulpy residue, not very much being left, was again digested with 50 c.c. of water, and the water afterwards placed with 10 grams of moist fibrin. At the end of two days only 8 grams of fibrin remained, and the liquid, after filtration, was precipitated slightly by nitric acid; the fifth wash water, therefore, still contained a small quantity of ferment. After these five washings there only remained 5 grams of moist pulp, representing 0·564 gram of dry matter. 2·5 grams of this pulp put to digest with 10 grams of moist fibrin at 50° C., left at the end of two days only 6 grams of moist fibrin, and the filtered liquid gave an abundant precipitate with nitric acid.

In another experiment 100 grams of juice obtained by incision of the fruit were suspended in water, forming a thick pulp, which was washed three times with water. The washings were added to the first liquor and the whole concentrated in a vacuum and precipitated by alcohol. The papaïne (No. I.) so obtained, which was very white, was analysed. The pulp that remained upon the filter was suspended in a large quantity of water. After filtration the liquid concentrated in a vacuum yielded a fresh quantity of papaïne (No. II.), which contained, as in the previous case, a larger quantity of carbon.[‡]

	I.	II.	Deduction made for ash.	
			I.	II.
Carbon . . .	42·21	44·18	46·90	48·55
Hydrogen . .	6·28	6·28	6·99	6·90
Oxygen . . .	10·00	9·00	—	—

It is therefore demonstrated that the pulp, after being freed by washing from soluble ferment that may be adherent to it, still yields, by the action of water, a ferment capable of digesting fibrin. It may be recalled here that the gastric ferment appears to be contained under an insoluble form in the pepsiniferous glands, for these do not yield it to pure water.

The analyses just quoted show that the soluble ferment of *Carica papaya*, such as is obtained in precipitating by alcohol the aqueous solution containing it, is not of a constant composition. Numerous analyses of crude papaïne have, in fact, given very divergent results in respect to the proportions of carbon and nitrogen, the carbon varying between 46 and 53 per cent. and the nitrogen between 14 and 18 per cent., deduction being made for ash. The proportion of ash varied also; generally it was high, amounting to 4 per cent. and even more; in one case it amounted to 20 per cent. It was ascertained that the ash consisted chiefly of phosphate of lime; it yielded soluble salt to water, and sulphuric acid and a small quantity of potash have been noticed.

It follows from the foregoing that alcohol precipitates from papaw juice, fresh or digested with water, a principle of variable composition. This would not be surprising, as the ferment might be mixed with other amorphous principles, especially with albuminoid substances, modified by its action, *i.e.*, peptones. These peptones being more dialysable than the ferment itself, it might be hoped that the ferment would concentrate on the dialyser. Experience has shown, in fact, that the residue from dialysis yields a ferment richer in carbon, and not containing more than 1 to 3 or 4 per cent. of ash. The following are some analyses of the ferment so purified. It may be remarked that the white precipitate obtained by alcohol was exhausted by ether, then dried in a vacuum at 75°.

Papaïne, purified by dialysis, deduction made for ash.

Carbon . .	50·77	51·80	50·70	52·77
Hydrogen .	7·23	6·71	7·50	7·47
Nitrogen . .	—	—	—	15·17

These analyses show that the product purified by dialysis approaches in its composition that of albuminoid substances, and this analogy is strengthened by the fact that papaïne contains rather a large proportion of sulphur, in two specimens there having been found 2·61 and 2·2 per cent. respectively.[*]

The preceding analyses presented too much divergence to allow of the conclusion that the product is definite and homogeneous. Another mode of purification was therefore attempted. Albumen and peptones being precipitated by subacetate of lead it was hoped to separate them by this reagent, which precipitates crude papaïne incompletely. To such a solution, therefore, subacetate of lead was carefully added until a portion after filtration no longer gave a precipitate. The precipitate was separated and a current of sulphuretted hydrogen passed into the filtrate. This was blackened, but the lead sulphide was not precipitated in flocks. To separate it the liquid was concentrated in a vacuum, and alcohol added to it drop by drop so as to carry down the lead sulphide with the first portions of the papaïne precipitated. The deposit having been separated by filtration the clear liquid yielded to alcohol a white precipitate of papaïne. Two experiments made upon crude papaïne from different sources yielded specimens of purified papaïne, which after exhaustion with ether and drying at 75° C. in a vacuum, gave, deduction being made for ash,—

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[*] *Comptes Rendus*, vol. xc., p. 1379.

[†] See *Pharmaceutical Journal*, [3], vol. x., p. 283.

[‡] Analyses of the pulp exhausted by water, alcohol and ether gave variable results. This residue still contained nitrogen.

[*] The experiments were made with products that had been submitted to lengthened dialysis and should not have retained any more sulphate, but the figures obtained require to be checked.

	I.	II.	III.
Carbon . .	52·36	52·19	52·9
Hydrogen .	7·37	7·12	—
Nitrogen .	16·94	16·40	16·44
Ash . . .	2·60	4·22	3·40

The sulphur was not estimated, sulphuretted hydrogen having been used during the operation. A third specimen contained 1 per cent. less of carbon, when submitted to dialysis during twenty-four hours it gave the figures stated under III.

It may be added that 0·1 gram of specimen III. digested energetically 5 grams of moist fibrine, even after having been heated to 105° C.

M. Wurtz considers that the preceding analyses demonstrate that the digestive ferment of *Carica papaya*, named "papaïne" by himself and M. Bouchut, possesses the composition of an albuminoid substance. To the characters previously attributed to this substance he adds the following, which relate to papaïne purified by subacetate of lead.

It is very soluble in water, in which it is capable of dissolving in less than its own weight, after the manner of a gum. The solution, even when dilute, forms upon agitation an abundant froth. The crude papaïne redissolved leaves sometimes an insoluble white residue.

Solution of papaïne becomes turbid upon boiling, without coagulating like albumen. When left to itself during several days it also becomes turbid, and if then examined under a microscope is found to be full of vibriones and bacilla.

It gives an abundant precipitate with hydrochloric acid, and the precipitate dissolves readily in excess of the acid.

Nitric acid, added in small quantity, precipitates thick yellowish flocks that dissolve in excess of the acid.

Neither ordinary phosphoric acid nor acetic acid precipitate it, but metaphosphoric acid gives a plentiful precipitate.

Prussiate of potash added to acetic acid gives a precipitate.

Corrosive sublimate does not precipitate immediately the solution of pure papaïne, or only gives a slight turbidity; after a time the turbidity becomes more apparent. Upon boiling an abundant flocculent precipitate is formed.

Plumbic subacetate does not give a precipitate or only causes a slight turbidity, soluble in an excess of the reagent. If excess of potash be added to the liquor and it be heated it becomes blackened in consequence of the formation of sulphide of lead.

Sulphate of copper gives a violet precipitate, which becomes blue upon boiling and dissolves in potash with a beautiful blue colour.

Chloride of platinum gives an abundant precipitate as also does tannic acid.

Picric acid gives an abundant precipitate insoluble in excess of the reagent.

Millen's reagent gives a plentiful yellowish-white precipitate that becomes brick red when slightly heated.

These characters, as will be seen, are those of albuminoid matters, with some variations, especially in respect to corrosive sublimate and subacetate of lead.

In its action upon albuminoid matters papaïne approaches the pancreatic ferment named "trypsine" by M. Kühne, who has made a careful study of it. Unlike pepsine, trypsine appears to approach the albuminoid matters; its action upon the latter appears to be more energetic than that of papaïne. Papaïne dissolves large quantities of fibrin rapidly, even in a neutral liquid; but to get a liquor that will not give a precipitate with nitric acid it is necessary to use a relatively large quantity of papaïne,—for example, 0·3 gram for 10 grams of moist fibrin,—and to prolong the digestion at 50° C. during twenty-four hours. In this case there remains only an insignificant residue of dyspeptone, very rich in mineral matters, and the filtered solution gives with nitric acid only a slight turbidity that may be due to an excess of the ferment. Moreover, in all these digestions, besides the bodies precipitable by nitric acid and by alcohol, there is formed a certain quantity of more hydrated peptones that are soluble in ordinary alcohol, especially with heat.

The rapidity with which solutions of papaïne become filled with microbes induced M. Wurtz to ascertain whether they intervene in the rapid liquefaction of fibrin by this ferment, but he finds that nothing of the kind occurs.

The solution of fibrin by papaïne takes place in the presence of prussic acid, boric acid, and even carbolic acid; that is to say, in conditions that exclude the formation of microbes.

In conclusion, M. Wurtz adds that he has separated from the juice of *Carica papaya* a fatty saponifiable substance and a crystallizable nitrogenous principle in white mamelons. These remain in solution in the liquor from which crude papaïne has been precipitated. Further information on this subject will be given in a future paper.

COCCUS RED.*

BY R. ROTHER.

Take of—

Cochineal (whole)	8	troy	ounces.
Alum, in fine powder . .	2	"	"
Citric acid	1	"	"
Chlorhydric acid	1	fluid	"
Ammonia water, 16 to 18 per cent.	2½	"	"
Alcohol, strong	4	"	"

Disodium carbonate, sodium chloride and water, of each sufficient. Mix the chlorhydric acid and two troy ounces of sodium chloride with forty-four fluid ounces of water and pour the solution upon the cochineal contained in a suitable vessel. After macerating the mixture for two days, with occasional stirring, decant the liquid and set it aside. On the residue pour thirty-two fluid ounces of water, and after a two days' maceration, as before, again decant the liquid and unite it with the previous decantate. The residue is now again mixed with thirty-two fluid ounces of water containing eight troy ounces of sodium chloride in solution, and after having macerated for two days the mixture is poured into a strainer and subjected to strong pressure. The colate is now incorporated with the mixture of the first two macerates, and the resulting liquid after a sufficient repose is decanted from the sediment. Dissolve the alum in the clear decantate and add the ammonia water, pour the mixture upon a plain filter and then wash the collected precipitate with water until practically freed from saline solution. Dissolve the citric acid in four fluid ounces of water and add disodium carbonate in large crystals until the effervescence of carbonic oxide ceases. In this solution now dissolve the washed aluminum carminate with a gentle heat, add water to the measure of twenty-eight fluid ounces, then the alcohol, and mix.

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* From the *Pharmacist and Chemist*, June, 1880.

In a former discussion of this topic the writer pointed out the various defects of the usual method by which cochineal colouring is prepared, and then submitted a new process, in which diverse drawbacks of the older operation did not occur. But the otherwise admirable features of the improved formula were not sufficiently potent to overcome the radical faults dependent upon the intrinsic character of the incorporated components. In order to achieve a result more thoroughly representative of the pure colouring principle, in an unincumbered, more definite and permanent form, the writer dissected the formula, as it were, and independently examined the several parts as to their behaviour and appropriateness in this connection.

Since the dibasic carminic acid solely possesses the tinctorial property of cochineal, the endeavour was directed towards its expeditious and complete elimination from the attendant inert, cumbrous, and putrescible matters constituting the body of the insect. Chlorhydric acid with sodium chloride in weak aqueous solution, followed by a saturated solution of sodium chloride, by means of remaceration, was found the most satisfactory and efficient agent for rendering a preliminary separation of the carminic acid from the gross of the matrix. The *s. a.* of cochineal with a weak acidulated salt solution is 1·5, but a saturated solution of sodium chloride causes the distended material to shrink and submit to subsequent pressure to such an extent that the nearly exhausted shell weighs after pressing less than the original substance. Thus, through the readily solvent action of the first menstruum, the absorbent and contractive property of the last and the self-clarifying tendency of the mixed macerates, the first desideratum was attained.

As carminic acid alone does not constitute the tinctorial agent of cochineal colouring, or coccus red, its simple isolation from the crude extraction is not the immediate aim; but as aluminum carminate is the objective body next in view, the succeeding step lies in that direction. Aluminum carminate is of variable composition, not only by virtue of the basicity of the acid, but also through the peculiarity of the metallic radical. The desirable compound in this case is, however, obtained without difficulty by treating the crude solution first with alum and then with ammonia. The normal carminate is slightly soluble in water, but is rendered insoluble by the employment of a moderate excess of alum, whereby insoluble basic carminate is produced.

Further progress in the operation now consists in bringing the aluminum carminate into an available solution. This is effected by the agency of monad salts of certain vegetable acids, resulting, however, in a closer union than mere solution and the generation of a double salt having that rich red tint characteristic of coccus red. Normal sodium citrate is the most adaptable solvent, and hence the writer has incorporated it with the new formula. Alcohol is added as before to obviate septic degeneration, which would otherwise occur.

The new formula also admits of greater concentration than was heretofore possible. The proportion above adopted is one troy ounce of cochineal in four fluid ounces. A solution double this strength is originally obtained after solution of the precipitate. The dry compound may also be prepared by precipitating the concentrated solution with alcohol or spreading it on glass plates, thereby obtaining it either as a pinkish powder or in dark red scales.

The aluminum carminate obtained by precipitation from the crude solution as above directed is a dark purple-red powder, soluble in acids and alkalies, yielding with the first bright scarlet, with the second deep purple solutions. Yet any solution of a carminate, in whatever degree of acidulation, when diluted with water to a certain point, changes suddenly from scarlet to purple, or deep pink, according to the amount of carminate present. Dilution with alcohol in the same manner does not alter the colour, but subsequent addition of water immediately turns it to pink. Aluminum carminate is also soluble in aluminum citrate with a purple colour. Previous to the adoption of the writer's new formula for coccus red it was the intention to prepare and utilize the aluminum citro-carminate to the exclusion of monad radicals, but the undesirable purple tint would not permit of its application. In order to produce the necessary aluminum citrate a hot concentrated solution of disodium carbonate was treated with powdered alum, so as to insure a slight excess of the former. After washing the rather voluminous precipitate until barium chloride no longer disturbed the washings, it was added to a proportionate amount of citric acid. A barely perceptible effervescence of carbonic oxide took place, but the aid of a gentle heat expelled it with profusion until solution was complete, which speedily resulted. This analogy was to be expected, since if a ferric hydrocarbonate could appear under such conditions much more certain must then be the generation of the corresponding aluminum compound. Normal aluminum citrate does not appear to be a permanent salt, since a solution containing one-fourth salt readily deposits crystals of a basic compound on standing a few days in a cool place or when allowed to evaporate spontaneously.

Whilst endeavouring to precipitate the carminic acid from the crude extraction in some useful form a portion of the solution was saturated with sodium chloride and treated with ammonia in excess. Ammonium carminate was thrown down as a purple powder and a similarly coloured supernatant liquid resulted. The ammonium carminate readily united with the aluminum citrate, producing a fine red solution. This reaction showed that the colouring base of coccus red could also be obtained by inverse synthesis, in the manner proposed by the writer some years since for the more direct preparation of ferric double citrates.

On treating another portion of the crude solution with aluminum hydrate, precipitated by ammonia, no satisfactory product was obtained. The mixture on treatment with acetic acid formed a solution from which alkalies or their carbonates failed to give a precipitate, the generated monad acetate appearing to hold aluminum carminate in solution. The addition of calcium carbonate, with a view to neutralize excess of acetic acid, resulted in a most astonishing reaction by precipitating a copious very gelatinous greenish-black magma. This precipitate was slightly soluble in water, yielding an inky solution. It contracted remarkably on the addition of sodium chloride to saturation and would then admit of rapid filtration. The filtrate still possessed a deep purple colour, from which ammonia in excess threw down an abundant pink precipitate, whilst the circumjacent liquid retained a light scarlet colour. The black calcium compound readily dissolved in acids with the usual scarlet solution, and likewise dissolved in alkalies with deep purple solution. Solution of calcium hydrate, however, instantly changed its colour to light pink. It is slowly decomposed by ammonium sulphate, yielding a purple solution. It is also quickly decomposed by aluminum sulphate, giving a purple solution, which on dilution with alcohol still retained the colour, and on spontaneous evaporation left a purple, apparently crystalline, residue. Compounds of magnesium or barium corresponding to the black calcium precipitate could not be produced, and in fact the calcium body required a peculiar treatment, but it would invariably result from an acidulated solution and calcium carbonate. This body often deposits on the walls of bottles containing tincture of cochineal or compound tincture of cardamom, and then has a striking resemblance to patches of mould. It also imparts that gelatinous consistence and black colour to cochineal on treatment with water, owing to the presence of chalk as an adulterant.

THE MANUFACTURE OF VINEGAR BY MEANS OF BACTERIA.*

BY EMMANUEL WURM.

The transformation of alcoholic liquids into vinegar has for a long time been a subject of scientific discussion. According to Pasteur the formation of vinegar is a physiological phenomenon, having for its cause the vegetation of a particular bacterium, the *Mycoderma aceti*. Liebig, on the contrary, saw in it only the chemical action of oxygen upon alcohol.

Pasteur has based his theory upon numerous experiments, and he has founded upon it a new process of manufacture which he made known in 1862, and described in detail in his work, 'Études sur la Vinaigre,' published in 1868. He proposed to produce vinegar by sowing the acetic mycoderm upon the surface of a mixture of wine and vinegar, or of water with which had been mixed besides 1 per cent. of acetic acid, 2 per cent. of alcohol and nutritive mineral salts. When about one-half of the alcohol had passed to the state of vinegar small quantities of alcohol were to be added daily until the liquid had received sufficient for the vinegar to have the strength required for commerce. In order to be able to add the alcohol without destroying the fungus by direct contact it was to be introduced by india-rubber tubes fixed at the bottom of the vat and pierced laterally with small orifices. The height of the liquid was not to exceed eight inches.

In 1869, Breton-Laugier, of Orleans, announced that he had organized a vinegar manufactory upon the principles of Pasteur, and that acetification was effected from seven to ten times more rapidly than by the process employed hitherto, consisting in acetifying wine in large vinegar vats. In 1870 the Société d'Encouragement de l'Industrie Nationale awarded to him a prize of one thousand francs for improvement in the manufacture of vinegar.

In Germany Pasteur's ideas did not find a favourable soil. Liebig, in his memoir on Fermentation and the Origin of Muscular Force,† maintained his view, previously expressed, that the formation of vinegar by means of alcohol is not due to a physiological phenomenon; that acetic acid is not the product of *Mycoderma aceti*, but the result of a chemical oxidation. As a proof it was alleged that a shaving from the lowest layer in a vinegar generator which had been used during twenty-five years in the manufacture contained no vinegar fungus that could be detected by a microscopic examination.

In 1866 Professor Otto wrote, in his treatise on the manufacture of vinegar, that he had tried the process of Pasteur and that he did not think it could be carried out practically. In the last edition of this work (revised by Professor Bronner in 1876) this statement still found place without a supplementary remark, and as other technological treatises are equally restrained in information on this subject it may be concluded that up to the present time Pasteur's process has not been practised in Germany. Mayer and De Knierym have, however, lent important support to the physiological theory by their work.‡ They have proved, in fact, that even in the manufacture by generators the *Mycoderma aceti* exists in great numbers on the shavings.

Some observations that I had occasion to make in the Institute of Vegetable Physiology, Breslau, at the instigation of Professor Ferd. Cohn, placed it beyond doubt that an energetic production of vinegar is caused by the vegetation of *Mycoderma aceti* (*Bacterium mycoderma*, Cohn).

Encouraged by the favourable results obtained upon a small scale, and according to the instructions of Pasteur, I have attempted to carry on industrially the manufacture of vinegar from spirit of wine, and have succeeded in an extremely satisfactory manner.

In the manufacture in which I am engaged with this object, for a Breslau manufacturer, I use large wooden vats, into which are poured 200 litres of a mixture of vinegar, water and alcohol, together with the mineral salts indicated by Pasteur (phosphate of potash, 0·01 per cent., phosphate of lime, 0·01 per cent., phosphate of magnesia, 0·01 per cent., and phosphate of ammonia, 0·02 per cent.). The vats are well closed with solid wooden covers, access of air taking place through small openings made in the side. The mycoderm is sown by means of a thin wooden spatula, in imitation of Breton-Laugier. The liquid in the vats is heated to 25° or 30° C., and the interior of the manufactory is maintained at a temperature of 30° C.

According to Pasteur the proportion of vinegar ought to be 1 per cent. But long continued observation has shown to me that a liquid so slightly acid is easily invaded by the mould fungus (*Saccharomyces Mycoderma*), which hinders the extension of the acetic fungus, and, consequently, the formation of vinegar, by burning up the alcohol and changing it directly into carbonic acid.

Some experiments made specially with the object of studying the influence of the proportion of acid upon the development of the two fungi have proved that with 0·5, 1·0 and 1·2 per cent. of acetic acid the result is to multiply exclusively the pellicle of mould; with 1·6 per cent. there is a predominance of *Mycoderma aceti*; with 2 per cent. there is a pure cultivation of the latter. The mixture of 2 per cent. of alcohol, indicated by Pasteur, has been found advantageous. In these conditions the production was such that the fungus sown had at the end of twelve, twenty-four or thirty-six hours covered the entire surface of the vat.

I undertook the microscopic examination under the direction of Professor Cohn, to whom I would in this place express my profound gratitude for the active participation and support which he has accorded to me throughout my investigation. The result of this research has been as follows:—The viscous pellicle of bacteria, sometimes thin, sometimes thicker, is not always identical. Three different forms can be distinctly observed, concerning which it cannot at present be said whether they proceed from one organism, constituting three different states of development, or whether, as Mayer presumed, there are three distinct organisms, capable of producing acetic acid.

With a proportion of 1 to 3 per cent. of acid there was observed specially the formation of a thick, viscous and fatty skin, consisting of extremely small globules (micrococci), which while young occurred in contiguous rows, and which after a few days were changed into an animal glue through the formation of an intercellular substance. Upon augmenting the quantity of acid there were formed in this layer veins, rays and spots of a less thickness, which extend more and more, whilst the original layer sinks to the bottom.

The new pellicle, more delicate and less viscous, was at first constituted of bacilli of variable length, disposed very closely by the side of one another. This layer also eventually became viscous, and was replaced by a more delicate pellicle of bacilli, especially when the addition of alcohol was not made with regularity. When the proportion of alcohol exceeded 3 to 4 per cent., irregularly curved and inflated filaments made their appearance.

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* From the *Moniteur Scientifique* for July.

† *Pharm. Journal*, [3], vol. i., p. 61, *et seq.*

‡ *Landwirthschaftliche Versuchsstation*, 1873, vol. xvi., p. 305.

Up to the present we have been unable to detect in these forms any difference whatever as to their power of acetification. It has only been established that the bacilli multiply also in a mixture containing 1 per cent. of acid, whilst the various micrococci do not form thick pellicles except when the proportion of acid is less. The observation of Mayer that the mycoderm of vinegar is very sensitive to changes in the proportion of acid is thus found to be limited to micrococci.

A much more important influence upon the different forms of vegetation ought to be attributed to the proportion of alcohol in the liquid in the vats. The viscous state is always occasioned principally by too small a quantity of alcohol. For the sowings only thin pellicles should be taken; the viscous pellicles of micrococci and bacilli germinate more slowly.

When the surface of the vat is entirely covered and the surrounding temperature is 30° C., the liquid becomes heated to 34° C., and at the same time a strong odour of acetic acid is given off.

The augmentation of acid, which is ascertained daily by titration, oscillates between 0·2 and 0·4 per cent. as the quantity of alcohol added is varied. Theoretically the 2 per cent. by volume of alcohol that is added ought to produce 2 per cent. of acetic acid, but practically the yield is less. According to the calculations of Bronner, in the generators with shavings the loss of alcohol rises in the preparation of "esprit de vinaigre" (ordinary crude vinegar) to 23 per cent., and in the case of the stronger vinegars to 12 or 15 per cent. In the process followed by us there was a loss by evaporation only at the commencement; afterwards it was prevented by the layer of vegetation. In all it amounted to from 10 to 15 per cent. One portion of this alcohol is used by the acetic bacteria in the construction of their constituent elements; another portion is changed into acetic ether by the action of acetic acid at the elevated temperature of the liquid.

Two per cent. of alcohol yielded 1·7 to 1·8 per cent. of acetic acid. In order, therefore, to obtain a stronger vinegar still more alcohol must be added to the liquor. Pasteur had already pointed out that the formation of vinegar may be stopped if the added liquor be too rich in alcohol. According to our experiments, the addition of alcohol ought not to be made when there is more than 0·5 per cent. in the liquid, and then it ought to be effected in such a way that the liquid which comes into contact with the fungus does not contain more than 0·5 per cent. of alcohol. In this manner we have succeeded in continuing the production until we have obtained liquids very rich in acid. The greater the proportion of acid becomes the more rigorously should the quantity of alcohol introduced equal the quantity used up.

When the vinegar has attained the desired strength it is drawn off into the clarifying vats, in order to free it from the turbidity produced by the particles of mycoderma. The vat is afterwards cleaned with brushes and filled anew.

The conditions for success in the manufacture are—a sowing of pure bacteria, a uniform temperature of 30° C., and a well regulated addition of alcohol. These conditions being exactly observed, the new process is easy of execution, and presents over those hitherto followed the following advantages:—

(1) In taking for a term of comparison the yield in a given time, it will be found that the new process produces vinegar twice as rapidly as the old "quick" mode of manufacture. A comparison may also be made from the point of view of the capital required for plant. According to the data of Otto, three vinegar generators, having a height of 3 metres, working together and additions made every hour, yield daily about 120 litres of vinegar containing 4·5 to 5 per cent. of acetic acid. The same quantity is produced by ten vats, for each vat acetifies daily, on an average, 0·3 per cent., making for the 200 litres which each vat contains, 600 grams of acetic acid daily, corresponding to 13 litres of 4·5 per cent. vinegar. Ten vats with accessories cost one-half less than three generators of the height mentioned above.

(2) The space required by the vats does not need, as in the case of the generators, to be of a particular height, seeing that the dimensions of the vats can be fixed at will. In any reasonable plant it would be less than that required for the generators.

One great inconvenience in the manufacture of vinegar in general is the appearance of vinegar eels, by which it may be completely arrested. The eels, as pointed out by Pasteur, because of their great need of oxygen, press towards the surface of the liquid, destroying by their swaying movements the pellicle of mycoderm and preventing it from reforming. In the generators they cover the shavings with their viscous mass and so render direct contact of the mycoderm with the liquid impossible. If they multiply much the temperature of the liquid is lowered. If the cooling be prevented the parts of the pellicle destroyed may be reproduced. In this case the eels take refuge in the upper part of the vessel and form a ring of viscosity above the layer of bacteria.

The same phenomenon is produced upon the shavings. Here also if the production of bacteria has taken place above the eels are deposited upon the sides of the vat. Sometimes, however, they multiply to such an extent that acetification is stopped. It is very difficult then to separate the eels. It becomes necessary to remove from the vat a portion of the shavings and treat them with boiling water. But in this way the mycoderm is destroyed at the same time, and it is only after from four to eight weeks that a new vegetation is formed and the work recommences.

It is obvious that in Pasteur's process the eels have not time to multiply so as to become injurious, since a vat is emptied and cleaned after from ten days to a fortnight.

It is necessary to take care that the sowings of mycoderm do not come from a liquid infected by the eels. These being visible to the naked eye such an accident is easily avoided. However, if a vat be invaded the liquid is drawn off and heated by means of boiling water or steam to 60° C. The vat is washed with boiling water and a little sulphuric acid, and then filled again with the liquid that has been heated and cooled. If the vat be kept clean and the vinegar used for the mixture be heated to 60° C. the eels cannot be produced.

To preserve from eels vinegar manufactured and in stock, an inconvenience frequently due to the unsuitability of the casks, recourse may be had to heating the vinegar to 60° in large casks with limited access of air. Pasteur, in his work before mentioned, describes a practical arrangement for this process of preservation.

Among the antiseptic agents there is one of which the preservative action is remarkable, *i.e.*, salicylic acid; 0·01 per cent., or 10 grams per hectolitre, is sufficient to preserve vinegar from eels. Unfortunately, however, in presence of the least trace of iron it gives rise to an intense blue coloration. Now, in domestic use, vinegar is frequently brought into contact with iron, and the boiling vinegar would colour blue black the green parts of vegetables, such for instance as cucumbers, because of the iron contained in their chlorophyll. For this reason it is necessary to give up the use of this excellent means of preservation in the case of vinegar.

Boracic acid also acts as an antiseptic, especially in the proportion of 0·04 per cent. or 40 grams to the hectolitre. After three or four days the eels are killed in vinegar containing considerable numbers. Boracic acid not being injurious to the health, if it be used in very small quantity, there is nothing opposed to its employment. Formerly, manufacturers added to vinegar a small quantity of sulphuric acid, but the sanitary authorities in this country have forbidden the practice.

A vinegar preserved by chemical agents, however can no longer be used in the further manufacture of vinegar, for the antiseptics destroy the acetic bacteria also. The most rational mode of preservation consists therefore in heating the vinegar to a temperature of 60° C., as recommended by Pasteur. In the manufacture in vats the production of eels is by this means rendered impossible.

The vinegar fly (*Musca cellaris*, L.), which is found always where acid liquors are evaporating, may also cause the introduction of the vinegar eels. By walking upon the viscous disc it may get the eels attached to its feet and thus transport them to vats or sound generators. In the vats this may be avoided by making the covers fit well and covering the tubes and plugging the aeration orifices with cotton. With generators, in consequence of the continual affusions, the evaporation of the vinegar spreading over the soil renders the locality unfavourable; the vapour given off by the generators themselves also attracts the flies, the approach of which to them cannot be prevented, whilst the vats are completely protected.

The acetification of a new shavings generator requires six to eight weeks. According to the calculations of Paul Pfund, also, a generator absorbs 5 to 6 hectolitres of vinegar to acetify the shavings. Moreover, the vinegar produced has during the first four weeks a very distinct taste of the wood, communicated to it by the shavings. The generators ought therefore to be kept in action uninterruptedly.

The method of Pasteur, where the vinegar is formed by bacteria, gives, on the contrary, immediately and without loss of vinegar a saleable article of good quality. Nevertheless, the vats in fermentation ought always to be under rigorous control. An insufficient addition of alcohol, or too great an excess of alcohol in the fermenting liquor, immediately slackens the fermentation or stops it entirely. But if the necessary proportions be exactly observed the practical execution presents no difficulty.

For the production of wine vinegar this method is the only rational one; for in this case it is not necessary to add alcohol and the course of the manufacture becomes still more simple.

THE CORK-TREE.*

The following description of the cork-oak is taken from a more extended paper on the subject published in the recent report of the United States Department of Agriculture for 1879. It is based upon a pamphlet by a Spanish engineer of forestry,† which also gives an account of the manufacture of bottle-corks in Spain. The report of the Agricultural Department contains many details relating to the cultivation of the cork-tree which are here omitted.

The cork-tree (*Quercus suber*, Linn.) is of various sizes, and this has given rise to differences of opinion with respect to the greatest height and circumference or diameter it attains. According to Mr. H. Laure, some have grown to the height of fifty feet, and he has seen trees of three feet in diameter in the neighbourhood of Bormes. Mr. F. Joubert de Passa fixes the maximum height at sixty feet, with a diameter of four feet. In Algeria, cork-trees sixty-five feet high and from ten and a half to sixteen feet in circumference have been found.

In Estremadura there are some trees as large as those found in Algeria. There is a tradition that in the valley of Batuecas (Salamanca) there was a large cork-tree, the hollow trunk of which was used as a cell by some of the monks of a neighbouring monastery. In 1862, in a cork plantation called Monte Mayor, in the province of Castellon de la Plana, cork was taken from a tree fifty feet high by ten feet in circumference. This tree was sixty years old. In the province of Gerona, the author has seen trees of a greater diameter than any mentioned above, excepting that of the valley of Batuecas, the size of which is not known.

The tree attains a great age, and its growth continues from one hundred and fifty to two hundred years. It lives after it ceases to grow, but the yield of cork is diminished.

Extensive plantations of cork-trees are found throughout the greater portion of the countries lying along the Mediterranean, as far north as the forty-fifth degree of latitude; beyond that line they do not flourish, and are sparse and of little value. Its polar line coincides with the isotherm + 13·5°

The cork-tree requires a warm, or at least a temperate climate. It is found in Spain at an altitude of one thousand six hundred feet; at the same height in France, according to some authorities, and at two thousand six hundred feet according to others. In Algeria, it grows at an elevation of three thousand two hundred feet. The minimum average annual temperature which it can stand appears to be + 13°.* A southern exposure is most favourable to its growth, although it does well in other situations when all other conditions are propitious.

The free circulation of air and an abundance of light are highly beneficial to the development of this tree, which prefers, therefore, slopes to plains, particularly if they are near the sea or immediately on the coast.

According to Antonin Bouset, the cork-tree can resist differences of temperature of fifty degrees.

According to Mr. H. Laure, the cork-tree only grows spontaneously, or in a wild state, in granitic or slaty formations. Experts in the province of Gerona affirm that the trees which yield the best cork are found on slaty lands.

The blossoms make their appearance in April or May, and the fruit ripens in the following months of September and January. Hence the different kinds of acorns, according to the time of ripening. Those which arrive at maturity in September, and sometimes about the beginning of October, are called *Brevas*, *Primerizas de San Miguel* or *Miguleñas*; those which ripen in October and November are called *Segunderas* or *Medianas de San Martin* or *Martineñas*; and lastly, the acorns which do not ripen until December or January are known as *Tardias* or *Palomeras*.

The acorns of this species of oak are more bitter and of an inferior quality of those to the *Quercus Ilex*, L., and are not so good as food for swine.

The trees begin to bear acorns within twelve or fifteen years, but until they reach thirty or forty, the acorns are not fertile, nor is the yield abundant. It is said that the tree bears fertile seeds when it yields cork sufficiently good to make bottle-stoppers. Close growth or lack of light diminishes the yield of acorns, and also impairs the quality of the cork and bark, and lessens their quantity.

The acorns, although not very delicate, lose their germinative faculty even when not on the trees, if exposed to a great degree of cold.

Some varieties or sub-varieties of the cork-oak produce very sweet acorns, as sweet or even sweeter than the *Quercus Ilex*. It has also been observed that the trees which yield small oblong or round and bitter acorns produce coarse cork, and those which bear large and sweet acorns produce a finer article, and their trunks are of a more regular shape. These characteristics are, however, not generally to be relied on as indicative of the peculiarities mentioned.

The operation of taking off the cork, although it inflicts a real disease on the tree, facilitates, nevertheless, the development of the trunk, and the production of the coats of cork. The cork should be taken off when the sap is running. Mr. Lambert is in favour of having this work performed in the spring, because at that time, in addition to the fact that the cork is removed with greater ease than in the depth of summer, the new formation of the cork which is not yet matured, and which is useless for manufacturing purposes, is not removed. The inner bark also is not so liable to dry up and separate from the tree. Some cork growers, however, prefer to take off the corks during the months of July and August, when the sap is descending. Along the coast in the province of Gerona, this work is generally done about June or July, the operation being begun when the cork readily separates from the tree.

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* From *New Remedies*, February, 1880.

† 'El Alcornoque y La Industria Taponera, por Don Primitivo Artigas y Teixidor, Ingeniero de Montes. Madrid, 1875.

* The author does not say whether this temperature is according to the Réaumur or the Centigrade system. If the Réaumur is meant, it is equal to 61·25° Fahrenheit: if Centigrade, 55·2° Fahrenheit. It is almost safe to assume that the Centigrade is meant.

The greatest risk in taking off the cork in the spring is, perhaps, in the danger of tearing away part of the inner bark in addition to the further danger incurred from late frosts which might kill the tree. It should be so arranged, therefore, if possible, that the newly stripped cork-trees, which are then covered with an abundant exudation of sap, should not be exposed to sudden changes of temperature, particularly to the cold winds which follow the autumn rains.

The trees should be stripped for the first time when the outer covering can be taken off without injuring them. In the province of Gerona, this is done when the trees are from two to four inches in diameter. This rule is not strictly adhered to, however, and it is not rare to see even smaller trees denuded of their covering. The first and sometimes the second coats of cork are of no value to make stoppers.

After the trees arrive at maturity, that is to say, when they begin to yield cork of mercantile value, it is of great importance to determine the proper period that should be allowed to elapse between the harvests. In the province of Gerona, the majority of the growers strip their trees every ten years, while some do so every twelve years. Cases are mentioned where the cork was permitted to grow for eighteen years, and then gave a handsome return to the grower. As cork sufficiently thick to make champagne-stoppers is worth more than any other, growers endeavour to produce this quality sometimes by putting off the time of gathering for one or two years.

The time necessary for the production of good cork varies according to the condition of the soil and climate, and experience is the best guide in determining when it should be gathered. When mature and fit for removal, the body of the cork is of a rose-white, which colour rapidly disappears upon exposure to the air. To remove the cork from the tree, an axe, the helve of which is wedge-shaped at the end, is used. Two circular cuts are made, one at the foot of the trunk and one at the proper height above. A longitudinal cut is then made, and after its edges are gently beaten with the axe, the end of the helve is introduced and the whole piece is easily taken off. Sometimes several circular incisions are made, and the cork is taken off in sections. After the cork is removed, two longitudinal incisions, which penetrate to the inner bark, are made in the trunk along its whole length. This is done to prevent the new formation of cork from cracking on its other surface. Some persons make as many as four of these incisions in the trunks of the trees. They should not, however, be made on the north side. The inner part of the cork consists of a yellow substance which is useless in the manufacture of stoppers. It is composed of dried sap, or at least of a corky substance in process of formation, and is distributed equally over the surface of the trunk. This substance dries quickly, and serves as a protection of the mother or inner bark. This corky substance is precisely that which is taken off and lost when the cork is removed later in season, when the sap is descending.

If all the cork is taken from the tree at once, the new cork is produced more slowly, but it is of a better quality than when the tree is only partially stripped. As it has been considered dangerous, to a certain extent, to deprive the trees of their whole covering at once, it has been proposed that the operation should be performed at different times; the first year taking off the cork up to a height of about twelve inches; the fourth or fifth year up to the branches; and the seventh or eighth year from the branches themselves. By this method the trees may not suffer so much from atmospheric influences. On the other hand, however, it has the inconvenience of always leaving a portion of the delicate surface of the trunk exposed to the vicissitudes of the weather. In the plantation of Monte Mayor, in the province of Castellon de la Plana, it is, or at least was, the custom to take cork from half the trunk the first year; two years later it was taken off as far up as the branches; and two years after from the branches themselves.

It is not expedient to remove the first cork all at once, but at intervals of two or three years. In this way the trunk acquires a greater diameter, and the tree is not so liable to be injured by the cold. The trunk should be stripped to the ground, because if a belt of cork should be left, it would serve as a cover for ants, which would fill it with holes, or for other insects, which would cause the same or greater damage.

If the trunk is stripped every eight or nine years, the thick branches should be stripped every ten or twelve years, and the lesser ones every sixteen or twenty.

In the province of Gerona it is very generally the practice to take the cork from the trunk only, as it is thought by these means that a better quality of cork is obtained the next time.

When the cork is all removed from the trees, it is taken from the temporary places of deposit and piled up to dry slowly, and in two months loses one-fifth of its weight. Here it is inspected by the manufacturers, who buy it on the ground.

If the cork-trees are not stripped, the cork splits and becomes full of holes, and is worthless for making stoppers. In about fifty or sixty years, the surface, exposed to the atmospheric influences, begins to decompose slowly, and the cork falls off in small pieces, in the same way as the bark of other trees. It never falls off in large slabs, nor does it naturally come off when the tree is alive, as some persons have supposed, presenting the cork-tree as an exceptional instance of physiological action, brought on by natural agencies on the bark of this species only.

When it is intended to improve a cork plantation which has never been stripped, the stripping should be done at once, in order to obtain, eight or ten years later, an article that can be used in making stoppers. The first stripping is useless to this purpose.

In Estremadura cork is worth from 1·40 to 2·00 dollars (7 to 10 pesetas) per hundred pounds. In Catalonia a higher price is paid. It is sold there in slabs at so much a dozen. These slabs are about 8 palms square, and bring from 2·40 to 4·00 dollars (12 to 20 pesetas) per dozen.

To-day cork is worth eleven times more than it was in 1790.

In 1843, in the department of Var (France), cork plantations were estimated to be worth about 500 francs per hectare (2·47 acres). The net return per hectare each ten years was 600 francs, or 12 per cent. per annum. At the same date oak forests only yielded 3 per cent. per annum.

To-day the value of cork plantations varies considerably, according to the locality, the age of the trees, the density of growth, and the quality of the cork produced. But as the demand for stoppers increases every day, the cork plantations acquire an additional value. Large sums are invested in this kind of property, and several Catalonian stock companies have rented large plantations in Estremadura, Andalusia, and other places, and are making handsome profits out of them. In a plantation in Estremadura the first stripping was let for 200 dollars; the second brought 5000, and the third 10,000 dollars.

The mother-bark of the cork-tree contains a large amount of tannin, as much as the best oak bark. It is extensively used by the tanners of Cadiz. Cork-trees grown for tan-bark are usually stripped every thirty years, at which age they are entirely denuded of their inner bark and cork. This kills the trees, and they are then cut down to the roots, from which spring new shoots, which, in their turn, are subjected to the same process. The roots soon lose the power of sending up vigorous shoots and get worse and worse, until at eighty years very few stumps show any signs of life. Few cork plantations are cultivated for tan-bark, as they give a better return when preserved for their yield of cork.

The wood of the cork-tree is a reddish brown. Its density, when dry, varies according to different authorities from 0·787 to 1·560. Exposed to changes from wet to dry, it soon warps. It is very tough, and, for that reason, may be used for carriage and waggon making, and for similar purposes. As the wood is heavy and warps easily, and the trunks are very short, it is hardly ever used in domestic architecture. In naval construction, curved pieces, which are continually under water and fastened with copper bolts, are very durable. Iron bolts cannot be used on account of the tannin in the wood. It also makes good piles. It burns well, but as fuel it is not so good as other species of oak. The charcoal is very good, the wood yielding about 18 per cent of that article.

JAPANESE ISINGLASS.*

This substance, known in China and Japan under the name of Tjintiow, has been described by Hanbury† as occurring in two forms, the one consisting of quadrangular sticks, from 1—1½ inch in diameter and 11 inches long, and the other in slender furrowed strips only ⅛ of an inch in diameter. The first form appears to be the rarest in commerce, and is usually not so white and transparent as the second form, although this is not always the case.‡

With a view to determining the algæ which enter into the composition of this article specimens were submitted to microscopical examination, those pieces being chosen which, from their opacity or less transparent and clean appearance, indicated the probability of containing fragments of algæ in an unaltered state.

The following species were thus detected:—

Streblonema.—Fragments of a species of this genus, consisting of articulated branched threads, of a brown colour, were found attached to a piece of *Gelidium*, but the fragment was too incomplete to determine the species.

Scytosiphon lomentarius, J. Ag.—A portion of this phæosporous alga, presenting a portion of the tubular frond, with the peculiar constriction characteristic of this species, was found.

Sporacanthus cristatus, Kütz.—This plant was represented by a little mass of branchlets, composed of a single row of cells and terminating in points; in some specimens cruciate tetraspores were found, the specimens corresponding well with Kutzing's figure of the plant ('Tab. Phyc.,' v., p. 24, t. lxxxii.).

Ceramium.—The *débris* of algæ belonging to this genus were not rare, but the fragments met with were too incomplete to determine the species. One species, so far as can be judged from the presence of spines on the nodes, appeared to be *Ceramium ciliatum*, Kutz., *l. c.*, 'Tab. Phyc.,' xii., p. 26, t. lxxxvi.

Centroceras clavulatum, Ag.—The specimen detected consisted only of two joints, but these presented such clearly defined characters that there could be no doubt the fragment belonged to the above-named species, since they exactly corresponded with Kutzing's figure, *l. c.*, xiii., p. 7, t. xviii.

Endocladia vernicata, J. Ag.—The *débris* of this alga was very rare. One of the filaments found exactly resembled that represented by M. Suringar ('Mus. Bot. de Leyde,' vol. i., Algues de Japon, pl. xxx.)

Gloiopeltis tenax, Turn.—Here and there in the jelly were found portions, not completely gelatinized, closely resembling this species, and the presence of ovoid cruciately-divided tetraspores exactly like those belonging to this plant confirmed the determination.

Gelidium polycladium, Kutz.—This was found in the form of fragments, often very well preserved, and distinguished from *Gloiopeltis* by the intricate character of the filaments, resembling Kutzing's figure of the plant, *l. c.*, tom. xix., p. 9, t. xxiv.

This species is frequently studded with the pretty diatom, *Arachnoidiscus ornatus*, Sur., which is abundantly met with in some specimens of Japan isinglass, and by the presence of which M. Menier detected the marine origin of some commercial currant jelly.

Nitophyllum?—Some portions presented a flat frond and hexagonal areolation, which recalled the structure of *Nitophyllum*. These, however, were found only in very small quantity, and in a badly preserved state.

Polysiphonia tapinocarpa, Sur.—This alga was met with in the form of little sections of filaments, consisting of short joints which, on transverse section, showed ten siphons, and I do not doubt belong to the above species, as figured in 'Algæ Japonicæ,' 1870, p. 37, pl. xxv., B. Some fragments of *Melobesia?* were found on this plant.

Polysiphonia fragilis, Sur.—This species is represented by Suringar on the same plate as the last, fig. A. It is distinguished from the last by showing only five tubes in the transverse section.

Polysiphonia parasitica, Grev.—This species has not apparently been yet found on the coast of Japan, but from the fragments possessing eight or nine siphons, and from other characters which were well preserved in the specimen examined, there can be but little doubt that they belong to the above species, as figured by Kutz., *l. c.*, xiii., p. 9, t. xxvi.

Diatomaceæ.—I have found a large number of species belonging to this group, but especially *Arachnoidiscus ornatus*, Ehr., described and represented by M. Suringar, 'Algæ Jap.,' fasc. iii., p. 5, pl. i., and by M. Menier.*

The above are by no means the only species which enter into the composition of Japanese isinglass, but a large number of others, which were observed to be different, were too damaged to be recognizable. The two forms of the article seem to be made with the same algæ, so far as it is possible to judge from the species found in them, but with this difference, that in the quadrangular form *Gloiopeltis* seemed to be the chief ingredient, while in the slender sticks *Gelidium corneum* was most abundant. This, however, may not be the case in all samples. It seems probable that the Japanese and Chinese search their coasts for such algæ as furnish mucilaginous substances, and having collected them, do not trouble themselves to remove the parasites which are attached to them, or less gelatinous species which are entangled with them, and thus the quality of different specimens varies considerably. If the gathering consists almost entirely of *Gelidium*, *Gloiopeltis* and *Endocladia*, the transparency, whiteness and purity are very noticeable.

The name of Japanese isinglass, inasmuch as isinglass (ichthyocolla) means fish glue, is objectionable, and should not be retained. The name Agar-agar, which has by some writers been proposed for it, has no better claim, since it is applied to various algæ which are not known to enter into the composition of this substance.

According to Mertens (*Preussiche Exped. nach Ost. Asien, Die Tange*, 1866, p. 140), the following species are employed in the East Indies, under the name of agar-agar:—*Eucheuma spinosum*, J. Ag., *Sphærococcus serra*,

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* Abstract of a paper by Dr. Leon Marchand in the *Bulletin de la Soc. Botanique de France*, [2], i., 287.

† Hanbury, 'Science Papers,' 1876.

‡ Specimens of this substance in laminæ have since been received from Japan, and contain the same algæ.

* C. Menier, 'Falsification de la Gelée de Groseille du Commerce découverte par les Diatomées,' Nantes, 1879.

Kutz., *S. gelatinus*, Ag., *Gigartina horrida*, Harv., and at Timor, *Hypnea divaricata*, Grev.

The term gelose is also objectionable, on account of being applied to a definite chemical substance.

The name phycocolle or seaweed glue would be preferable, unless the name tjintiow or lo-thâ-ho be preserved.

POLYGRAPH COMPOSITION AND INK.*

The following compositions may be added to those formerly quoted by us:—

1. Gelatin	100 parts.
Water	375 „
Glycerin	375 „
Kaolin	50 „

(*Lebaigue.*)

2. Gelatin	100 parts.
Dextrin	100 „
Glycerin	1000 „
Sulphate of barium	q. s.

(*W. Wartha.*)

3. Gelatin	100 gm.
Glycerin	1200 „
Moist sulphate of barium washed by decantation	500 c.c.

(*W. Wartha.*)

4. Gelatin	1 part.
Glycerin (30° B.)	4 parts.
Water	2 „

(*Kwaysser and Husak.*)

Polygraphic Inks.

1. "Violet de Paris"	10 parts.
Water	30 „

(*Lebaigue.*)

2. "Violet de Paris"	1 part.
Water	7 parts.
Alcohol	1 part.

(*Kwaysser and Husak.*)

3. Acetate of Rosaniline	2 parts.
Water	10 „
Alcohol	1 part.

(*Kwaysser and Husak,*)

The first two produce a violet, the last named a red copy.

THE PALL MALL GAZETTE ON THE CHEMIST AND DRUGGIST.

The following article which appeared in *The Pall Mall Gazette* for July 17, as one of a series on "London Tradesmen," will probably be read with interest by chemists and druggists at the present juncture:—

"But few of us in making provisional arrangements for our annual expenditure put down the chemist's bill as a necessary item, or expect to become intimately acquainted with that person in the course of our experience. Few, however, escape him; and as his charges appear before us at last as an unexpected extra, they are ungrateful,—sometimes as having become so painfully necessary, and sometimes as representing nameless little requirements which seem to be redundant, or almost fictitious. But the way to value a chemist's services is to live for a while beyond his reach. In London his proximity is, perhaps, too close. Every fancied ailment sends your servant there, or your daughters, or your wife. You may soon find your house to be full of little bottles, with small jars crowding the bedroom tables. They do not come for nothing, as you discover at the end of the year. But live away from your chemist for a time,—in the backwoods of Australia, let us say,—and you will find how glad you would be to welcome him.

"It is painful—that bill for £15, with nothing to show for it but old scars, rheumatic twinges, and the memory of sick headaches. You have revelled in your beef and mutton; you have still the tailor's good things within your drawers: you have appreciated your wine merchant; and your plumber, whom I regard as the worst enemy of the human race, has served at least to keep the rain out. There is still a doubt in your bosom whether the chemist has really done anything for you. The contents of very few of the numerous little pots have been applied to your own body. It is on this account that the feelings of paterfamilias as to the exorbitant nature of his account have been so strong, and that we are reminded from time to time that the 1*s.* 6*d.* which we have paid for the small bottles recently sent in has been charged at the rate of 500 per cent. on the original cost of the drug which has been used. Nevertheless, if there be a cheap chemist in the neighbourhood, you will hardly trust your stomach or those of your wife and offspring to his tender mercies.

"Having a regard to abstract justice, we should endeavour to ascertain what is the general result of a tradesman's career in his trade before we charge him or his brethren with exaction. Does the chemist make his fortune quicker than the butcher or the tailor or the publican? Or does he retire into grander or more luxurious ease? We think not. The publican is, we fancy, the man who arrives the soonest at that final desideratum of "a fortune"—though the nature of his business has been such that we doubt whether he enjoys it the longest. And next to him come the other two that I have named. The chemist is by no means prominent as a man who in early life and by rapid strides has made his way. If this be so, and if to his trade he take as much education, forethought, and intelligence as do the publican, the butcher and the tailor, then the natural conclusion will be that he has not dealt exorbitantly with the public, although he may have charged 500 per cent. for the dose of rhubarb with which he has relieved your little boy in the time of the early apples.

"But as to his education, forethought and intelligence, can there be any doubt about it? As to the nature of his education, we will say a word just now; but consider a while the extent of the knowledge required by the publican and the chemist. Of the former we may say that the less he knows of the science of mixing the better for his customers. To retail his beer as he gets it from the brewer, or the gin from the distiller, is his duty,—if he only would do it. Almost without fear as to the consequences of adulteration he pursues his practices. Down in those dark vaults to which we see the barrels consigned by the burly men of Truman, Hanbury and Buxton, or Barclay and Perkins, the liquor is prepared for the drinker with a rough hand, and none is the wiser. Certainly not the poor recipient. But the chemist? What latitude in mixing is allowed to him? There can be no rough hand there,—no cellar-work, no deeds of darkness. The poor woman goes into the publican's house and comes out drunk. No inquiry is made as to the nature of her intoxication. Drunk she is, and drunk she has made herself; and she is carried away on the constable's stretcher to the nearest police-station. But if anything wrong has happened in the chemist's mixings he will never hear the end of it. One mistake as to two drops out of a wrong bottle, made by an assistant, will ruin a man for ever.

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* From *New Remedies*, July, 1880.

"And yet complaints are made about his charges! No doubt a chemist may make overcharges;—no doubt he will make overcharges unless restrained by competition. It is the nature,—of a tradesman, I was about to say,—but it is in the nature of all mankind to make such overcharges with a clear conscience unless they be prevented by the fear that they will be left with their goods or their knowledge unsold upon their hands. Ascending into higher regions, may we not say that the same thing takes place even with the barrister's work? Sir John and Sir Henry, having got to the top of their tree, may charge nearly what they please. The same may be done in almost every profession and trade more than in the chemist's. But as, to the ordinary run of legal assistance, Mr. Jones is made "reasonable" by the proximity of Mr. Smith, so it is in other trades. The chemist is governed by the same law, and will soon mix his lotions in vain unless he conform himself to the prices usual in the neighbouring streets. In fact, there is a scale for such prices recognized among chemists, though upheld by no law, and in accordance with this they have to do their daily work. Pills, though not unfrequent in family use, are not as common as mutton chops, and the exact price at which they may be purchased is not known to all housekeepers; but among the chemists themselves the rule is preserved. We take it that one chemist examining another chemist's bill would be able to declare at a moment's notice whether the articles have been overcharged. We may be sure that one chemist does often see another chemist's bill, and that, therefore, such overcharges are unusual. It may be that the man is no more honest than his neighbours, but he is subject to the same restraints, and bound to good behaviour by the same laws of living. When we hear of the tale of 500 per cent. demanded for drugs, we should consider the circumstances under which the drugs are administered.

"There is a story told of a passionate old Spanish artist named Alonso Cano. He had lived many years, which he had devoted to his art, and was passionate as well as old. A judge came to him one day and gave him an order for a figure in little of his patron saint. Cano made a beautiful statuette, and charged the judge a hundred doubloons. "A hundred doubloons," said the judge, "for work that has occupied you less than twenty days; and I, chancery judge as I am, only receive one poor doubloon a day for my services!" "Twenty days!" said Cano, dashing the statue to pieces at the judge's feet. "It has taken me fifty years of unintermittent study to learn to make that figure." The frightened judge left the artist's workshop as quickly as he could, for Alonso Cano was a rough man in his wrath, and was said to have murdered his wife. When we hear of chemists' charges being held up to reproach on the 500 per cent. computation, we always think of Alonso Cano and the broken figure of the patron saint.

"We doubt very much whether a chemist's trade is peculiarly profitable. There are well-known instances of men, or firms, which have made large fortunes; but we suspect that this has been done by a peculiar knowledge in the science of drugs,—by something in which scientific research has been combined with the retailing of physic. And in these cases a peculiar happiness, something which may be called luck, has been combined with research,—so that after many years a man's name has been brought to the front, and other chemists have found it to be their interest to deal with him; and capital has joined itself to knowledge, till those elements of success have been brought together which always reach large pecuniary results. But taking the numerous chemists' shops which we see from street to street, we believe that modest comfort is more often attained than great wealth. The labour of the shop is continuous, and hard labour has to be paid for. We doubt whether the first idea in the minds of many, as they walk the streets on Sunday, is not one as to the good fortune of the chemist who can make his money seven days in the week. The chemist's assistant looks at his own lot in life in a different light, and thinks that he ought to be paid for his constant attendance. For him there is no early closing on Saturday, the bowels of men and women being subject to no mercy. All this must be considered in the remuneration paid to him. And then there is his knowledge. The simplest apothecary's boy must have some training, and before he arrives at the mystery of mixing should have had much. Public opinion is a weapon terribly strong. One wrong grain thrown into a pill, as we said before, will send the father of a family out into the desert a ruined man. Consequently a chemist does pay his assistant more highly than another tradesman. We are told that the common expense of an assistant in a chemist's shop is about £200 a year, which is much higher than is generally paid in other retail trades.

"But for the chemist himself the education necessary is not only long and expensive, but is looked after by the Government itself in a manner quite unusual in other trades. For the butcher, the baker, and the publican, no such care is necessary. They may teach themselves as much or as little as they may choose to learn, and if the teaching be not satisfactory, they must settle that themselves with their customers. But with the chemist the matter is conducted in quite a different form. We think that we hardly exaggerate when we say that a man may become a barrister without much necessary qualification. He may become a barrister and be quite unfit to do a barrister's work, that work being of a nature which the Government can leave to be arranged between the lawyer and the litigant without danger to the lives of either. But it has been felt that the vendors of drugs must not be allowed to poison their neighbours, and therefore no man can now open his shop as a chemist without having proved himself fit to do so as regards the education demanded of him. First of all he undergoes what we may call general school teaching, which includes, we believe, always the Latin language; and he does that so as to pass—or be plucked for—an examination. He then has to undergo two various examinations in chemistry before examiners appointed by the Pharmaceutical Society. On passing the first he is entitled to call himself a chemist and druggist. On passing the second he becomes, or may become, a pharmaceutical chemist and druggist. What is the difference, we must confess that we have been unable to learn. They can both sell physic, and neither of them is empowered to practise medicine. We can only suppose that the pharmaceutical chemist is the more learned pundit of the two, and therefore entitled to a wider faith. It is not the case that he has any other advantage in his trade. Now we do maintain that a man so trained to follow a learned profession—or at any rate a scientific pursuit, if the word profession gives offence—should not be regarded as one bound to sell his goods at any peculiar percentage of profit. It is not in fact the goods he sells, but the goods so arranged as to preserve instead of injuring life.

"We must add a word or two as to the chemist personally. He is a tradesman; otherwise he would have no *locus standi* in our columns. At the first blush of the thing it may seem that we are flattering him in calling him a gentleman. But, with the chemist as with all men, education will show itself. Our readers remember that there is still an idea in the British mind averse to retail dealing, which begrudges that comfortable name to him who stands behind a counter. But our readers will remember also the old adage—

> Ingenuas didicisse fideliter artes
> Emollit mores, nec sinit esse feros.

The art of medicine, though acquired merely with the object of retailing it, is "ingenuous," and leaves its good results. The consequence is that the chemist as we have found him is always a man with whom it is pleasant to spend a half-hour in free conversation."

The Pharmaceutical Journal.

SATURDAY, AUGUST 14, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

CHEMISTS' CHARGES.

IT is with some considerable satisfaction that we this week reprint from a recent number of the *Pall Mall Gazette* an article in which the position of the chemist and druggist in regard to the general public has been dealt with in a spirit of greater fairness and rationality than is often the case with writers in newspapers. After the sensational letters in which attempts have been made to represent the legitimate dispensers of medicine as extortionate and unreasonable in their charges, it is refreshing to find their services dealt with from a fairer and more considerate point of view, as being of a nature that does not admit of their being appraised upon the level of quick returns and small profits.

We are in no degree disposed to object to the consideration of the chemist's services as those of a tradesman, but in the nature of things it is essential that a very wide distinction should be drawn between the trade of a chemist and druggist and that of other tradesmen. In the first place the work done by him involves an amount of knowledge and preparatory education altogether disproportionate to what is demanded for the skilful conduct of other trades. A mistake made in the supply of any article may be attended with consequences far graver than any that could result from a mistake made by the grocer, the tailor, or the publican, and for this reason the chemist is required to give proof of possessing the requisite qualification before he can carry on business. In view of these requirements on part of the chemist and druggist, our contemporary admits that the pursuit he follows, if it be not a learned profession, is at least one of a scientific character, and that he should not be regarded as one bound to sell his goods, like the butcher or the grocer, at any particular percentage of profit, since it is not in fact merely the goods he sells, but the goods so arranged as to preserve instead of injuring life.

There is another point of view which is important in regard to the question as to chemists' charges, and we are glad to find that it has not been overlooked by the writer in the *Pall Mall Gazette*. The average result of a chemist's business is not such as to indicate that it is peculiarly profitable. Leaving out of account certain exceptional instances, there is much more reason to believe that the contrary is the rule, and that it is but rarely the chemist is enabled, from the proceeds of his business, to retire upon a competence as other tradesmen often do.

Then, as regards the complaints that are sometimes made of the chemist's overcharges, our contemporary has very reasonably pointed out that in the present days of competition there is not much likelihood of such a practice being maintained by chemists any more than by other classes of public servants. Even taking it to be the inclination of tradesmen, as of other classes, to charge as much as they can, the influence of competition, no less than regard for their own interest, will in most cases be sufficient to prevent overcharge or any disregard of the commonly recognized scale of prices. It would be absurd to suppose the chemist is generally an exception to this rule although some few may perhaps be able, like eminent barristers or physicians, to fix for themselves such a rate of remuneration as they please.

It is curious to notice in the article that we are now referring to an illustration of the fact that the difference between a chemist and druggist and a pharmaceutical chemist is but very little understood by the general public. In a kind of vague way it seems to be known that there must be some difference; but, as the writer of the article confesses, most people are at a loss to recognize what it is. The difficulty is one that merits the consideration of all who seek to secure for the British pharmacist a more liberal recognition by the general public. In the legal profession and in the practice of medicine such a result has been attained; but at present we can only hope that there may be, in like manner, such a better appreciation of those who have obtained the higher qualification as to lead to its being more generally sought for by members of the trade.

THE MEDICAL COUNCIL AND THE PHARMACOPŒIA.

THE subject of a new edition of the British Pharmacopœia came under the consideration of the Medical Council at its recent meeting, upon a motion of Mr. MACNAMARA that a Pharmacopœia Committee should be appointed "with the view of "considering and reporting to this Council how best "any future edition of the British Pharmacopœia "may be brought up to the scientific standard of "the present day." It cannot be said, however, that the discussion was one calculated to beget confidence in the present arrangements of this national work. Mr. MACNAMARA, whilst admitting that at the time of its production the present edition of the Pharmacopœia was an admirable work, said that the advance of scientific discovery and differences in nomenclature made it at this time an imperfect, inaccurate guide, the patchwork nature and inefficient character of which were unworthy of the

Council. He also quoted several omissions from it, which he considered important, and urged the appointment of a permanent Committee charged with the revision of the work. The motion was opposed by Dr. ANDREW WOOD, Dr. QUAIN and others, and it was pointed out that a Pharmacopœia Committee was already in existence, to which Mr. MACNAMARA retorted that he had resigned his position as a member of it because he had never been summoned to attend a meeting. Eventually, the motion was allowed to be withdrawn, though it may be hoped that the existing Committee will henceforward show sufficient signs of life to prevent at least its own members from regarding it as defunct.

APOTHECARIES' WEIGHTS AND MEASURES.

A NOTICE has been issued by the Town Clerk of Westminster to the effect that the inspector of that district has been provided with copies of the Board of Trade Standards for the verification of chemists and druggists' weights and measures, pursuant to the Order in Council of August 14, 1879. It is also notified that the inspector will attend at the Stamping Office, Guildhall, Westminster, every Monday and Friday morning from ten to one, for the purpose of verifying and stamping weights and measures.

After the 31st December next, the inspector will proceed to carry out the provisions of the Act by visiting the houses, shops, warehouses, buildings and yards of persons possessing, or using for the purpose of trade, the weights and measures here referred to, and in the event of any such being found unlawful or defective he will cause the owner to be prosecuted as the Act directs.

We make a point of drawing the attention of those of our readers who carry on business in the Westminster district to this notification, in order that they may avail themselves of the opportunity to have their weights and measures verified and stamped so as to prevent inconvenience to themselves hereafter.

DISPENSING FROM A MEDICAL POINT OF VIEW.

WE have not until now had an opportunity of referring to the case of prosecution under the Food and Drugs Act at Deptford, in which the defendant, carrying on the business of a chemist and druggist, was fined five pounds and costs for selling as tincture of quinine a preparation that was not in accordance with the British Pharmacopœia. So far as we have been able to ascertain, there was little reason for taking exception to the magistrates' decision, but the most remarkable part of the case was the evidence given by a medical man on behalf of the defendant, to the effect that if a prescription ordering quinine were sent to a druggist, an article other than quinine would be used in dispensing the medicine unless the word "ver." were written on the prescription. A more unwarrantable statement than this it would be difficult to imagine, so far as chemists and druggists are concerned, and though this statement was made by a qualified medical man, we are loth to accept it as an indication how dispensing should be conducted from a medical point of view. Mr. BROWNING's experience in this respect may be peculiar; but we have no hesitation in saying that it does not represent the practice of chemists and druggists. His statements would appear to suggest dishonesty on the part of dispensers at least, if it were not evident from them that he has been misled by confounding the dispensing practice of hospitals with that of chemists and druggists. It is no doubt true that in hospital practice and by some medical men a sulphate containing other alkaloids of cinchona bark besides quinine is largely used as Mr. BROWNING said. There are good reasons for the use of such a preparation in such cases as a substitute for quinine, and we can understand that where it is so used there may be a necessity for using the word "ver." whenever the prescriber intends true quinine to be used, but Mr. BROWNING has gone beyond the truth in saying that this practice obtains among dispensing chemists.

Consequent upon the report of this case in the daily papers, several letters were written by members of the trade, repudiating Mr. BROWNING's statement and pointing out that it was not only unwarranted, but undeservedly calculated to shake the faith of the public in the integrity of chemists' dispensing. We fully endorse those opinions and think that even a heavier fine than that inflicted in this case would be well merited if there were any foundation for Mr. BROWNING's statement.

THE BUOTT FUND.

The following is a list of the subscriptions that have been received by Mr. HAMPSON in answer to his appeal on behalf of Mr. CYRUS BUOTT:—

	£	s.	d.
Professor Attfield	1	1	0
R. Parkinson, Liverpool	0	10	0
Alfred Franks, Ramsgate	0	5	0
"From One who has received some favour from him," Dublin	0	2	4
W. M. Covell, Hackney	0	5	0
F. Hinde, Retford	0	2	6
Robert Chipperfield, Southampton	1	1	0
Lorimer and Co., London	1	0	0
"Carolus"	0	10	0
John Robbins, 372, Oxford Street, W.	2	2	0
R. D. Commans, Bath	0	10	6
James Farr, Halifax	0	10	0
P. T. W.	0	5	0
Alfred Bishop, London	2	2	0
Arthur Lloyd, London	1	0	0
Anonymous	0	5	0
S. C.	0	5	0
F. Hudson, Sheffield	0	10	6
Thos. Pullan, Bradford	0	10	0
A. C. Wootton, 44a, Cannon Street, E.C.	1	1	0
R. Brodie, Glasgow	0	5	0
Kay Brothers, Stockport	2	2	0
J. Wellington, Fowey	0	5	0
Michael Jones' Flint	0	5	0
Richard Reynolds, Leeds	0	10	0
"A Friend in Derbyshire	1	1	0
Robt. Hampson	0	10	0

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

Wednesday, July 7, 1880.

Present—Professor Tichborne, President; Sir George Owens, M.D., Dr. Collins; Messrs. Bennett (Kingstown), Brunker, Goodwin, Hayes, Hodgson, Holmes, Oldham, Pring (Belfast), and Simpson.

The minutes of the meeting held on June 2 were read and signed.

Read a letter from Mr. William Harrington, M.P.S.I., of Cork, in reply to a communication from this Council.

At the request of the Council, Dr. T. Collins, Chairman of the Law Committee, undertook to reply to Mr. Harrington's letter.

Read a letter from Dr. M. A. Ward, Secretary to the Ledwich School of Medicine and Surgery, requesting that the name of that school be added to the list of those from which certificates of instruction in practical chemistry are received by this Council.

The Registrar was instructed to inform Dr. Ward that the laboratory of the school would be inspected by a Committee of the Council during the month, who would report to the next meeting of Council.

A letter from Londonderry signed "Pharmacist" was laid on the table. The Registrar stated that the subject of the letter was an alleged breach of the Pharmacy Act in that town.

Resolved—

> "That anonymous letters be neither read nor acted upon by this Council."

The following motion by Mr. R. Simpson was, by permission of the Council, withdrawn—

> "That the Council take into consideration the desirability of engaging a man to collect evidence as to the reported illicit compounding, now said to be common in Dublin."

The Report of the Preliminary Examination held on July 5 was laid on the table. Twenty-three candidates presented themselves, of whom all but two passed.

The Registrar laid on the table estimates for printing the licence as pharmaceutical chemist on parchment, instead of on paper; also for lithographing it in an enlarged size, and improved form, on parchment.

The subject was deferred to a future meeting for consideration.

The examination for the licence as pharmaceutical chemist was held on the same day as the Council meeting, but it had not terminated when the Council rose. Eight candidates presented themselves.

Provincial Transactions.

SUNDERLAND CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The general meeting of the Sunderland Chemists' Assistants and Apprentices was held at the rooms, corner of William Street, on Monday evening, July 5; the President, Mr. J. J. Browell, in the chair.

The President expressed his satisfaction at the progress of the Association during the past session. Although it had not been possible to carry out the programme in its entirety, yet there had been several very efficient substitutes for those papers which the authors had not been able to give on account of other engagements. The chemistry and materia medica classes had been well attended and a laboratory was being fitted up in connection with the former, for the use of the members. Several additions to the library and also to the materia medica museum had been received. Messrs. Horner and Sons, and Messrs. Potter, Son and Clarke, had sent parcels of specimens; Messrs. Lynch and Co. had provided a number of suitable bottles to contain specimens; and Mr. Walton had presented the Association with a large case, with sliding glass doors, to hold the whole collection. In addition, there had been received from Messrs. Clarke, Bleasdale, Bell and Tollington, £2 2*s.*; from Messrs. Hearon, Squire and Francis, £1; Mr. W. Fowler, a collection of minerals; Mr. J. W. Robinson, a microscope; and Messrs. J. J. Nicholson and Co., specimens of different kinds of coal.

The President then thanked the members for their assistance during the session and expressed a hope that the Association might go on improving.

The Secretary (Mr. J. T. Humphrey) read his report, in which the number of honorary members was stated to be 21, of members 23, and the average attendance 11.

In the absence of the Treasurer (Mr. J. Peacock), the Secretary also read the financial report, the income for the session being £22 4*s.* 10*d.*, the expenditure £7 12*s.* 10*d.*, leaving a balance of £14 12*s.*

The reports having been adopted, and votes of thanks accorded to the officers for their services, to the donors of specimens, etc., and to the authors of papers; the election of officers for the ensuing session was proceeded with, the result being as follows:—

President, Mr. T. Watson; Vice-Presidents, Messrs. J. J. Browell and R. H. Mushens; Secretary, Mr. J. T. Humphrey; Treasurer, Mr. J. Peacock; Committee, Messrs. C. Ranken, J. G. Cowey, J. W. Cameron, J. Hall, G. Tully and J. McGregor.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

THE FORMULÆ OF SOME INORGANIC SUBSTANCES.*

BY C. H. HUTCHINSON, F.C.S.

(*Continued from page* 844, *vol. X.*)

Since a previous report on this subject was read before the Association, further particulars with regard to the determination of the densities of substances at high temperatures have been published: as these are of considerable importance, I determined to bring this subject again under your notice.

In that report the formula given for stannous chloride was stated to have been called in question by Dr. Carnelly, who considered that the density had been determined at too low a temperature. Since then Hn. Victor Meyer and Zublin have again experimented with it,† and find that the temperature at which they obtained numbers corresponding with Sn_2Cl_4 (619°-697°)‡ may be considerably increased without danger of chlorine being evolved; thus two estimations at 880° and 970° gave respectively 6·67 and 6·23; the numbers calculated for $SnCl_2$ are 6·53. Their work seems to show, then, that this substance exists in two modifications, Sn_2Cl_4 at comparatively low, $SnCl_2$ at higher temperatures. The remarks which were made with regard to Rieth's work being probably unreliable through partial evolution of chlorine at the temperature at which he made his investigation are consequently withdrawn.

The subject, however, of more special interest at the present time, is a continuation of the experimental study of the so-called dissociation of the halogens.

Professor Crafts, in continuation of his former researches whilst experimenting with iodine, has, together with Fr. Meier,§ obtained densities which differ very considerably from those obtained by Victor Meyer. The apparatus employed differed in some particulars from that used by the latter, the modifications introduced being adopted in order to overcome certain supposed sources of error, thus—The capillary tube dipping under the water in the pneumatic trough would naturally offer some resistance to the passage of a gas through it. In an experiment in which 10 c.c. of air were passed into the cold apparatus, only 9·5–9·65 were obtained in the measuring tube, "and one saw that an excess of pressure of 6–10 c.m. was necessary in order to force air through the water, although the capillary tube was only 1 c.m. below its surface." In order to overcome this difficulty the capillary tube was connected with the upper end of a U tube graduated on both sides and connected with a reservoir so that the contained liquid could be maintained at any desired level; the side of the U nearer the furnace was enclosed in a glass tube filled with water of a known temperature. This form of apparatus has the advantage of recording any variations of volume which may take place during an experiment, as the following instance shows:—0·1266 gram iodine was introduced into the heated bulb of the apparatus and the variations recorded in the measuring tube were,—second minute after introduction 12·48, third 12·52, fourth 12·51, fifth 12·49, eighth 12·47, twenty-fifth 11·59. The commencement of the lessening of the volume being generally coincident with the formation of a little cloud of condensed iodine vapour in the upper part of the tube. This experiment also points out the necessity of having the narrow tube of the apparatus of as small an internal bore as possible in order to prevent diffusion taking place; a further precaution with this object is to fuse the substance under examination into the bottle, or enclose it by means of a stopper so that it may be introduced mouth downwards, and thus the stream of vapour is not directed against the neck of the apparatus.

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* A Report on Inorganic Chemistry read at a meeting of the School of Pharmacy Students' Association, July 8, 1880.

† *Ber.* 13, 811.

‡ The temperatures quoted are in all cases Celsius.

§ *Ber.*, 13, 851.

A second alteration consists in the modification of the top of the apparatus in such a manner that the substance under examination can be introduced into the heated bulb after the replacement of the stopper. In the case of substances not volatilizing very rapidly there is no difficulty in introducing the bottle with its contents, replacing the stopper and allowing the few air bubbles thus expelled to escape outside the measuring tube: if, however, the substance be very volatile at the temperature employed this procedure is not possible, and in that case an allowance has to be made for the air found in the measuring tube, which has been forced into it by the introduction of the cork: to obtain this "value" Victor Meyer* recommends the cork to be pushed into the neck as far as a mark made on it, ten times successively, a tenth part of the total amount of air thus expelled constitutes "cork-value," which varies from about 0·3–0·6 c.c. according to the size of the cork used. Experimenting in this way Hn. Crafts and Meier obtained results in which certain irregularities seemed to point to the existence of some source of error, blank experiments were therefore instituted with the object of its discovery, and they found that after the introduction of the empty vessel and replacement of the stopper, an increase in volume of 0·4–1·0 c.c. took place beyond that allowed for the cork. This they attributed to the carrying down of air from the room into the cylinder by the bottle, and to obviate this, it was considered advisable to alter the top of Meyer's apparatus in the following way:—The capillary delivery tube, instead of being fixed to the apparatus, is fused on to a small piece of tube of the same size as the narrow tube of the main apparatus, thus constituting a T; one end of this is connected with the usual form of apparatus by means of caoutchouc tubing, the other end is closed by the cork. This top piece is then held by a key in such a position that the side of the short end, instead of continuing the straight line of the apparatus, falls over the centre of its narrow tube, so that if the bottle be placed in the top of the T it cannot fall into the bulb until the key has been removed. In an experiment then, the bottle would be placed in position, the stopper put in, and when the level of the liquid in both limbs of the U was equal, the key would be removed, which, when the bottle had fallen, would be again replaced.

The two errors thus described would, in the estimation of Hn. Crafts and Meier, tend to neutralize each other; the first causing too little gas to be found in the measuring tube, and so raising the density; the second causing too much to be forced over and thus lowering the density; on this account Victor Meyer's method is not necessarily inexact, but in a question of such importance as this it was deemed advisable to get rid of every probable source of error.

The further modifications adopted have reference to the method of heating, and of measuring the temperature obtained. By holding a long platinum wire in the furnace they found that the light emitted by it was by no means uniform, and in the hope of obtaining a more even temperature they employed a Perrot furnace twice the size of that used by Victor Meyer, and whilst working at the highest temperatures, the bulb of the apparatus was surrounded by a muffle constructed from two "French" tiles (these are deeply convex tiles), which were placed mouth together, the upper one being bored, to allow of the passage of the tube of the apparatus which is here protected by an earthenware tube. Temperatures of from 500°–900° were obtained by means of a lead-bath, the cylinder being protected by a thin iron plate tube closed at one end.

An attempt to measure the temperature by gauging the amount of gas used was not successful, it being found that the amount of air passing through the furnace affected its temperature most considerably, and they could find no means of measuring even approximately the air passing in. Calorimetric estimation of temperature by means of a block of platinum was rejected, on the score of its being scarcely accurate to consider that the temperature of a block of platinum having a volume of 4·5 c.c. is the same as that of a cylinder of 100 c.c. volume. Their attention was especially directed to Meyer's estimations of temperature by this method, and they remark that the coefficient of specific heat of platinum which he used is less than that found by Hr. Violle in his latter experiments, and if this number were introduced into Meyer's formula the temperature of 1500° would be reduced by 50°, which is perhaps still too high, since Violle's experiments only determined the specific heat up to 1190°, and at temperatures nearer the point of fusion this would increase more rapidly. The same author determined the fusion point of palladium, and this temperature (1500°) must be regarded as not reached, since they satisfied themselves by several experiments that palladium is not fused in a porcelain cylinder heated in a Perrot furnace. The method of determining the temperature which they adopted was to fill the heated apparatus with dry nitrogen, allow it to attain the temperature of the furnace, and then to displace it by means of hydrogen chloride gas, which, being instantaneously absorbed by water, allows one to see when the nitrogen has been entirely displaced, an operation requiring from one to two minutes, an additional two minutes being allowed as a precautionary measure. In these determinations Meyer's method of collecting and measuring the gas was adopted. The volume of gas thus obtained represents the total contents of the apparatus at the temperature employed, but as the degree of heat in this varies as one ascends from the bulb to the top, so it was necessary to consider separately the hotter and cooler part, some experiments in which small pieces of gold and silver were suspended at different heights inside the smaller tube having shown that the covering of the furnace formed a well-defined line of different tempera-

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[*] *Ber.* 13, 813-814.

tures; the portions of the apparatus above and below this line were calibrated and a compensator tube of the same form and volume as the lower part was constructed; by this means the total volume of the apparatus, as well as that of the upper and lower part, could be obtained for any temperature, and on this basis their calculations of temperature were made. The accuracy of the method was checked by an estimation of the boiling point of sulphur. Two experiments gave the temperatures 448° and 445° at a barometric pressure of 725·45 mm. The boiling point at this pressure, according to Regnault's table, is 445°.

After thus stating the method of working which they adopted, three series of densities of iodine are given, comprising thirty-six results obtained at temperatures varying from 355° to 1300°, which show that the density slowly diminishes as the temperature increases. Another series was then made, with all possible precautions against error, and is appended together with a table of Meyer's results, as follows:—

Victor Meyer.		F. Meier and Crafts.	
Temperature.	Density.	Temperature.	Density.
253—450°	8·89; 8·83; 8·84; 8·85	445°	8·70; 8·78; 8·75
586°	8·87; 8·71; 8·71		
		677—682°	8·06; 8·58
		737—770—765°	8·05; 8·28
842°	6·68; 6·80; 6·80	831—870°	8·04; 8·11
1027°	5·75; 5·74	1039—1059—1030°	7·18; 7·02; 6·83
		1270—1280°	6·07; 5·57
1570°	5·67; 5·60; 5·71; 5·81	1390°	5·23; 5·31

The highest temperatures are most likely identical, that which they consider to be 1400° corresponding with 1570° in Meyer's table. The only source of error which they consider probable is the possible expulsion of iodine from the small bottle into the neck of the apparatus; as this would tend to raise the density, the lower numbers may be the more correct.

Their experiments show, then, that the density of iodine commences to be abnormal between 600—700°, and that it decreases as the temperature rises up to 1390°, when 0·6 of the normal density is attained. They suppose that at a higher temperature the proportion 0·5 corresponding with I_1 would be reached; in other words, that the molecule I_2 is *progressively* divided into two atoms.

Before passing to a consideration of Professor V. Meyer's reply, it will be well to notice briefly two modifications of his apparatus which have been recently described:—

I. Lothar Meyer's method of introducing the substance without an accompanying removal of the cork.*—A hole is bored through the caoutchouc stopper which closes the apparatus, and through this is passed a tube slightly longer than the stopper, having an internal bore corresponding with that of the narrow tube of the apparatus. The tube is closed at one end, and this end projects a little above the upper side of the stopper. A pointed piece of iron wire is pushed through the stopper parallel with the tube, and its lower end so bent as to form a rest for the bottle which is to be placed inside the open end of the tube already described, the upper end of the wire is then bent so as to form a lever. By means of this arrangement the substance may be allowed to fall into the cylinder after the stopper is in position by merely pushing the lever end of the wire, and thus withdrawing the support of the bottle containing it.

II. The modification suggested by Piccard† consists in the division of the apparatus into two parts, viz., a tube with one end widened to receive a cork, but otherwise of the same bore as the smaller tube of the apparatus, and the usual form of the apparatus minus the cork piece. The short tube is connected to the apparatus by a piece of caoutchouc tube at about the position where the cork piece is generally placed, and is then allowed to rest on one side at right angles with the apparatus, being protected from the warmth radiating from the furnace by a cardboard shield. In this case the bottle containing the substance is introduced into the mouth of the tube. lying on one side, the stopper is then replaced, and when everything is ready the short tube is brought into a perpendicular position, so as to cause the bottle to slide into the cylinder; it is then replaced in its former position.

In his reply to Professor Crafts, Professor V. Meyer* admits that his estimation of the highest temperature of the Perrot furnace was excessive; the reason of this he does not exactly know, but thinks it may be partially attributable to the burning of the iron cover with which the platinum block is surrounded in order to prevent as much as possible the radiation of heat during transference to the calorimeter; this burning would cause a considerable local increment of heat, which can, however, be easily avoided by using a platinum cover instead. Since, in this method of determining the temperature, the density estimation cannot be carried out at the same time, but must be separated from it by an interval of some hours, it was necessary to adopt a method by means of which the temperature obtained on one day could be again employed at another time; this consisted essentially in the use of a gas tap, to which was connected a pointer moving over a graduated arc; by means of this any previous position of the tap could be again found with great accuracy. The air draught was caused by a chimney four metres long, ending under the ceiling of the room, and therefore unaffected by wind or weather. The time of working was between ten and one o'clock in the day, as at this time the least variation in the gas pressure took place. Calorimetric estimations showed that the tap being in a given position, the temperature of the furnace was the same for the same time on different days; it varied, however, for different times on the same day.

Whilst thus stating the precautions he took, Professor Meyer points out that his temperature estimations were never more than approximate, but since it is now necessary to note the temperature and the degree of dissociation, he will undertake another series of experiments, using a method by which temperature and density can be determined at the same time. He does not agree with Professor Crafts' objection, "that the pressure which is necessary to overcome the capillary resistance of the water to the passage of a gas through it" has been overlooked; since pressure has as little influence on his method as temperature, and if it be represented by a formula, it will be neutralized in the end formula as much as temperature is, nor does he consider that Crafts' method of passing air through the apparatus is comparable with the effect produced by the volatilization of a substance in it, especially as the first case requires the addition of a set of tubes, through which a gas can only be passed by varying the pressure, and the loss of gas may be traceable to these.

Professor Crafts considered that the error produced in this way was neutralized by the introduction of cold air into the apparatus, when the substance to be experimented upon was thrown into it. If this be the case, the introduction of the substance into the apparatus by a method such as Piccard's, in which no external air can be carried down with it, ought to give results in which the gas collected is too little, and the density correspondingly too great. In order to determine whether this were the case or not, some experiments were made with mercury under these conditions, and at a temperature of 1050° (this being chosen on account of the notably great divergence of the results at this point), the densities obtained were 7·01, 6·62, 7·07, instead of 6·91; two others obtained, using Lothar Meyer's method of introduction, were 7·04, 7·03.

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* *Ber.*, 13, 991.

† *Ber.*, 13, 1079.

* *Ber.*, 13, 1103.

From these results, the conclusion drawn is that the method of working is not subject to the error hinted at, and he therefore fails to see any advantage in adopting a more complicated apparatus for his simple one.

The other source of error mentioned by Professor Crafts he does not admit, viz., that with the substance under examination, air is also introduced into the apparatus, which expanding causes the expulsion of too much gas, and the corresponding lessening of the density. He makes it a postulate that the bottle introduced into the apparatus must be completely filled with the substance, and if blank experiments are to be made, they must be made with solid cylinders instead of empty bottles; working in this way, he found in two sets of experiments that the "cork value" was 0·42, 0·38, with full flame 0·57, 0·62, the replacement of the cork in each case being preceded by the introduction of a short piece of glass rod into the apparatus; thus showing that if his precautions be adopted, his method is perfectly reliable; finally three more experiments with mercury were made at 1050°, this time opening the apparatus in each case. The numbers obtained were 7·13, 7·08, 6·86. That this method of opening and shutting is troublesome he admits, and also announces his determination to use the simple modifications which have been described, but nevertheless, the results which have already been obtained by this method are, he considers, free from the error imputed, as is shown by the above experiments with mercury, as also by the very many others he has made before, and which agree equally well with the theoretical value.

After thus making sure of his ground, the following determinations were made with iodine, in order to ascertain whether or not his former experiments were correct, the temperatures were measured in the manner adopted by Crafts:—1043° 5·76, 1065° 6·16, 1062° 5·72. A second series of control experiments was then made, in which Lothar Meyer's fall method was used, the temperature being determined before and after each experiment, 1109–1124° 5·92, 1084–1095° 5·78.

He therefore considers that although the objection raised about the temperature estimation was proved, those with regard to the density estimations were not, and that his former results have been proved by his latter ones.

Whilst making some temperature estimations and using a cylinder from which the neck had been removed, Professor Meyer noticed* that the lower part was evidently not so hot as the higher, but by raising it a little, the temperature of all parts was rendered equal, as shown by several calorimetric determinations; he also found that the pressure of gas by night is so much in excess of that at command by day, that he could without difficulty obtain a temperature at which the silicate used for connecting the tube and cylinder of the porcelain apparatus became so soft, as to be easily drawn into threads with a platinum wire. Working at this temperature he obtained the figures 4·53, 4·55, 4·57, which approach very nearly the calculated density for I_1, viz., 4·39, being considerably lower than the $\frac{2}{3}$ I_2 density, which was, as he cordially admits, first passed by Professor Crafts. Whether the lowering of density to I_1 is the limit or not remains to be proved, and the temperature necessary for this proof he hopes to obtain by means of a tar-oil furnace, lately described by Deville and Troost,† by means of which porcelain may be fused; in which case, if porcelain can no longer be used, he hopes to be able to employ graphite.

In furtherance of his work on the effect of heat on the elements, he mentions in a note* that at a yellow heat he has observed a considerable diminution of the density of arsenic.

Whilst thus following this extended series of important investigations, it is well to note some results recently obtained by Hn. Otto Pattersson and Gerhard Ekstrand,† in which Meyer's method of determining vapour densities has been compared with Dumas'. The fact that determinations of the first importance have been made by Meyer's method has given rise to very great confidence in it; and these authors do not consider it deserves this, on the following grounds. They note that although the results obtained by Meyer's method with organic substances agree fairly well with the calculated numbers, and are also fairly concordant, yet in those cases where this method has been compared with others, especially at high temperatures, the results obtained were not as concordant as could be wished. Thus, Deville and Troost, whilst estimating the density of iodine at high temperatures, obtained no evidence of dissociation; and Crafts and Meyer, working with gaseous chlorine, both found this gas to be normal at the temperatures employed.

Opportunity for comparing the Meyer and Dumas methods at temperatures of 100—214° was afforded these chemists during an investigation which they were carrying out, on the effect of small quantities of water on the gaseous state of anhydrous formic and acetic acids. Both methods were slightly modified. The alteration of Meyer's consisted merely in choosing a relative size of the cork piece and capillary delivery tube, so that on raising or depressing this in the pneumatic trough just so much water would rise into it as would be expelled by replacing the cork. The modification of Dumas' consisted in using a large test-tube, as a vessel in which to weigh the gas under consideration, which is drawn out at the open end, and a narrow tube fused on. This vessel (*a*) is then filled with pure water up to a file mark (*m*) on the narrow tube, and weighed, by which means the weight of water and the volume of *a* up to *m* is determined, and from this volume the weight of the empty vessel may be obtained. The water is then emptied out and the vessel dried and filled with perfectly dry air, by means of a capillary tube reaching to its bottom; the narrow tube is then drawn out at the point *m*, so that merely a capillary opening is left. A second tube is then prepared exactly like the first, to serve as a counterpoise, and which may conveniently be a few decigrams lighter than it. These two are then placed on opposite pans of a delicate balance and exactly counterpoised, temperature and pressure noted, and the point of the capillary tube of the counterpoise sealed off. The vessel *a* is next heated to the temperature at which the experiment is to be carried out, sealed off and again weighed. The point is then cut off and preserved; sufficient of the substance under examination introduced into *a*, which is again heated until full of the vapour alone. This heating is conveniently carried out in the bath used by Meyer. The moment when all liquid in *a* has been volatilized and the contained vapour is at the temperature of the bath is easily determined by noticing when the column of condensed vapour in the capillary tube is stationary; when this is the case, the small drop there remaining is volatilized by holding a cylinder of copper, previously heated, round the capillary tube, which is then quickly sealed off. The precaution adopted in sealing, where the bath is full of an inflammable vapour, is to cover it with a disc of metal, through a hole in the centre of which the point of the capillary tube passes.

Some comparative results obtained in this way are—

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* *Ber.*, 13, 1010.

† *Compt. Rend.*, 1880, vol. xc., p. 728.

* *Ber.* 13, 1116.

† *Ber.*, 13, 1185—1195.

Pure Benzene, calculated Density = 2·695.

In Vapour of	Temperature.	V. Meyer's Method.	Dumas' Method.
Water . . .	99·95°	I. 2·573 II. 2·662	I. 2·768 II. 2·771
Toluol. . .	111·5° 111·7°	I. 2·627 II. 2·553	I. 2·740 II. 2·718

Formic Acid.

In Vapour of	Temperature.	V. Meyer's Method.	Temperature.	Dumas' Method.
Toluol . . .	111·78° 112·5° 112·5°	2·039 1·849 1·874	111·78° 111·5°	2·379 2·387
Turpentine .	160·5° 161·0°	1·687 1·692	161·0°	1·824 1·809
Nitrobenzol .	214°	1·526 1·540 1·550	214°	1·625 1·630 1·622

Acetic Acid.

In vapour of	Temperature.	V Meyer's Method.	Temperature.	Dumas' Method.
Turpentine . .	161·2°	2·492	157·5° 160·9° 161·1°	2·747 2·640 2·620
Nitrobenzol .	214°	2·127 2·130 2·040	214°	2·29 2·17

The results in these tables, obtained by Dumas' method, agree perfectly well with those found by Bineau, Cahours, and also with those obtained by calculation from the gas theory of W. Gibbs. Meyer's method gives in each case too low a density. From this it was argued that the latter method contained some source of error.

Since every solid or liquid substance condenses air on its surface at the ordinary temperature, this amount of air on being carried into Meyer's apparatus would be either partially or entirely volatilized, according to the temperature employed. The error due to this may be considered under two divisions:—

I. Air condensation on the surface of the bottle introduced into the apparatus.—Meyer and Crafts have already pointed out that this may cause an increase in volume of more than 1 c.c., though at the temperature at which these chemists were working, 100—214°, the amount was very small, about three or four bubbles only. This difficulty may be easily overcome by fusing the glass vessel used to contain the substance under examination on to the end of a long glass rod, passing air-tight through the cork to the bottom of the apparatus; as soon as the condensed air has expanded to the volume corresponding with the temperature of the bath, the substance is set free in the cylinder by breaking the containing vessel, through the agency of the glass rod. By this means the first error may be entirely set aside; but nevertheless, the results obtained were not very different from the earlier ones, thus—

Meyer's ordinary Method.	Meyer's Method Modified.	Dumas' Method.
2·039	1·966	2·379
1·849	1·976	2·387
1·874		

II. Air condensed by the substance introduced into the apparatus must therefore be the chief source of error. This error is much less in the case of liquids than of solids, especially if the latter be in the state of powder; that in the latter case it is a very important factor was shown by introducing a small tube containing dry ferric oxide into the apparatus, heated to 185°, when 1·2 c.c. of gas was disengaged. Dry platinous chloride, which had been well washed, and afterwards dried for several days at a temperature of 230°, gave the following results:—

Bottle 0·1693 grm. } disengaged at 214°, 0·96 c.c. air.
$PtCl_2$ 0·1441 „ }
Bottle 0·1454 „ }
$PtCl_2$ 0·1194 „ } „ „ „ 0·73 „ „

The empty glass bottles introduced into the apparatus disengaged 2-3 bubbles, equivalent to 0·1-0·15 c.c. air.

This error would become of great importance at the high temperature employed by Victor Meyer, when from 13–25 c.c. air were collected in the measuring tube. Since Dumas's method is not subject to it, as all the air would be driven out from the flask by the process of volatilization, the authors conclude that if numbers which have been obtained by this method are to be altered in accordance with those found by Meyer's, it will mean that a method free from error is to be supplanted by one less correct.

Dr. Senier said that he took a great interest in the subject which Mr. Hutchinson had placed before them with even more than his usual ability. There were two points to which he would allude. In the first place, he would direct attention to a source of error to which Mr. Hutchinson had not adverted, and indeed he did not know that notice had been taken of it hitherto. Although the vapour density vessel and its contained air attained a constant condition of temperature before the substance was introduced, that temperature was not a uniform one. The upper parts of the vessel, and especially the delivery tube, were much cooler than the bulbous lower portion. When the substance was introduced the gas which resulted forced out of the apparatus an equal bulk of air, and the first air to escape was the cooler air from the upper parts of the vessel. This was replaced with hotter air from the lower parts of the vessel. Thus the collected air had not precisely the same temperature of the equal volume of gas. It was slightly cooler, and would therefore represent a somewhat larger volume when compared with the vapour at the same temperature. This would make the density obtained a trifle less than it should be. The other point to which he wished to allude was the question of the interpretation of the results obtained by Meyer, Crafts, and others. He was not, of course, prepared to say that it might not be shown that dissociation had taken place, whether that meant dissociation into other elements, or into lighter molecules of the same element. He thought, however, that scarcely sufficient attention had been bestowed upon the assumptions which led to theories of dissociation. It was assumed that gases which increased equally with equal reduction of pressure or equal increase of temperature contained the same number of molecules, and that these molecules were to each other in weight as were the weights of the gases themselves. This assumption was innocent enough when all gases were supposed to be affected by heat and pressure in the manner described. Cases were observed amongst compounds where this did not obtain, and it was attributed, and doubtless with good reason in some of the instances, to dissociation into simpler compounds, and now we are told that in the case of several elements this unequal expansion occurs, and this too is attributed to dissociation. He would suggest that the meaning of these facts be sought in another direction, that inasmuch as the general facts respecting the action of heat and pressure on gases had been found to have exceptions in so many instances the assumptions based upon them by Avogadro be seriously reconsidered.

SOCIETY OF ARTS.

The Chemistry of Bread-Making.*

BY PROFESSOR GRAHAM, D.SC.

Lecture IV.

(*Continued from page* 59.)

The dust of the air contains organisms of various kinds; thus, in a short time, a piece of moist bread becomes covered with mould; our boots, if put away in a damp place, become covered with mould, and these moulds consist of different organisms, readily enough distinguished from each other, and to which different names have been given. One is the *Penicillium glaucum*, another *Aspergillus*, and others are different species of *Mucor*. These all convert starch into carbonic acid and water, providing they are growing in the air; but if you submerge them in a saccharine liquid, they no longer can breathe the oxygen of the atmosphere by which they were able to convert starch into carbonic acid and water; they are deprived of their oxygen, or, at any rate, in a very short time the amount of dissolved air in the saccharine liquid is used up by them, and the result is that they are compelled to obtain their oxygen from the decomposition of the sugar itself. In getting oxygen from the decomposition of the sugar, they convert the remaining portion of it into carbonic acid and alcohol.

The ordinary mother of beer, called by scientific men *Mycoderma cerevisiæ*, the organism that converts beer into carbonic acid and water, if submerged in a fresh solution of barley malt, sets up a slow alcoholic fermentation, with the production of carbonic acid and alcohol. And so with other cell-structures; not only is this the case with organisms such as I am speaking of, but even the cells of sprouted barley, or of sprouted wheat, or the cells of an apple, act in the same way. If you were to take a sample of sprouted barley, and put that into a bottle, after a week you would find, on opening the stopper, a great rush of carbonic acid, with a strong aroma of alcohol, together with some ethers. The same takes place with fruits undergoing spontaneous decomposition. There is a difference, however, between the action of the cells of vegetable organisms and the yeast cells, such as I have called your attention to this evening, in that they are not able to reproduce; they do not increase; on the contrary, they die, and, therefore, the amount of alcoholic fermentation produced by the cells of the sprouted barley, or the cells of fruits, is comparatively limited.

The conditions requisite for the vigorous action of yeast, and the vigorous growth of yeast, are these:—First of all, a certain amount of air is required. I said just now that the organism was compelled to obtain its oxygen from the decomposition of the sugar; but, if you deal with an organism you have submerged under these conditions, the amount of alcohol produced is certainly great compared with the ratio of its weight to the whole weight of the yeast produced, but the amount of work absolutely done is comparatively small; whereas, by the aeration, to some extent, of the liquid, or by the employment of organisms that have previously been exposed to the air, there is a much greater activity.

The next matter of importance for their vigour is the presence of soluble albuminoids. True it is, of course, that Pasteur has shown that the yeast organism is able to attack ammoniacal salts, and to convert them into the protein compounds of its own structure. That is quite correct; but I am speaking rather from the technical point of view, and in that point of view the presence of albuminoids is necessary to active fermentation, whether of beer or bread.

The next essential is the presence of sugars. There must be sugars present in order to undergo decomposition, producing carbonic acid and alcohol, and also to enable the yeast organisms, as they are multiplying, to build up new cell structures by the cellulose formed from the decomposition of the sugar. Nine-tenths of the weight of ordinary yeast, when well dried, consists of albuminoid substances, the other tenth being matters derived from the sugar.

We have seen that dust contains the spores of many organisms, and it becomes necessary, when using ferments—obtained from beer, for example—for the baker that he should see whether the yeast which he has got contains the particular alcoholic organism which he wants, or whether it contains a large number of other organisms that produce acidity—produce, in other words, decomposition of a kind unfavourable to his bread-making process. I have here, on the wall, diagrams representing ordinary English brewers' yeast, the cells of which are circular in character; there is Burton yeast, which is ovoid in character; another one represents ordinary yeast which has remained for a considerable time in a liquid after the fermentation has been completed. Such an exhausted liquid is unfit, of course, for the continual growth and propagation of the organisms, and you will notice that the organisms show distinct granulations; these granulations may be noticed in young active yeast cells, but less distinctly than in the old exhausted cells, in which the protoplasm has been used up in the struggle for existence.

I am afraid some of you at a distance cannot see very distinctly in these diagrams the characteristics of the different organisms, but I have placed on the table more than a dozen preparations, which you can examine with the microscope, showing the different appearance of the organisms which produce healthy alcoholic fermentation and also those producing the lactic, acetic, butyric, and ropy fermentations.

Under ordinary circumstances, the yeast ferment converts 100 parts of sugar into 51 parts of alcohol and 49 parts of carbonic acid and 5 parts of glycerine, succinic acid and other products. The ropy organism converts 100 parts of sugar into 51 parts of a peculiar viscous, gummy body, called mannite, 45 of gum, and 6 of carbonic acid. This ropy organism, then, converts saccharine liquids into a thick, oily, viscous mass, and occasionally it happens with a brewer, in the preparation of beer, that a beer which was previously perfectly bright and limpid, pours out as if it were almost like treacle; and, if such diseased kind of yeast be given to a baker, he must expect a similar kind of unfavourable action on the saccharine matter he has made in his previous panification process.

If you take one of these peculiar organisms of mould, the mucors, and submerge it in a saccharine liquid, it begins to form separate cells; ultimately, they break up, and they all act much in the same way, though not quite with the same energy, as the ordinary English brewers' yeast. I have not got a representation on the wall of German yeast, but it much resembles the Burton, being ovoid in character. You will see an example under one of the microscopes.

London bakers, I am told, find that yeast from certain breweries is much superior to yeast obtained from others. Indeed, I learn that many of them are obliged to go out of London to the more old-fashioned breweries in order to get the kind of yeast they require. This is probably due to the fact, that in the older breweries a different method of fermentation is carried on; the cleansing system, as it is technically termed, is adopted, and not the skimming system; but, with the skimming system carried on carefully with the microscope, one can obtain as pure yeast as by what is called "cleansing," where the fermentation is begun and carried on in large vessels down to a certain stage, about one-half, and then it is placed in smaller vessels, and there the fermentation is continued by the yeast forcing its way through the bung-hole. In Burton, they use a combination of the small vessels, termed unions. Bitter ale yeast is not so well adapted for bread-making as mild ale yeast; for this reason, that a large quantity of hop has been employed in the process, and the tannic acid in the hop, together with the oil, are inimical to the activity of the yeast. Consequently, the yeast obtained from very highly hopped ales is not so well adapted for the baker as that obtained from less hopped ales.

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* Cantor Lectures: Delivered November and December, 1879. Reprinted from the *Journal of the Society of Arts.*

I spoke just now of the patent yeast, and it is somewhat singular to find that hops are always used in its production. Indeed, I have been told by more than one, that, if we were not to use hops in dealing with malt, it would be impossible to get any yeast formed, and that if we were to add yeast to an infusion of malt prepared without hops, we could not get yeast formed. Of course, this is erroneous. It is not much more than three centuries ago that hops were first introduced into England. Old English ale was not made with hops. The use of hops is to aid the keeping qualities of the yeast, by preventing too rapid decay.

German yeast is largely used in England now. It is not a yeast which comes up to the surface of the beer, in the same way as ours; on the contrary, it is a yeast which settles to the bottom, and, therefore, that form of fermentation is called "bottom fermentation;" whereas ours is called "top fermentation;" but, in their chemical action there is no essential difference between them. In each case they convert saccharine matter into carbonic acid and alcohol, and in the same ratios. On reference to the Board of Trade returns, I find that in the year 1876 we imported £406,000 worth of yeast from foreign countries; in 1877, £437,000, and in 1878, £468,000; so, apparently, the traffic is slowly increasing. When I tell you that in many parts of England brewers' yeast is a drug, and that there is not sufficient demand for it, it does seem that we ought to find some means of making English top yeast into a useful servant to the baker, instead of wasting it, and having to purchase other yeast from Germany. It is perfectly easy, with English top yeast, to secure, on the one hand, that it shall be a quick-growing, active yeast, like the German; or, on the other hand, that it shall be slow in its action, such as ordinary brewers' yeast.

Good flour and good yeast, in the hands of a good baker, will, of course, give us good bread. But, after all, when the Council of the Society of Arts did me the honour to ask me to give a course of lectures on the chemistry of bread-making, they were not limiting their thoughts to the West-end of London. A Society like ours thinks not merely of the West-end of London, but of all England; and we have to consider, as I have more than once pointed out, that we have, unfortunately too often, bad harvests, and, therefore, bad flours. Then, again, there are many bakers in country places, and, perhaps, one need not go so very far away to find those who certainly require some extra assistance in understanding the very complex phenomena underlying their art. I called your attention to the fact, you will remember, that, in our bad harvests, the peculiarity of our wheats was not that there was any deficiency in the total percentage of albuminoids, but that there was a less percentage of the tough, elastic, valuable bread-making gluten; and I then said that something might be done by a partial kiln-drying of the wheat, and by so drying the flour afterwards that it should not be ready to undergo the degradation due to moisture which often occurs.

Composition of Barley and Malt. (*Oudemans.*)

	Barley.	Malt.		
	Air Dried.	Air Dried.	Kiln Dried.	Kiln Dried.
			Pale.	High.
Starch	67·0	58·1	58·6	47·6
Dextrin	5·6	8·0	6·6	10·2
Sugar	0·0	0·5	0·7	0·9
Cellulose	9·6	14·4	10·8	11·5
Albuminous matters . .	12·1	13·6	10·4	10·5
Fatty matters	2·6	2·2	2·4	2·6
Ash, etc.	3·1	3·3	2·7	2·7
Torrefaction products .	0·0	0·0	7·8	14·0

In the process of fermentation, which I have briefly described to you, we have seen that, in the sponge stage, a considerable quantity of the flour is left to undergo the degrading action set up by the yeast on the soluble albuminoids already there; manifestly, then, inferior flours should not be submitted to such a panification process, for two reasons. In the first place, there is a want of the proper elastic matter in the bread; secondly, a large amount of colouring matters is obtained in the fermentation. If you will refer to this table of Oudemans showing the action of a high temperature on the albuminoids of wheat, you will find that when malt undergoes a kiln-drying action, which is at a temperature certainly lower than that of the oven, there are 7·8 per cent. of torrefaction products. These are formed, to a great extent, from the destruction of the albuminous matters; they are also partly formed by the action of heat on the saccharine matters. At a still higher temperature, in what is called "high dried" malt, we have no less than 14 per cent. of torrefaction products, but these coloured products are almost entirely due to the action of heat on the degraded forms of albuminoid matters, and on the dextrin and maltose formed. Manifestly, therefore, the inferior wheats should not be submitted to the panification process. That was the conclusion come to some years ago by Dr. Dauglish, and he devised a system by which one may employ inferior wheats by using carbonic acid made in other ways, and not by the action of the yeast-organism upon the flour. Of course, tastes differ. I do not know how many of you like aerated bread, but personally I do not like it. There is a want, to my taste, of that nice sweet flavour one gets by the fermentation process. Those who like aerated bread have certainly an excellent means of using inferior flours; but for those who wish to have the peculiar aroma which is brought about by fermentation, the problem presents itself, how shall we have carbonic acid manufactured in the ordinary fermentation process, and yet not obtain the highly coloured products which are formed when we carry on that process with inferior flours?

It seems to me that we can get over the difficulty by not allowing these inferior flours to be submitted to the action of the albuminoids of yeast, and, therefore, that in our preparation of the ferment we should use the best potatoes and the best flour. I did suggest that it was worth while to try the effect of using the sugar called dextrose in conjunction with potato, and one might also suggest that the potato-starch which comes so largely from America and elsewhere, and which can be bought at 21*s.* per cwt., might be used along with or in place of potatoes. But, in the second stage, I think the important change to make is this: that we should use, for what is called by the baker the sponge stage of the fermentation, where it remains eight hours, a quarter of the flour, and not allow the flour of the sponge to be inferior, so as to undergo this very serious degradation by which an unpleasant form of bread is obtained, and high colour. It seems to me, that in this stage one ought to use flour made from well-matured wheats, and that when we come to the comparatively inert stage, which only lasts for a short time, and in the presence of a comparatively small ratio of water, that then we should make use of our inferior flours, if we are so unfortunate as to have them. I sugest this as a method by which we may improve, not merely the appearance of the bread, but also its digestibility, because a heavy, sodden bread is not the kind of bread that lends itself readily to the subsequent stages of fermentation, which I shall have to draw your attention to.

(*To be continued.*)

Correspondence.

. *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

ACONITINE.

Sir,—I most cordially agree with your remarks in a recent issue of the *Pharmaceutical Journal* that a considerable amount of work is yet requisite before the question of the economical production of aconitine is definitely settled; but I wish to point out that the questions now remaining to be solved are essentially of a pharmaceutical and manufacturing nature, and as such somewhat out of the province of the scientific chemical investigator; these questions being simply the determination of the circumstances (as to soil, climate, age of plant, etc.), which influence the relative proportions between the crystallizable aconitine and the non-crystalline bases naturally accompanying it, so that the kind of plants most suitable for the extraction of the alkaloid may be known; and the elaboration of the best method of separating the crystallizable from the amorphous substances on the large scale.

During the last decade the amorphous alkaloidal mixtures obtained from various species of aconites by Von Planta, Geiger and Hesse, Hübschmann and others have been shown by the experiments of T. B. Groves, Duquesnel, Paul and Kingzett, and more especially of the writer and his successive collaborateurs Beckett, Luff and Menke, to be made up of crystallizable alkaloids, products of the decomposition of these bodies during isolation, and amorphous alkaloids naturally contained. The crystallizable bases have been isolated and carefully studied as to their reactions, chemical decompositions, and constitutional relationships to one another, to other alkaloids, and to organic bodies generally. The term "aconitine," or "*aconitine crystallisée,*" was restricted by Duquesnel, now nearly ten years ago, to the crystallizable alkaloid isolated by him from *A. Napellus*. The examination of several different samples of napellus roots by T. B. Groves and by the writer subsequently has shown, firstly, that in every case tried a certain amount (by no means invariable) of the alkaloidal bodies present could be obtained in the crystalline form by appropriate methods; and secondly, which is highly important, that in every case the crystallized base thus obtained was the same single well-defined alkaloid, as characteristic of *A. Napellus* as nicotine is of tobacco or conine of hemlock; whilst the further examinations of other species of aconite roots has shown the existence of other equally definite crystallizable alkaloids, each of which is apparently characteristic of its own respective species.

The questions as to how far these other crystallizable alkaloids are analogous to "aconitine" (*i.e.*, the crystallizable base of *A. Napellus*) in physiological action, and consequently how far they can be substituted for aconitine in medical practice, is evidently beyond the province of the chemical investigator, just as it is outside that of the pharmacist; on the other hand the latter is clearly the most appropriate person to grapple with the purely pharmaceutical problems as to what soils, climates and ages of plants furnish the most crystallizable base, and what are the exact details of manipulation which will enable the largest percentage of crystallizable base to be isolated in manufacture on the large scale.

As far as I personally am concerned, I have during the last few years derived much pleasure and satisfaction in applying with some measure of success the various grants entrusted to me by the Pharmaceutical Conference for the purpose of defraying the working expenses of investigations on the general chemistry of the aconite alkaloids; but now that I have succeeded to some considerable extent in elucidating the more purely chemical relationships of these bodies to one another, and to other organic bodies, and in preparing the way for the skilled pharmaceutical chemist to olve the problems connected with economy in manufac- e (which as you justly point out yet require some iderable amount of labour), I feel that my share in the k as a scientific chemist is about accomplished; and ac- ingly am desirous of resigning the further prosecution ese pharmaceutical details into the hands of whatever manufacturing firm may be enterprising enough to take up the preparations of the crystallized alkaloid, for which, I am assured by Dr. Rice, a very considerable sale in America alone can be guaranteed, even though the price should be reckoned by shillings per grain. The only reason why American manufacturing pharmacists have not already taken the matter up for themselves is, as I understand, the difficulty in obtaining large enough supplies of the plant. Had it been otherwise it would not at this epoch have been still possible for British pharmacists to secure for this country whatever honour and profit there may accrue from the application to commercial pharmacy of the scientific knowledge gained by the expenditure of the funds of the British Pharmaceutical Conference in investigations into the chemistry of the aconite alkaloids.

Chemical Laboratory, C. R. ALDER WRIGHT.
St. Mary's Hospital, W.

ASSISTANTS IN THE SOUTH OF FRANCE.

Sir,—The gradually increasing number of English assistants engaged every year in the south induces me to caution intending candidates against accepting engagements without some reliable information as to the situations they are taking. In general, these are very comfortable; there is more liberty than in England, and some of the governors are notoriously liberal in every respect to those they employ; but on the other hand, there are several whose treatment of their assistants is simply abominable, who break all promises and engagements, as readily as they make them, and against such, an Englishman has practically no appeal. There is one man, in ——, who appears to make this a point of honour, as he does it, more or less, every season, however good his assistant, and though much to his prejudice; and so well is this known that no one who has been on the continent would think of accepting his plausible explanations and liberal offers. The wholesale houses offer no guarantee; they are simply commissioned to get, amongst other items, an assistant for the season, and though they may know how previous assistants have been treated, their interests oblige them to ignore it.

A lengthened stay in the south has shown me what the different situations are worth, and I shall be happy to advise gentlemen having accepted or intending to accept engagements, and who are unable to get confidential information elsewhere.

It will be needless for me to note that this caution does not apply to English governors, who may always be treated with in full confidence.

Pharmacie Hogg, H. BOUTELL.
2, *Rue Castiglione, Paris.*

THE BUOTT FUND.

Sir,—Be so good as to grant me space to acknowledge several generous donations in answer to my appeal on behalf of old Mr. Cyrus Buott.

I regret the space I require is not as large as that which I expected would be necessary. It would, indeed, be most ungracious if I were to comment upon the response I have obtained. Yet there appears no haven left open for this old gentleman, if timely and sufficient aid be not given, but the one most dreaded by every honest person, whose spirit of independence is not entirely crushed.

It is difficult perhaps to fairly weigh the real claim Mr. Buott has upon the trade, as there are different views taken upon the kind of influence the society he represented had upon the pharmaceutical legislation of 1868. I shall not attempt to measure the extent of his claim. It has been felt to be sufficient to know that he is very old and in distress. With this feeling, I unite with those who have kindly sent their gifts, and I ask with them for still further help. I feel assured there are many more who will willingly add to the sum already obtained.

205, *St. John Street Road, E.C.* ROBT. HAMPSON.

T. A. Ancell.—We are not aware of the publication you refer to.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. R. G. Gould, B.T., J.B., A. E. Lomax, J. Sadler, A. J. Heald, W. Hooper, W. Stewart, F. A. Barritt, J. Morrison, J. J. Browell, W.J.B., Vis, West-end, Fraxinus, F. Taylor, G. C. Druce, R. H. Parker, G. Venables, Houghton, Mifflin and Co., J. F. Edwards, R.L.G., W. B. Darroll, Pilula.

JAPANESE ACONITE.*

BY D. V. WASOWICZ.

As supplementary to my paper on Aconite,† I may be allowed to make some mention of another kind of aconite root, coming from Japan. From a botanical point of view the term "Japanese aconite" includes markedly different kinds, viz.: (*a*) *Aconitum Japonicum*, Hortul., and (*b*) *Aconitum Japonicum*, Thunb. The first kind is considered by Seringe to be a variety of *Aconitum variegatum*, Linn. (*A. variegatum diffusum*, as well as *A. glabrum*, D.C.). Siebold,‡ on the contrary, mentions it as synonymous with his *A. Chinense*, Sieb. (*A. Napellus*, L.).§ Miquel refers it, and also Siebold's *A. Chinense* (called in Japanese language "tori-rapta") to *A. Fischeri*, Reichb., and says literally, "A botanicis indigenis, nec non a Siebold, Buerger, Textor, Mohnike lecta exemplaria satis diversiformia, huc tamen, ni fallor, omnia ducenda."‖ Reichenbach¶ found this variety among the specimens brought by Pallas from Kamtschatka, and classes it under the *Uchylodea* in transition to the *Cammaroidea*, but does not give the characters of the root.

The second kind, the *Aconitum Japonicum*, Thunb., is considered by Reichenbach to be probably *A. uncinatum*, L., cultivated in Japan, upon the basis of a description and drawing obtained from the former, which drawing is reproduced in his work with Thunberg's autograph. At the same time, Siebold, as well as Miquel (according to whom this kind is called "reisinsoo" by the Japanese), refer it to *A. lycoctynum*, L., var. *β floribus ochroleucis*. More recently Holmes thinks he has proved that in Japan there are only three varieties of aconite, *Aconitum Fischeri*, Reichb., *A. uncinatum*, L., and *A. Lycoctynum*, L. In the Chinese bazaars two apparently different roots are met with, under the name of "Japanese aconite." One of them is described by Tartarinov,** and this description agrees with that of Hanbury relating to the root named "chuen-woo," as belonging to an unknown variety of aconite. The accompanying descriptive drawings, fig. 1, are copied from Hanbury's book.††

"*Chuen-woo*; Root of ? *Aconitum* sp. (*Ranunculaceæ*).—Conical or top-shaped tuberous roots (fig. 1), about 1½ inch in length, covered with a blackish-brown cuticle; internally they are white and amylaceous. They taste slightly bitter and leave a persistent sensation of numbness and tingling on the tongue with some acridity in the throat.

Ground to powder and mixed with an equal quantity of the root *Tsaou-woo* (next described) and of the flowers *Naou-yang-hwa*, also in powder, a compound is obtained which is reputed to produce local anæsthesia. This powder, moistened, is to be applied to the surface of the part to be operated upon for two hours previous to the operation, by which means, it is alleged, insensibility to pain will be produced."

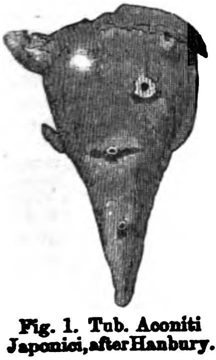

Fig. 1. Tub. Aconiti Japonici, after Hanbury.

The second root described by Tartarinov, and named by the Chinese "cao-wu-tu," is called by Hanbury "tsaou," and he regards it, on the authority of Hofmann and Schultes, as the root of *Aconitum Japonicum*, Thunb. Von Schroff, jun., and even Hanbury, doubt the correctness of this derivation, for the latter says in the next following passage that it is highly probable that the Chinese name is not restricted to a single species. This root has within the past year been examined in regard to its chemical composition by Paul and Kingzett, and Professor Flückiger obtained from them a quantity of the drug. Professor Flückiger was good enough to hand over to me the greater part of his supply, which presented the following characters. The roots resembled Hanbury's drawings so completely that it appeared almost unnecessary to make fresh drawings, though I have done this for the sake of completeness.

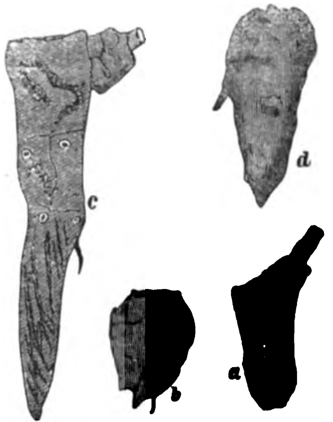

Fig. 2. Tub. Aconiti Japonici Tsaou-woo, natural size.

The roots are chiefly elongated radish-shaped and less frequently ovoid tubers, almost always flattened at the top and presenting distinct remains of lateral stalks. At the lower extremities they are generally conical, but some are round, and a few of them are pointed. They are irregularly and scantily furnished with a few lateral roots, or only with the scars of these. Externally they are greyish-brown, almost blackish, with numerous longitudinal wrinkles and comparatively many transverse wrinkles, so that the surface of some pieces appears divided into irregular quadrangular spaces. They measure from 1·5 to 5·2 centimetres in length, and have a maximum diameter of 9 millimetres to 1·4 centimetre and they weigh from 0·5 to 3·53 grams. The weight of most of the tubers varies from 1·2 to 2·8 grams.

The fracture is granular. The roots are internally of a white colour and quite free from smell. The taste is at first farinaceous, with a sweetish bitterness, and soon after burning, acrid and irritating. Digested with hot water, or macerated for some hours in cold water, the tubers swell up slightly and after perfect drying they again become hard and brittle, but not horny. The water in which they have been macerated presents a dark yellow colour and has a persistent bitter taste.

A transverse section is quite white and under the microscope it appears as a uniform tissue, intersected by eight to sixteen somewhat yellowish coloured circularly placed bundles of vessels, which enclose a proportionally large pith. Concentrated sulphuric acid colours the section pale reddish, but only after long continued action. Solution of iodine in iodide of potassium produces at first a deep blue colour that soon becomes black. Perchloride of iron produces no effect at first; subsequently it gives rise to a greyish coloration. Millon's reagent produces a very slight greyish coloration, that soon passes into distinct yellow, and an alkaline solution of cupric tartrate indicates only an extremely small quantity of protein substances.

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* From the *Archiv d. Pharmacie*, vol. xiv., p. 217.

† See before, pp. 301, 341, 463.

‡ Siebold et Zuccharini, 'Floræ Japonicæ,' vol. i., part 2, pp. 183, 184.

§ Thunberg, 'Flora Japonica,' 1784, p. 231.

‖ 'Prol. Floræ Japonicæ,' Amsterdam.

¶ 'Illust. Spec. Aconit. Gen.,' Leipsig, 1823, 27.

** 'Catalog. Med. Sinens.,' p. 5.

†† 'Science Papers,' p. 258.

Under the microscope the outer rind of the root appears to be formed of five to seven rows of crowded roundish and tabular cells of a light brownish colour. After this follows a layer consisting of from four to ten rows of extended and equal-sized collenchymatic cells only slightly thickened, and with proportionally very many stone cells imbedded in them. The next layer is prominent and consists of rounded slightly thickened parenchymatous polyhedric cells, which are not yellow coloured as in *Aconitum heterophyllum*. Next to this follows the principal tissue, composed of several rows of extended cells, which are more rounded and gradually more contracted towards the centre, and about the vascular bundles have the smallest diameter. These are also parenchymatous cells. In this tissue there are circularly distributed vascular bundles to the number of eight to sixteen, which consist of from five to eight vessels grouped together in rows. These latter are almost always spiral, very seldom scalariform-thickened and their walls are yellow coloured. The pith enclosed by these bundles also consist of rounded polyhedric cells, with scarcely any intercellular spaces between them and exceeding three or four times in size the cells of the principal tissue. The form of this central tissue is generally regularly rounded, but here and there, though seldom, and only in the upper part, is elliptic. The normal aspect of such a transverse section is represented by fig. 3.

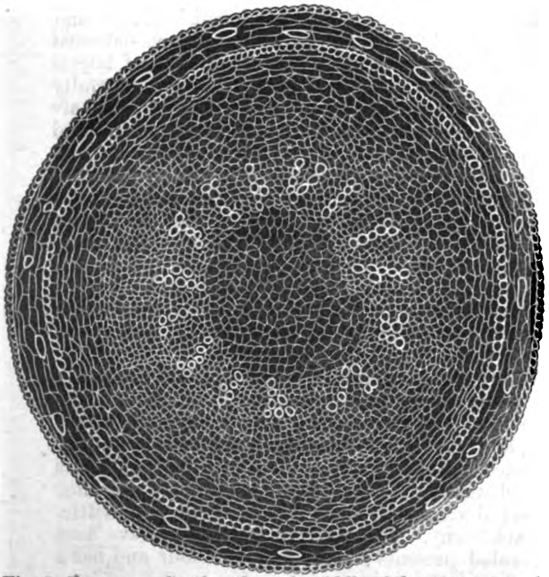

Fig. 3. Transverse Section through middle of the root—strongly magnified.

The longitudinal section, fig. 4, distinctly shows that the several vessels of the stalk cicatrix extend separately to the end of the root, and do not anastomose, though they are often bent and curved. The lateral roots, to judge from the remains of them, scarcely differ from the principal roots, except that in them the stone cells are very scantily distributed. The contents of all the parenchymatous cells consist of single minute and perfectly round starch granules, which are frequently grouped together in small lumps, less frequently separate, and then rather larger, and still less frequently in compound granules, which are never composed of more than two members. See fig. 5.

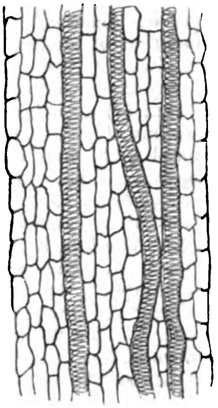

Fig. 4. Longitudinal Section—strongly magnified.

Fig. 5. Starch Granules.

The root dried at 100° C., yielded 2·799 per cent. of ash. This was not completely soluble in water or in hydrochloric acid. The aqueous solution was very alkaline. The ash was found to consist of Fe, Al, Mg, Ca, Ka and traces of Na, combined with H_2SO_4,H_3PO_4, and H_2SiO_3,HCl.

Paul and Kingzett obtained from this root, according to the process of Duquesnel, besides true aconitine, in the form of a crystallizable salt, possibly aconitate of aconitine; also another and hitherto unknown alkaloid, having the formula $C_{29}H_{43}NO_9$, with which no crystallizable salt could be prepared.

In operating upon this root it was found to be very acrid, producing numbness of the hands and lips, from which it was supposed that its was not inferior in activity to the root of *Aconitum ferox*.

Hanbury states that these roots are used with *chuen-woo* to produce insensibility to pain in surgical operations. According to Christison they form also the principal constituent of an extract for poisoning arrows.* According to Von Schroff, jun., it is an amusement in China to place unexpectedly on the tongue the pure extract of *tsaou-woo*. He was unable, however, to recognize in it a higher degree of acridity than in *Aconitum Napellus*. As to the dried root I am able to confirm that. .

In order to determine the position occupied by this root in a physiological relation, as compared with the other poisonous aconite roots, such as *A. Napellus*, *A. ferox*, and the roots of Japan aconite, *chuan-woo*, described by Von Schroff, jun., I prepared from the remainder of my supply, by Schroff's method, an alcoholic extract, according to the directions of the Austrian Pharmacopœia. I obtained from 35·7 grams of root, 2·78 grams of extract of a proper consistence. This gave a clear solution in dilute alcohol of a brownish colour. The watery solution was not clear and of a dirty brown colour. The solutions were unusually bitter, and much more acrid than a solution of the extract of *A. Napellus*. 0·75 gram of this extract, dissolved in alcohol, killed a rabbit, weighing 1712 grams, in the course of thirteen hours and three quarters; and 5·2 grams dissolved in water killed a rabbit, weighing 1547 grams, in sixteen hours and a half. The *post-mortem* examination next morning did not give any particular result beyond the appearances that are usually observed in cases of poisoning by aconite.

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* *Edinburgh Medical Journal*, April, 1859, p. 69.

This result compared with the observations of Von Schroff, jun., of the actions of the above-mentioned three varieties of aconite shows that the *tsaou-woo* root almost exceeds in poisonous effects the *chuan-woo*, and that both of them are equally to be ascribed to *Aconitum ferox*. This demonstrated prominent poisonous character of the root is opposed to the assumption of Hofmann and Schultz, especially in case the *Aconitum japonicum*, Thunb., should really be referred, as Siebold and Miquel affirm, to *A. lycoctonum*, var. *β floribus ochroleucis*.

PHOSPHORIC ACID.*

BY J. U. LLOYD.

In 1858 Mr. Wm. S. Thompson suggested the employment of a formula, at that time in use by Mr. George Andrews, to wit:—Mix 54 fluid ounces of nitric acid with 26 fluid ounces of water and add 4 troy ounces of phosphorus, place in a porcelain dish over which is to be inverted another dish, and heat gently until the phosphorus disappears, and afterwards, until the nitric acid is driven off. This process was subsequently adopted by the U. S. P. (1860) in its essential points, but instead of an inverted dish a glass funnel was substituted, the rim of which rested just above the liquid. Professor Diehl called attention to the defect of this arrangement in 1867, stating that the funnels often broke, and he recommended a return to the first form of apparatus for making phosphoric acid, a glass retort. This I feel is desirable. When the air within the funnel becomes warm, it rises and passes through the exit. The place is supplied with fresh air which enters between the dish and the funnel and just over the surface of the liquid, becomes heated, and in turn escapes at the top. Thus a constant flow of fresh air is the result, entering between the dish and the funnel, passing over the solution escaping at the exit of the funnel. A more perfect and simple apparatus for producing a flow of air in the manner designated, according to the laws of nature, could scarcely have been designed, and from the fact that it does this, it is objectionable, the effect being as follows:—

When the heat is applied to the dish which contains the diluted nitric acid and the phosphorus, the phosphorus melts, and as the bubbles of gas escape which are the result of the reaction they carry small globules of phosphorus to the surface of the liquid. Immediately these inflame and the phosphorus pentoxide escapes with the air from the exit of the funnel. As the liquid decreases in bulk from evaporation and its specific gravity increases, the phosphorus rises easier and more abundantly and the combustion progresses more rapidly. This increases the heat within the funnel and strengthens the draft, particles of burning phosphorus are thrown upon the funnel, and the intense heat produces its destruction. Thus it will be seen that, even though the heat of a water-bath be employed, or an expanded steam-bath, a very large amount of phosphorus is lost, considerable danger incurred, and an acid is produced which is deficient in strength. To an extent this trouble may be overcome by employing a funnel the exit of which is closed with a stopper, or better, by placing a plate of glass over the top of the dish and dispensing with the funnel. Neither of the foregoing is equal to the glass retort, however, in the estimation of the writer, and yet with this a few precautions are necessary in a practical way.

When heat is applied to the retort, the phosphorus melts, and, as before stated, small globules of it are carried to the surface. There meeting with oxygen they burn until the oxygen within the retort is consumed. These small burning globules of phosphorus often float to the side and thus break the retort at the very commencement of the process. To obviate this trouble it has been my custom to pass carbon dioxide into the retort and displace the atmosphere before applying heat. If a two gallon retort be employed, and 6¼ oz. avoirdupois of phosphorus, 48 oz. avoirdupois of nitric acid, and 64 fluid oz. of water, the heat of an expanded steam (or water) bath applied sixty hours will dissolve the phosphorus. There will be no loss of phosphorus by combustion. The temperature of the liquid during the reaction will range about 208° or 210° F. The retort should be connected with a condenser and the distillate collected. This will contain about 10 per cent. of nitric acid and may be employed in subsequent operations instead of water for the purpose of mixing with the nitric acid. The process of the Pharmacopœia from this point seems very simple, "continue the heat until the excess of nitric acid is driven off, and a syrupy liquid, free from odour, and weighing two ounces, remains." This in practice, according to my experience, is more difficult than dissolving the phosphorus. It requires a very high heat to drive off the nitric acid, a heat often sufficient to produce both meta- and pyrophosphoric acids.

To overcome this trouble, I make the following suggestion. Evaporate the liquid within the retort until it is reduced to the measure of sixteen fluid ounces, then remove the heat, cool until reduced to the temperature of 130° F., and add deodorized alcohol as much by measure as there is of the solution. Then evaporate on a water-bath until reduced to sixteen fluid ounces. Nitrous ether will be evolved, and when the reaction has ceased it will be found that the bulk of the nitric acid will have disappeared. In case it is still present in appreciable amount (?), again add sixteen fluid ounces of deodorized alcohol and warm until the alcohol is evaporated and the temperature reaches 200° F. and all odour of nitrous ether has passed away. Lastly, add of distilled water a sufficient amount to bring the solution to the required gravity or q. s. to make 160 fluid ounces.

It will be found in practice that if the alcohol is impure the acid will be discoloured. A little purified animal charcoal will decolorize it in this case.

Acidum Phosphoricum Dilutum (*Diluted Phosphoric Acid*).

Take of

Phosphorus, three parts	3.
Nitric Acid, twenty-five parts	25.
Alcohol, eight parts	8.
Purified Animal Charcoal, one-fourth part	¼.
Distilled Water	q.s.

Mix the nitric acid with forty-eight (48) parts of distilled water, and pour the mixture into a tubulated and stoppered glass-retort capable of holding twice the amount. Then add the phosphorus and pass carbon dioxide into the retort until the air is displaced. Now connect the exit of the retort with a condenser, stop the tubulure of the retort, and apply the heat of a water-bath until the phosphorus has disappeared. Then pour the liquid into an evaporating basin, and evaporate it until reduced to eight (8) parts. Then add sixteen (16) parts of distilled water and pass sulphide of hydrogen into the solution until the gas is in excess. Permit the mixture to stand twelve hours and then filter it through a plug of cotton placed in the exit of a glass funnel. Evaporate his solution by means of a water-bath until it is reduced to eight (8) parts, and cool it. Then add the alcohol and evaporate it on a water-bath until there remain eight (8) parts.* If it is coloured, or retains a burnt odour, mix the animal charcoal with it and digest one hour, then add of distilled water an amount sufficient to bring it to sixty (60) parts, and filter it through a plug of cotton placed in the exit of a funnel, returning the first that passes and reserving it only after it becomes colourless.

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* From *New Remedies* July, 1880.

* Observe note to succeeding formula on next page.

Characteristics of this diluted phosphoric acid are the same as those of the acid made from amorphous colourless.

I find that pharmacists dislike to handle ordinary phosphorus. This is natural, as it is both dangerous and disagreeable. Many times heretofore amorphous phosphorus has been recommended for making phosphoric acid, and certainly much can be said in its favour. The following formula is not in the least dangerous (from amorphous phosphorus):—

Acidum Phosphoricum Dilutum (*Diluted Phosphoric Acid*).

Take of

Amorphous phosphorus, three parts	3.
Nitric acid, twenty-five parts	25.
Alcohol, eight parts	8.
Purified animal charcoal, one-fourth part	¼.
Distilled water	q.s.

Mix the nitric acid with ninety-six (96) parts of distilled water in a porcelain capsule of twice the capacity of the mixture, and add the phosphorus. Place the capsule on a water-bath and heat it until the phosphorus is dissolved, then evaporate the solution until it is reduced to eight (8) parts. Permit it to cool, then add sixteen (16) parts of distilled water and pass sulphide of hydrogen into the solution until the gas is in excess. Permit the mixture to stand twelve hours and then filter it through a plug of cotton placed in the exit of a glass funnel. Evaporate this solution by means of a water-bath until it is reduced to eight (8) parts, and cool it. Then add the alcohol and evaporate on a water-bath until there remain eight (8) parts.* If it is coloured, or retains a burnt odour, mix the animal charcoal with it and digest an hour (this is unnecessary in case it is colourless and odourless); then add of distilled water an amount sufficient to bring it to sixty (60) parts and filter it through a plug of cotton placed in the exit of a funnel, returning the first that passes and reserving the solution only after it becomes colourless.

Characters.—A colourless, inodorous liquid, of the specific gravity . . . . It is not rendered black by nitrate of silver, nor turned white or whitish by bichloride of mercury (absence of phosphorous acid). When gently warmed it does not deposit a bright yellow sediment, after being saturated with sulphuretted hydrogen, and after standing at rest for some time (absence of arsenic acid). A crystal of pure sulphate of iron introduced into a cold mixture of equal parts of sulphuric acid and of the diluted phosphoric acid may render it pinkish, but does not produce a black or brownish colour in the liquid (absence of excess of nitric acid). No precipitate is produced by chloride of barium (absence of sulphuric acid), or nitrate of silver (absence of hydrochloric acid), when either of them are added in small proportion. It produces no precipitate with an equal bulk of tincture of chloride of iron after standing for several hours (absence of pyro- and metaphosphoric acids).

One hundred parts of it are saturated by . . parts of bicarbonate of potassium and no precipitate is produced.

THE MANUFACTURE OF OLEO-MARGARINE OR ARTIFICIAL BUTTER IN THE UNITED STATES.

Mr. Victor Drummond, Her Majesty's Secretary of Embassy at Washington, in a recent report, sends the following memorandum in respect to the present position of the artificial butter in the United States:—

The National Association for the Prevention of the Adulteration of Butter lately met to hear a report of the Executive Committee in regard to a proposed circular letter to the dairymen of the country, calling upon them to organize to resist the fraudulent sale of oleo-margarine. It is not surprising that an organization on the part of dairymen should be carried out at this time, when it is acknowledged by the oleo-margarinists that millions of pounds of this butter imitation are exported from this country annually into Europe. The Commercial Manufacturing Company at New York alone make 13,000,000 lbs. yearly, of the value of from 15 to 20 cents. a pound.

The Committee of Congress on "Manufactures and Agriculture" lately visited the works of the Oleo-margarine Company at Baltimore, and appear to have been favourably impressed with this new product, as being a wholesome and pure food and a benefit to the working man as to its price.

The arguments in its favour are, that it is such a perfect counterfeit of butter that thousands of pounds of it are annually bought, sold, and eaten by the public in the belief that it is the genuine article, that it is as wholesome and as palateable as butter, that it adds to the productive wealth of the nation, that it will prevent the manufacture of thousands of pounds of bad butter now made, and encourage the making of first-class butter, and thus will be a blessing to the dairymen, and that its price is essentially a blessing to the poor.

The argument on the other side is that it is jeopardizing thousands of people connected with the dairy interests of this country, that it undersells genuine butter and thus makes itself attractive to the millions, who, from its extreme similitude to the real article, readily buy it in that belief. The difficulty will probably be got over by a legislative statute that oleo-margarine must be made of a distinctive colour, and the goods branded so as to prevent the public from being imposed upon.

M. Mége, a Frenchman, appears to be the inventor of oleo-margarine; the operations necessary for its production I give below, with an analysis of the article compared with that of butter, so that those who buy this compound in England may know exactly the process which enables them to obtain the cheap article.

The method developed by him in this commendable undertaking can best be appreciated by following it step by step through the extensive works of the Commercial Manufacturing Company of this city, at West 48th Street, North River, where it is practised on a large scale, with such improvements as experience has proved to be advantageous.

At an early hour each morning the selected fat from the several abattoirs about the city begins to come in. The fat being received within a few hours from the time of killing, it is and must necessarily be fresh. After being weighed the fat is thrown piece by piece into large vats of tepid water; any pieces showing blood stains being thrown into a special vat for extra washing. After soaking for an hour in the tepid water, the fat is thoroughly washed with cold water and then covered with fresh cold water and left another hour to soak. It is then assorted. The pieces rich in oil are severed from the rest by a skilful cut, the assorter throwing the finer pieces into an adjoining tank for another washing, and the pieces less rich in oil into tubs to be transferred to the tallow factory. The fat for butter making is now carefully washed a third time, then elevated to the floor above for hashing and melting. The object of hashing is to disintegrate the fat, thoroughly breaking up the tissues so that the oil will separate therefrom at a low temperature. This is necessary to prevent the development of the rank tallowy flavour which results from the action of a heat, such as was heretofore used for the melting of tallow before the Mége discovery.

The hashing machine is simply a series of knife blades revolving in an iron cylinder; the fat being fed in at one end, and after being disintegrated, forced out at the other end through a perforated iron plate. From the hashers the fat is conveyed to the melting tanks, a series of cauldrons, jacketed and surrounded with water. The water is heated by steam, and in turn heats the fat, which is melted at a temperature of from 122° to 124° F. When the fat is thoroughly melted the mechanical stirring is suspended, the particles of membrane settle to the bottom, forming "scrap," and a thin film of white emulsion of water and oil forms on the top. The latter is removed and the clear yellow oil is drawn off into wooden tank cars, which are sent into the "seeding" or press room to rest while the oil is granulating by the crystallization of the stearine. The melting process occupies from two to three hours, and the granulation fully twelve times as long, the temperature of the room being kept at 85° F.

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* It must be remembered that nitrous ether is inflammable, therefore the near application of a flame must be avoided at this point.

The refined fat is next pressed, when the excess of crystallized stearine is removed by straining under pressure. The fat is now packed in cloths set in moulds to form packages about the size of a common brick, the packages being placed on galvanized iron plates in the presses on the left. When a press is entirely filled the packages are subjected to a slowly increasing pressure, under which the fluid oil flows out until the stearine cakes are left dry and hard, when they are removed by an adroit flirt of the canvass wrapper. The larger area of the press room is occupied by cans of crystallizing fat.

Two important steps in the butter-making process have thus been completed. The thoroughly washed suet has been deprived, first, of the inclosing cellular tissues, and next of the excess of stearine. We have now a limpid amber-coloured oil, perfectly sweet, and substantially the same as the oil of butter. When cooled this oil, or oleo-margarine, is slightly yellow in tint, melts in the mouth like butter, and has an agreeable taste. At this stage it furnishes an excellent fat for culinary purposes, and may be kept for a long time without risk of becoming rancid. This makes it much preferable to ordinary butter for naval uses. In the works of the Commercial Manufacturing Company, the larger part of the butter-oil formerly did not go beyond this stage, being drawn off from the press room into casks for exportation. At present the company cannot supply the demand for butter.

To convert the butter-oil into butter, it is necessary for it to undergo the processes by which fat is converted first into cream and then into butter, in the udder of the cow and in the churn. For this purpose so much of the daily product of the Manufacturing Company as is needed for home consumption is forced through pipes to the churning room. In the cow's udder the fat which is to be converted into cream is divided into minute globules, in other words, emulsionized by the action of the mammary pepsin in the milk. To accomplish the same end in the factory the butter-oil is churned with milk for about twenty minutes, when the oil is entirely and minutely broken up. At the same time a small quantity of the solution of annatto is added, as is commonly done in ordinary butter-making, to heighten the colour of the product. The churning ended, the mixture is withdrawn from the churn into a tub of pounded ice. The sudden cooling causes the emulsionized oil to solidify without crystallization. After remaining for two or three hours in contact with the ice, the butter-like oil is worked over by hand and the pieces of ice removed. The product has now the appearance of freshly churned butter, but it is deficient in the soluble butyric elements which give to creamery butter its delightful odour and flavour, and, it must be added, its tendency to become rancid with age. To supply these essential elements of savoury table-butter the product is churned a second time with nearly an equal weight of milk, during which process it takes up a sufficient quantity of milk to make it to all intents and purposes the same as dairy butter; not so delightfully fragrant, it is true, as the finer grades of creamery butter, but much more attractive to the senses of taste and smell than the average butter of the shops.

After the second churning the butter undergoes substantially the same operations of working over to press out the excess of milk, salting, packing, etc., as are practised in our dairies; in these, as in the preceding operations, scrupulous cleanliness being a characteristic feature.

The works of the Commercial Manufacturing Company are three storeys high, and cover an area of twenty-two city lots—about 1½ acres. From an average of 100,000 lbs. of fresh caul fat received daily, from 40,000 to 50,000 lbs. of butter are produced—equivalent to the yield of nearly as many thousands milch cows. From 20 to 25 lbs. of beef oil suitable for butter-making is obtainable from each of the 12,000 beeves killed every week for the requirements of New York and the adjoining cities, an annual addition to the food supply of this port of not less than 12,000,000 of pure food, having a dietetic as well as a commercial value of from 15 to 20 cents. a pound. The possible annual gain to the whole country from M. Mége's discovery runs high among the millions.

For those who are curious to know the comparative compositions of natural and artificial butter, the following analyses are appended. It is proper to add that, owing to differences in cattle, in their food, and in the common processes of butter-making, natural butter is somewhat variable in composition. The figures given below, however, may be taken as a fair average.

ANALYSIS OF NATURAL AND OLEO-MARGARINE BUTTER.

BY DR. H. A. MOTT.

Constituents.	No. 1, Natural Butter.	No. 2. Oleo-margarine Company's Butter.
Water	11·968	11·203
Butter solids	88·032	88·797
	100·000	100·000
Insoluble fats—		
Olein	23·824	24·893
Palmitin		
Stearine	51·422	56·298
Arachin		
Myristin		
Soluble fats—		
Butyrin	7·432	1·823
Caprion		
Caproin		
Caprylin		
Casein	·192	·621
Salt	5·162	5·162
Colouring matter	Trace.	Trace
	88·032	88·797

FIXITY OF COMPOSITION OF PLANTS. ANALYSES OF SOYA HISPIDA.*

BY H. PELLET.

For some years past the author has sought to prove that the composition of many plants is much less variable than might be supposed from the analyses published. On the other hand, in the case of certain plants, such as the beet, he has found that if differences exist in the composition of the mineral substances which they contain, these differences occur according to the laws of equivalence. That is to say, that the principal acids being constant, especially phosphoric acid, the bases on the contrary, may vary within certain limits; nevertheless that this variation does not take place weight for weight, but equivalent for equivalent.

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* *Comptes Rendus*, vol. xc., p. 1177.

Other plants, such as corn, do not show very great variations. But recently having had occasion to analyse some soy beans (*Soya hispida*, Moench.), M. Pellet found that they presented a rather remarkable fixity of composition.

Three specimens were analysed, one obtained from China, another from Hungary, and a third collected from a plant cultivated at Etampes, in the department of Seine-et-Oise, France.

	No. 1.	No. 2.	No. 3.
Water	9·000	10·160	9·740
Fatty Matters	16·400	16·600	14·120
Protein Matters (coagulable nitrogen × 6·25)	35·500	27·750	31·750
Starch, Dextrin and Saccharine Principles*	3·210	3·210	3·210
Cellulose	11·650	11·650	11·650
Ammonia†	0·290	0·274	0·304
Sulphuric Acid	0·065	0·234	0·141
Phosphoric Acid	1·415	1·554	1·631
Chlorine	0·036	0·035	0·037
Potash	2·187	2·204	2·317
Lime	0·432	0·316	0·230
Magnesia	0·397	0·315	0·435
Substances insoluble in acids	0·052	0·055	0·061
Traces of Soda, Iron, and Mineral Substances, unestimated	0·077	0·104	0·247
Various Organic Matters	19·289	25·539	24·127
	100·000	100·000	100·000

	No. 1.		No. 2.		No. 3.	
Nitrogen of the Ammonia	0·230		0·225		9·250	
Coagulable Nitrogen	6·680		4·440		5·080	
		5·910		4·665		5·330
Total Nitrogen estimated directly		5·910		4·720		5·440
These were therefore traces of soluble ammonia.						
Total Ash per cent. of normal substance obtained by washing (+CO_2)		4·86		4·87		5·15
Soluble substances insoluble in boiling water and acetic acid		67·10		68·40		65·80

Notwithstanding the different countries in which these beans had been collected, it will be seen by these analyses how slight was the difference in the organic and inorganic composition of the three specimens.

The composition of the ash was as follows:—

	No. 1.	No. 2.	No. 3.
Carbonic Acid	4·10	1·20	1·00
Phosphoric Acid	29·13	31·92	31·68
Sulphuric Acid	1·37	4·80	2·74
Chlorine	0·75	0·75	0·75
Potash	45·02	45·27	45·02
Lime	8·92	6·50	4·48
Magnesia	8·19	6·48	8·47
Insoluble	1·10	1·10	1·20
Traces of Soda, Iron, etc.	1·50	2·15	4·83
	100·17	100·17	100·17
Deduct Oxygen for Chlorine	0·17	0·17	0·17
	100·00	100·00	100·00

It will be seen that there is little variation in the quantity of phosphoric acid and potash, which are the principal substances, constituting between them three-fourths of the ash. There is a little more variation in the alkaline earths; but the portion including the soda is slightly higher where the quantities of lime and magnesia are lower.

The mean quantity of phosphoric acid is 1·53 per cent. of the normal vegetable substance, and the quantity of ammonia is 0·29 per cent.; the quantity of ammonia necessary to have the relation 71:17 would be 0·36. There is therefore more ammonia than is required for the magnesia to be only in the state of ammoniaco-magnesian phosphate. The phosphoric acid must therefore have entered the plant, as in the case of corn, in the state of double phosphate of potash and ammonia. As a consequence of this large quantity of phosphoric acid there is little carbonic acid in the ash. *A propos* of this, it has been found that the double salts of soda and ammonia decompose the alkaline carbonates, not only in the normal state but after calcination; *i.e.*, the soda salt calcined left a residue which when heated with carbonate of soda drove off completely the carbonic acid. The earthy carbonates appear to be less easily attacked by the phosphates, and that is the reason why in No. 1, where the proportion of lime and magnesia is highest, more carbonic acid has been retained.

GUM-HOGG.*

BY CHAS. L. MITCHELL, PH.G., M.D.

Under the above title a peculiar form of gum is described in the U. S. Dispensatory, p. 1664; it was obtained from the establishment of Messrs. J. B. Lippincott and Co., where it was used in one of the processes for the manufacture of books. As described by Dr. Wood, "it is in lumps of various size, from that of a chestnut to that of a walnut or larger, of an extremely irregular shape, often much contorted, appearing frequently as if consisting of several pieces which had become agglutinated in their soft state, translucent and nearly colourless, with a slight reddish-yellow tint in some places, of a rather dull though somewhat shining surface, very hard, brittle, with a glassy fracture, inodorous, and nearly or quite tasteless. With water it swells to a soft transparent mass, which retains this condition long without change, and if now stirred, instead of forming a consistent mucilage, breaks up into minute, irregular, transparent fragments, which retain this form indefinitely."

Chemically examined by Professor William Procter, jun., it was found to be only very slightly soluble in water, both cold and hot, the solution giving a precipitate with sol. subacetate lead, but none with oxalate of ammonium, in the latter respect differing from gum arabic. The insoluble portion was dissolved by strong sulphuric acid, and was converted by boiling dilute sulphuric acid into a soluble gum. He considered the insoluble substance to be bassorin, the insoluble constituent of tragacanth, and the gum itself probably the same as Bassora gum. The gum was obtained from the East Indies, but its botanical source was unknown.

The attention of the writer was recently called to this article, and a few experiments and a number of inquiries made with a view to determine its true relation to Bassora gum. A quantity of the drug was accordingly obtained from the same house which furnished the specimens to Dr. Wood. Upon examination it does not present quite the same physical characteristics which are described by him, but appears to be more a collection of gums from different species bearing a general similarity to tragacanth. It occurs in fragments of irregular shape and varying from the size of a chestnut to much larger; its colour in different samples varies from a dirty white to a yellowish-brown; it is hard, inodorous, tasteless, and breaks with a short glassy fracture. Some fragments have still adhering portions of the bark of the tree from which it has been obtained, while the general appearance of the gum shows it to have been deposited in successive exudations, similar to tragacanth.

A portion of the gum was set aside with a quantity of cold water, when, after the expiration of twenty-four hours it had swollen up into a soft, white, transparent mass, occupying the lower half of the vessel. When agitated, this mass showed no disposition to form a uniform mucilage, but separated into small, soft, transparent, and rather granular fragments, resembling pounded ice; this subsided to the bottom of the vessel again when it was set at rest. The whole was now thrown on a filter, and the filtrate examined; it gave a very faint precipitate with sol. subacetate lead, and no reaction whatever to solution oxalate ammonium; it was neutral in reaction, and had neither taste nor smell.

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* These figures represent the mean of three specimens.

† No. 1 is the mean of Nos. 2 and 3.

* From the *American Journal of Pharmacy*, April, 1880.

A second portion of the gum treated by prolonged boiling with water gave the same result as obtained with cold water. The insoluble portion was next examined. Alcohol and ether had no solvent action upon it; boiled with dilute sulphuric acid it was soon dissolved, the resulting solution showing no reaction with tincture of iodine, and not responding to Trommer's test for sugar. When boiled with a weak solution of an alkali or alkaline carbonate it was speedily converted into a uniform thick mucilage of a pinkish colour. When this was treated with an acid it did not again precipitate, although the mucilage lost its colour and became perfectly transparent. The loss of colour may be probably accounted for by the presence of iron in very small quantity. These tests, with the exception of perhaps the last, on which there is little information, correspond with those for bassorin, and show the close similarity of the present gum with that previously described by Dr. Wood, and to the Bassora gum of other writers, and they are all probably identical and the same.

While the solubility of bassorin in alkaline solutions has been but briefly alluded to in various works, it seems to indicate certain properties which might almost entitle it to be considered as an acid similar in its nature to the arabic or gummic acid of gum acacia.

Its commercial history is quite interesting. It was brought into this country about thirty years ago at Salem, Mass. At that time Salem was the headquarters of the East India trade, and this gum came with a lot of tragacanth imported to that place from Calcutta. It was supposed that it might be used in place of tragacanth as a cheaper article by the shoe manufacturers of Lynn and others. It came, however, into the hands of a noted drug garbler of the place by the name of Whipple, and was rejected by him immediately as an unsuitable and inferior gum. It was next shipped to Boston for sale, and after a number of ineffectual attempts to foist it on the market (for its worthlessness soon became known), was finally put up at public auction, and sold for two or three cents a pound to George Loring, at that time one of its principal booksellers. Mr. Loring made a number of ineffectual attempts to utilize it for different purposes, and, finally, rather disgusted, placed it in the hands of a Professor Jackson, a chemist of Jamaica Plain (one of the suburbs of Boston). Professor Jackson experimented with it for some time, and discovered its property of forming a good non-adhesive mucilage when boiled with an alkali, and being quite intimate with Mr. Loring, they soon utilized it for the manufacture of marbled paper, which was just then commencing to be known in the country. Gradually the secret became known, and as there was a slight demand for the article, at different times small lots were brought into the country. Up to the time of Jackson's experiments the gum had received no name, but afterwards it was known through the trade by the name of gum-hogg, and it is believed he gave it this name on account of its obstinacy in resisting the different efforts for its solution, and thus behaving like a well-known domestic animal of similar perverse and wilful habits.

The different gums varied very much in price, being at various times from 25 cents to 1·25 dollars per pound, and I have been informed by those who have used the article for a number of years, that the character and similarity of the specimens varied as much as its price. They all seemed, however, to have a certain resemblance to tragacanth. The mucilage formed by this gum possesses no adhesive qualities, and thus is well fitted for its peculiar use, although not superior to similar mucilages obtained from flax seed, elm bark, quince seed, etc.

Of late years, it has gone considerably out of use on account of the irregularity and scarcity of the supply, being substituted by some of the other mucilages before mentioned.

From all these facts, the writer concludes, that gum-hogg is not the product of any particular tree or plant, but is a *trade name* applied to various cheap and inferior gums, all probably identical with Bassora gum, and containing and consisting almost entirely of bassorin.

In this connection, before concluding, it might be interesting to give a short account of its use in the manufacture of books. The process in which it takes a part is that of "marbling," as it is termed, which consists of staining paper and the edges of books in a peculiar and variegated manner. The gum is first allowed to soak in cold water until swollen, and then boiled with a weak solution of pearlash until a thick consistent mucilage is obtained, which is strained. This forms the basis or vehicle for receiving the colours and transferring them to the paper, and is placed in a shallow tank on legs; the tank being about 5 feet long, 3 feet wide, and 4 inches deep. This body must be renewed as often as fermentation in the mucilage renders it liquid; in cold weather this is not so frequent, but in hot weather it must be replaced with fresh at least twice daily. The colours used are the ordinary paint colours, ground to a cream with thin mucilage of gum arabic. The workman, standing over the tank, first takes a large brush with spreading bristles, and dipping it in his colour, sprinkles it over the surface of the tank by twirling the handle between his hands. The value of the mucilage is now shown, for the colour does not either mix with it, or spread over its surface, but retains the circular form the drops would assume upon first striking a plane surface. The first colour is then followed in a similar manner by a second, using a fresh brush, and this in turn by a third, and so on at the pleasure of the operator, each particular drop showing no disposition to mix with its fellow. The pattern thus made is mostly of round drops, but should it be desired to vary it, combs of different degrees of fineness are drawn in different directions gently over the surface, producing beautiful wavy lines and figures. The paper is now floated gently upon the surface of the tank for a few seconds, when the colour is transferred from its surface to that of the paper, and after being hung to dry is burnished by hot steel rollers. No particular quality of paper is needed, the only requisite being, it should not be too highly calendered. A smooth piece of board is now drawn over the surface of the tank when it is ready for a fresh operation. The edges of books are stained in a similar manner; the book being taken unbound and pressed between boards tightly together so that none of the colour shall penetrate beyond its surface; they are afterwards, when dry, burnished with a hot iron tool by hand. The products afforded by this process are of infinite variety, and, as can be imagined, no two products are ever exactly alike, and by varying the colours an almost endless and kaleidoscopic change can be produced.

"FLOWERS" OF VINEGAR AND WINE.*

BY J. B. SCHNÆTZLER.

Flowers of Vinegar.—Thanks to the now classic researches of Pasteur, we know that the conversion of alcohol into vinegar is the work of a minute fungus of the bacteria order, the *Mycoderma aceti* of Pasteur. This fungus takes the shape of an elliptical cell, somewhat constricted in the middle, and about 1·5 *millième* of a millimetre in length. The cells occur singly or in chains. They form a thin pellicle on the surface of wine, and by extracting oxygen from the atmosphere and communicating it to the alcohol, convert the latter into vinegar. They propagate by division and surround themselves with gelatinous substance. They thus form a thick, soft, gelatinous head or scum, known in popular phraseology as "vinegar plant" or "flowers of vinegar," which gradually sinks in the liquor, at the same time losing its acidifying properties.

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* Communicated to the Swiss Natural History Society.

The "flowers of vinegar" referred to in this paper formed spontaneously on the surface of a sound two-years'-old white wine, in bottle, kept in a chest away from all sources of impurity, at a temperature of 10° C. (50° F.). Concave discs of mycoderma appeared in succession on the surface of the wine, and in sinking, got heaped one upon another, so that they at last formed a cylinder about 4 inches in height and 1 inch in diameter. The same thing happened when the wine was poured into a test-glass. As each disc sunk, a slight train of gelatinous substance could be traced, extending upwards from it to the surface of the liquor, where the formation of another disc was beginning. Under the microscope, this gelatinous substance, minute flakes of which were floating about in the wine, was found to consist of bacteria, whose energy of movement appeared to be proportionate to the acidity of the liquor. The formation of the discs continued as before after the end of the test-tube had been carefully closed with a cork. In this case, the bacteria must have been supplied by the wine, not the air. During the treading out of the grapes in autumn, large numbers of minute atmospheric organisms, mostly saccharomyces and mycoderma, find their way into the expressed juice, and, according to the conditions to which the latter is subsequently exposed, produce alcoholic fermentation, flowers of vinegar, flowers of wine, the condition known as *ropiness* in the wine, etc., depending on the particular organism which obtains the mastery in the struggle for existence.

Flowers of vinegar consist of bacteria (*Mycoderma aceti*, Pasteur) and a gelatinous substance, yellowish-white or reddish in colour according to the colour of the wine. This substance is generally regarded as produced by gelatinization of the cell membrane. It does not give the same reactions as cellulose; it is insoluble in cupric ammonia, and affords no blue or violet coloration with iodine or chloride of zinc. With tincture of iodine it turns yellow, as do the bacteria in it. Most fungi, however, present the same peculiarities, leading to the inference that they possess a modified form of cellulose (fungus cellulose). Boiled in water the gelatinous matter of vinegar flowers does not dissolve, but thickens and takes a firmer consistency.

Under pressure, the moisture becomes squeezed out and the volume greatly reduced. Dried by exposure to heat, it dwindles to a corneous pellicle, which chars in flame, emitting an odour of burnt paper. The most striking feature is the tenacious coherence of the component films and the resistance they offer to separation.

Gelatinization of the cellulose occurs in many fungi. The chain-like cells of nostocs produce gelatinous masses in considerable volume, which in the common nostoc form olive-green laminæ exhibiting a high degree of cohesion. But, the fact is more striking when we find the thin films of vinegar plant cohering so tenaciously.

It has lately been observed that certain living fungi, as *Penicillium glaucum*, have the property of fixing tannin in considerable quantity. To ascertain whether the fungoid organisms of vinegar plant possess the same property, I placed shreds of flowers of vinegar in a solution of sulphate of iron. Exposed to the air without the shreds, the solution took, as usual, a yellowish hue; but when the gelatinous substance of *Mycoderma aceti* was mixed with it, this gelatinous substance took a bluish-green tint, although in vinegar alone it appeared a greyish-yellow. Vinegar in which the bacteria were floating, singly or in chains, took the same bluish-green tint on the addition of sulphate of iron, while vinegar from which the bulk of the floating germs had been precipitated took a yellow hue with the iron. If, as appears very probable, the coloration of the vinegar plant by ferric salts is due to the presence of a certain proportion of tannin, we must assume that the bacteria have absorbed this tannin from the wine converted by them into vinegar. The tannin fixing itself in the albuminous substance, that is, the protoplasm of the bacteria of the vinegar, probably contributes to their cohesive properties and powers of resisting rupture.

Chlorophyll is absent in bacteria, but none the less, these minute organisms have the property, with the aid of alcohol, acetic acid, certain salts, water, etc., of elaborating considerable quantities of proteid matter, as cellulose, fats, etc. Pasteur supposes electricity to exert the same influence here as light does on chlorophyll cells. The effects of electricity on plant-cells are now no longer mere conjecture. The experiments of Velten ('Botanisch. Jahrb.,' 1876) have proved that inductive currents of electricity produce in dead plasma of the plant cell movements identical with those recognized in the living cell under the names of rotation, circulation, etc. So long ago as 1849, I endeavoured to show that the cause of ciliary motion, of the movements of spermatozoa, etc., was electricity. Now, the vibrating ciliæ of animals and plants are simply protoplasm (*Archives de Genève*, 1849). Dallinger and Drysdale, according to a paper in the *Monthly Microscopical Journal*, 1875, determined, with the aid of a strong Powell objective, the existence of a vibratile filament at each extremity of *Bacteria termo*. Cohn had previously ascertained the existence of a vibratile filament at each extremity of *Spirillum volutans*.

Flowers of Wine.—Wine left in bottles or casks imperfectly filled, or in open vessels exposed to the air, becomes sooner or later covered with a thin finely convoluted pellicle of greyish-white substance, popularly known as flowers of wine. Under the microscope, this is found to consist of minute fungoid organisms to which the name of *Mycoderma vini* has been given. This fungus differs from *Mycoderma aceti*. According to the researches of Max Rees, it belongs to the *Saccharomyces*, to which belongs also alcoholic ferment. Rees has given to *Mycoderma vini*, Desm., which is identical with *Mycoderma cerevisiæ*, Desm., the name of *Saccharomyces mycoderma*, Rees. The cells are oval, elliptical, 2 to 3 *millièmes* of a millimetre in breadth, and 6 to 7 *millièmes* of a millemetre in length. They propagate by budding, forming chain-like ramifications. Under certain conditions, *ascospores* are found, as when wine containing flowers of wine is mixed with water. The cells then lengthen to 20 *millièmes* of a millimetre, and the protoplasm differentiates into 1—3 spores.

In the autumn of 1877 I put some pure grape-juice in well corked bottles, which were placed in a cellar where the temperature never exceeded 10° C. (50° F.). The fermentation was slow. A deposit formed in the bottom of the bottles; some matters continued floating. In March the clear portion of the liquor was decanted and had still a sweetish taste. The microscope showed that it contained numerous cells of *Saccharomyces ellipsoideus*, Rees, and bacteria, with and without motion. The cells of *Saccharomyces* budded and gave rise to a secondary fermentation. Exposed to the air in a test-tube, on April 6, the wine speedily formed a thin convoluted scum of flowers of wine. These flowers consisted o *Saccharomyces mycoderma*, Rees. But every stage o transformation between this and the *Saccharomyces ellipsoideus*, Rees, floating in the liquor, was found among them. Exposed to air and light, the cells budded, gelatinized and formed flakes in the liquor. In a test-tub filled with the same liquor and kept in darkness n increase of numbers ensued and no gelatinization could be detected; the proportion of *Saccharomyces ellipsoideus* floating in this liquor also appeared larger.

De Seynes has shown that when placed on a dry substratum affording little nourishment, *Saccharomyces mycoderma*, Rees, formed two to three spores in *asci*. These spores germinated in saccharine solutions, producing budding cells. I noticed the same thing in flowers of wine, which had formed on the surface of wine in a test-tube. The scum thickened; the upper portion, no longer in direct contact with the liquor, but moistened still by capillary action, was less nourished than that beneath it; the cells, longer than the others and punctuated, often grouped themselves into ramifying chains, terminating in circular cells. Larger elongated cells were also observable, in which the protoplasm differentiated into two or three circular cells. But despite the presence of floating bacteria (*mycoderma*) in the wine exposed to air and light, there was no formation of flowers of vinegar. The *Saccharomyces* had prevailed over the bacteria in the struggle for existence.

I placed this same wine of 1877, which, after undergoing the secondary fermentation in bottle above mentioned, appeared to the naked eye perfectly clear and limpid, in a sand-bath at a temperature of 80° C. (176° F.). Afterwards I exposed a sample of this with another of the same wine, which had not been thus treated. After a while the former showed no trace of flowers of wine, the latter was covered with them. A similar result was obtained by adding 1 per cent. of borax to the wine. From April 6 to June 6, wine thus treated was exposed to the air without a trace of flowers of wine appearing on it. The borax completely hindered the development of *Saccharomyces* in the liquor; but it was noticeable that the bacteria continued to live and move in the wine in spite of the borax, although apparently incapable of producing acetification. In strong red wines, borax in like manner prevented the formation of flowers of wine, but destroyed the colour. A less dose prevented growth without affecting the colour. Artificially coloured wines lost their colour sooner than others.

A word must now be said regarding the relationship between *Saccharomyces ellipsoideus*, Rees, and *Saccharomyces mycoderma* of the same. The species floating in the wine undoubtedly was the first. The convoluted pellicle, which formed on the surface of the wine when exposed to the air, had all the characteristics of flowers of wine. It thickened in the tube, not by mere agglomeration of cells, but by the peculiar membranous thickening observable in the flowers. The undermost layers of this head, which were in direct contact with the liquor, presented a greater resemblance to *Saccharomyces ellipsoideus*, while the upper and more aerobian layers consisted of organisms exactly resembling *Saccharomyces mycoderma* as figured by Rees. In view of these transitions, it may be asked whether the two species are not identical. This view is favoured by M. Schulz's experiments ('Botan. Jahresb,' 1877). Schulz's experiments show that the fungus of flowers of wine when developed in saccharine solutions produces alcoholic fermentation therein.

On the Condition known as "Ropiness" in Wine.—For two successive years it was observed that a certain wine became "ropy" when run off into a small 100 litre cask, although in the larger cask from which it was taken it still remained sound and clear. Before putting the wine into the smaller cask, the latter had been twice carefully washed out and even "sulphured." Under the microscope the sick wine, which ran like oil, and had assumed an opaline tint, was found to contain innumerable minute bacteria, of spherical shape, and mostly arranged in chains. Pasteur, who noticed the same forms in a white Nantes wine, gives their diameter as 1 *millième* of a millimetre. Mine were smaller in their dimensions. They appear mostly in white wines; rarely in red. Like the bacteria of vinegar, they undergo gelatinization, and, according to Pasteur, sometimes form a thick scum or head, resembling that produced by flowers of vinegar. As the malady shows itself in the best cleansed casks and bottles, it would seem that the bacteria must be derived from the grapes. In casks which have held ropy wine, invisible germs lurk in the seams, and so transmit the malady. Only by prolonged antiseptic treatment can their influence be annulled. Whether the peculiar state of ropy wine arises from gelatinization of the bacterial cells, or from some peculiar kind of fermentation set up in the wine, it is beyond doubt that the presence and multiplication of the bacteria are the primary cause. In red wines this affection rarely shows itself; it is most common in white wines which have not been highly pressed or left long in contact with the husk. According to M. François, tannin precipitates the glutinous matter, and on this fact is based the application of tannin to the treatment of certain maladies in wine, a practice which enjoys a high repute in Champagne. This action of tannin may explain the difference between white and red wines in the above respect. As a rule, red wines contain a larger amount of tannin than white. The bacteria introduced with the grapes become tanned, and their development is checked accordingly. When the wine is deprived of its tannin, the surviving bacteria are free to develop themselves, and produce acetification or ropiness. In white wines containing little tannin this development takes place more readily. What tannin is present is fixed by some of the bacterial germs; the rest thrive and multiply, with the attendant results. The introduction of a certain proportion of tannin into the wine thus affords a means of combating the evil. The "ropy" wine above referred to contained much mycelium of *Mucor racemosum*, the protoplasm of which differentiates in globular cells, which occur singly or in gelatinous clusters, and have the property of producing alcoholic fermentation in saccharine fluids.

SOME CONSTITUENTS OF THE ESSENTIAL OILS OF ORIGANUM VULGARE AND THYMUS SERPYLLUM.[*]

BY E. JAHNS.

Whilst the essential oils of some of the species of *Origanum* of the Mediterranean flora (*O. hirtum*, *O. Smyrnæum*, etc.), as pointed out on a previous occasion,[†] are distinguished by their richness in carvacrol, the oil of the German indigenous *Origanum vulgare*, according to the opinion hitherto held by Kane and others, contains no phenol. From want of material this oil had been excluded from the scope of the author's investigation, but a specimen now placed at his disposal[‡] gives the opportunity for a comparison.

The oil was a pale yellow thin fluid, of sp. gr. 0·871 at 150° C. It was lævogyre, the α_D in a column 100 mm. long being $= -34{\cdot}4^\circ$. Potash solution removed from the oil only a very small quantity of phenols (estimated at scarcely 1 per cent.), one of which gave with alcoholic ferric chloride a violet, and the other a green colour. The separation of these phenols from one another was effected in the manner described in the former paper. They did not appear to differ from those occurring in other origanum oils, but the quantity was not sufficient for further experiments.

An opinion has been expressed that the liquid phenol which Buri[§] found in the essential oil of *Thymus Ser-*

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[*] From the *Archiv der Pharmacie*, [3], vol. xvi., p. 277.

[†] *Archiv der Pharmacie*, [3], vol. xv., p. 1.

[‡] Distilled from fresh herbs in the previous autumn by Drs. Weppen and Lüders.

[§] *Archiv der Pharmacie*, [3], vol. xii., p. 485.

pyllum might be identical with carvacrol, because in many reactions it appeared to resemble it, whilst the near natural relationship of the genera *Origanum* and *Thymus* would favour such an opinion. That this opinion is at least partially correct has been shown by a repetition of Buri's experiments; unfortunately only a small quantity of the phenol obtained from true serpyllum oil was available, the oil yielding only about 1 per cent. Buri dissolved the crude phenol mixture in potash solution and shook this alkaline solution with ether, when phenol A was taken up by the ether, whilst phenol B remained dissolved in the potash, and was afterwards separated by means of hydrochloric acid as a reddish oil, having a creasote-like smell, the alcoholic solution of which was coloured violet by ferric chloride. A nearer examination of the latter body was not made.

Phenol A, the supposed carvacrol, behaved as described by Buri. In alcoholic solution it was coloured green by ferric chloride, not very intensely, and could not be solidified at a temperature of −15° C. But when cooled in a powerful freezing mixture (snow and crystallized calcium chloride) to −32°, and the side of the containing vessel simultaneously rubbed with the immersed barometer, the mass, which had become thick and turpentine-like, was rendered turbid by the separation of crystals, and a portion immediately solidified. At the ordinary temperature the crystals only partially liquefied; the solid portion was therefore separated and freed from liquid by pressure. From this liquid a smaller quantity of the solid substance was more readily obtained, the first crystals being formed when it was cooled to −15°. In this manner about one-half of the phenol A was obtained in the solid form, and a nearer examination showed this body to be thymol, with which it agreed in crystalline form, melting point, indifference towards ferric chloride, as well as in the properties of the thymoquinone prepared from it (m. p. 45° to 46°). The material was not sufficient for analysis.

A complete separation of the thymol from the non-solidifying phenol could not be effected in the manner mentioned. The portion remaining fluid was therefore converted into the sulpho-acid and this into the barium salt, in the supposition that the somewhat difficultly soluble salt of sulphocarvacrolic acid, if present, would crystallize out first. Of the first crystallization a portion was used far the estimation of the barium and water, and the figures found corresponded with the figures previously published by me for the sulphocarvacrolate of barium. 0·4855 of crystallized salt dried at 80° to 90° lost 1·058 H_2O=10·91 per cent., and gave 0·1663 $BaSO_4$, corresponding to 0·0977 Ba=20·12 per cent. of the crystallized and 22·58 of the dried salt. It also corresponded in crystalline form and the approximately estimated solubility. The remainder of the salt was used partially in the preparation of the quinone, in order that it might be identified as thymoquinone by its crystalline form, melting point and other properties, and partly for the isolation of the pure phenol, the quantity of which, however, was not sufficient for further experiments, except the production of the green iron reaction.

According to these experiments it can scarcely be doubted that this liquid phenol was carvacrol, although, on account of want of material, the identity could not be made quite certain. The phenol A consists, therefore, of thymol and carvacrol, to which must be added as a third phenol-like constituent of serpyllum oil the body giving a violet colour with ferric chloride.

It is remarkable that the obstinacy with which the thymol in the above-mentioned case resisted solidification also appears to interfere under these conditions with the solidifying power of carvacrol. A quantity of pure thymol and pure carvacrol fused together behaves similarly. It can be cooled to −17° C. without a separation resulting, whilst each constituent, treated separately, easily solidifies at that temperature. The same phenomenon is seen in a fused mixture of equal parts of thymol and crystallized phenol (carbolic acid), which even at −20° C. remains still liquid, even when stirring and rubbing the sides of the vessel are practised to induce crystallization. This considerable depression of the solidifying points in such mixtures might explain how it is that many observers have failed to obtain carvacrol, for instance, in the solid state; no doubt the cause lay in the presence of probably only a small contamination with a similar body. The property of solidifying readily, as observed in the carvacrol from origanum oil, might therefore be used as a criterion of purity.

In respect of the iron reaction of carvacrol, there is yet a remark to make. As has been before mentioned, there exists between the natural carvacrol and that prepared artificially from sodium sulphocymolate, apparently a difference, inasmuch as the former dissolved in alcohol is coloured green by ferric chloride, whilst the latter, according to Jacobsen, gives no such reaction; some doubt, therefore, might result as to their identity. In a letter from Professor Jacobsen he explains this apparent difference by saying that this statement had reference to the aqueous solution; in alcoholic solution his carvacrol also gave a green coloration, but this reaction has been accidentally left unmentioned. Professor Jacobsen kindly placed a specimen of his preparation at my disposition, and I have found that in this respect both carvacrols behave perfectly similarly; both give with ferric chloride in alcoholic solution a green, and in watery solution no remarkable coloration.

THE REACTION OF FERRIC CHLORIDE WITH SALICYLIC, CARBOLIC, GALLIC AND TANNIC ACIDS.*

H. Hager gives the following means of distinguishing between these acids by the aid of the ferric chloride test:—

The substances which interfere with the violet coloration which ferric chloride gives with these acids are numerous, and by noting them we may obtain a clue as to which of the acids may be present in a solution. Thus with salicylic acid the reaction is not disturbed or hindered by the presence of acetic, boracic, sulphuric, nitric or hydrochloric acids (all acids in dilute condition), common salt, nitre, glycerin, alcohol, amyl alcohol or ether. It is hindered by caustic alkalies, alkaline carbonates, sodium acetate, ammonium acetate, borax, potassium iodide, sodium phosphate, oxalic, citric, tartaric, phosphoric and arsenic acids. With carbolic acid the reaction is not hindered by boracic acid, common salt or potassium nitrate. It is hindered by acetic, oxalic, tartaric, citric, sulphuric, hydrochloric, nitric and phosphoric acids, sodium acetate, ammonium acetate, borax, sodium phosphate, glycerin, alcohol, amyl alcohol and ether.

Phosphoric acid decolorizes both with salicylic and carbolic acids and with gallotannic and gallic acids as well. The officinal sodium phosphate, however, hinders the reaction with salicylic and carbolic acids, but not with tannic and gallic acids.

For a preliminary distinction between salicylic and carbolic acids the solution is to be treated in abundance with alcohol or glycerin, or with dilute acetic acid, and then tested with ferric chloride. Salicylic acid will give the reaction, carbolic acid will not.

To distinguish whether gallotannic or gallic acid be present, add sodium phosphate to the solution, and then test with ferric chloride. The violet coloration will show their presence, but is not produced by salicylic or carbolic acid.

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* From *Dingler's Polytechn. Jour.*, 235, p. 407. Reprinted from the *American Journal of Pharmacy*, May, 1880.

The Pharmaceutical Journal.

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SATURDAY, AUGUST 21, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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THE PHARMACEUTICAL CONFERENCE AND THE BRITISH ASSOCIATION MEETINGS AT SWANSEA.

BEFORE another issue of the Journal appears, the seventeenth session of the British Pharmaceutical Conference will have been concluded, and from all that we can gather respecting the character of the papers to be read, and as to the other features of attraction held out by our friends in Swansea, there is good reason to anticipate a no less satisfactory result than is now customary when the members of the Conference meet to discuss the latest scientific novelties and renew their intercourse with old friends. Even the weather seems inclined to be propitious, and though north-easterly blasts still prevail, and are to be looked favourably upon chiefly because they may be credited with keeping off rain, sunshine has not so utterly forsaken our misty sky as to leave no hope of pleasant days to be spent during the coming week on the coast of South Wales. The meeting of the British Medical Association at Cambridge last week was fortunate in this respect, and we trust that the gathering of the disciples of Pharmacy may not be less favoured.

In addition to the list of papers that has already been published we are informed by the Honorary Secretaries that five others have since been promised on the following subjects:—

19. Ipecacunha Wine. By J. B. BARNES, F.C.S.

20. Notes on a Journey Eastward. By H. B. BRADY, F.R.S.

21. Emulsions. By A. W. GERRARD, F.C.S.

22. A Peculiar Kind of Cinchona Bark. By B. H. PAUL, Ph.D.

23. The Determination of the Strength of Alcoholic Solutions of Chloroform. By J. C. THRESH, F.C.S.

At the coming meeting, we understand that it is expected Professor MAISCH, of the Philadelphia College of Pharmacy, will be present as a visitor and as a representative of American pharmacists. We may perhaps expect to hear from him some account of the mode in which his colleagues cooperate with medical men in the preparation of the Pharmacopœia which is now in progress.

The general course of business at the meetings of the Conference in Swansea will be of the usual nature, commencing at half-past ten o'clock on Tuesday morning, and terminating in the afternoon of Wednesday, the members being invited during the mid-day hour on both days to partake of a luncheon, to be served in the garden belonging to the Royal Institution, where the business meetings are to be held.

On Thursday, an excursion has been arranged, not as the members of the Local Committee first intended, by boat in Swansea Bay, a project which they regret having been compelled to abandon, owing to the uncertainties of landing in Oxwich Bay; but by road, through the adjoining country. Carriages are to leave the Royal Institution at half-part ten in the morning, proceeding by way of Sketty, Fairwood Common and Park Mill to the entrance of Penrice Castle, the seat of Mr. TALBOT, M.P. After a walk through the park to Oxwich, the visitors will be entertained with a luncheon on the beach. From that point the members of the Committee will conduct their friends either to the ruins of Oxwich Castle and Cefn Bryn or else back through Crowley Woods to the Gower Union, the board room and dining hall of which have been kindly placed at the disposal of the Committee. From the windows of these rooms, if the weather be fine, a magnificent view will be obtained of the Bay and the coasts of Devon and Somerset across the "silver streak." At six o'clock a "high tea" will be served, and it is hoped that the party will be able to leave for Swansea at eight o'clock.

By following this programme probably there will be a greater certainty of enjoying the beauties of the country round Swansea than might have been generally the case had the original plan been carried out, and the risk of having to test the efficacy of specifics against sea-sickness will not be incurred.

In connection with the British Association we understand that active preparations have been made for excursions to the more interesting places in the district. Part of Thursday is to be devoted to a visit to the iron works and collieries at Dowlais, and in the evening the Mayor of Swansea will give his reception *soirée* in a pavilion capable of accommodating 6000 persons. On Saturday there will be excursions to the Gower Coast, Penrice Castle, Oxwich Bay, Arthur's Stone, Worm's Head, Bishopstone Valley and its underground river, to Bacon Hole and other bone caves, to the Via Julia and tin works at Langhor, to Llandilo, Golden Grove, Carreg-Cennen and Dynevor Castle, and by sea to Lundy Island and Ilfracombe. At the time of the visit to Pembroke Dock there will be a large number of war vessels lying there, as well as the "Great Eastern."

On Thursday, the 2nd September, numerous excursions are arranged which will afford opportunities of inspecting the smelting works for which Swansea is famous. The smelting of copper has been carried on there for nearly two centuries to such an extent that it is said nine-tenths of the copper smelting of the kingdom is done there by a process which is known as the Welsh process. Of late years attempts have been made to turn to account the "copper smoke," or mixture of sulphurous acid and arsenical fumes resulting from this operation, which has entirely destroyed vegetation on the hill-sides in some places. The methods of converting this smoke into sulphuric acid can be seen at the Hafod Works, belonging to Mr. VIVIAN. Tin smelting, tin plate works, and the steel works at Landore will also be shown by the Mayor of Swansea, Messrs. LEACH, FLOWER and Co., and Dr. SIEMENS.

Among other industries carried on in the neighbourhood of Swansea we may mention the making of patent fuel, of sulphuric acid, phosphatic manures, sulphate of ammonia, oxalic acid and alkalies, the distillation of wood, and the smelting of cobalt silver, nickel, lead and zinc ores.

As additional attractions during the meeting of the British Association, there will be an agricultural show, a flower show, and an exhibition illustrative of local productions and operations. At the evening *soirées* there will be exhibitions of machinery in motion and an exhibition of scientific instruments lent for the occasion.

We purpose giving, as usual, a full report of the papers read and of the discussions that take place as well as other proceedings of the Pharmaceutical Conference, and in order to give a general *résumé* the delivery of the Journal, next week, will be postponed a day beyond the usual time, as on the occasion of the Meetings of Council.

PHARMACOPŒIA REVISION FROM A MEDICAL POINT OF VIEW.

A VERY interesting article upon the Pharmacopœia of the United States has been published in *New Remedies* for July. The author, Dr. D. WEBSTER PRENTISS, Professor of Materia Medica in one of the Washington Colleges, is a medical man, and he discusses the revision of the Pharmacopœia from the physician's point of view. According to him the Pharmacopœia may be divided into three sections as follow:—

1. Embracing matters in which physicians are most interested and that it is their province principally to direct; such as what drugs are to be included, and the doses, or in other words, the strength of preparations.

2. Matters in which pharmacists are most interested, such as the construction of formulæ and directions for their manipulation, which should be left mainly to pharmacists.

3. The intermediate ground on which physicians and pharmacists meet with equal interest, as in questions as to introducing matters of therapeutics and toxicology, the use of parts by weight instead of apothecaries' weights and liquid measures.

The Editor of the *Canadian Pharmaceutical Journal*, in referring to this paper, expresses his approval of the views put forward by Dr. PRENTISS, and regards them as suggesting a just apportionment of the work to be done in revising a pharmacopœia. He also expresses a hope that the time will come when the revisers of the British Pharmacopœia will see their way clear to making a similar division of labour, since he considers it is only by such an arrangement that the work can be satisfactorily performed.

We draw attention to these opinions because we entertain the hope that they may be of use in helping to bring about among ourselves a more adequate recognition of the principle that the construction or revision of a pharmacopœia requires the associated labour of medical men and pharmacists, co-operating upon an equal footing and with the same object. In the United States we have a demonstration of the fact that such co-operation is not only possible but advantageous, and there is reason to believe that by following the example set on the other side of the Atlantic, the character of the British Pharmacopœia would be in many respects improved. Some weeks since we gave an account of the constitution of the Committee charged with the revision of the United States Pharmacopœia for the purpose of showing that it comprised a considerable representation of special pharmaceutical skill. If we look back to the time when the last edition of the British Pharmacopœia was produced, it will be seen that the work was actually and avowedly done by pharmacists, and on several occasions, when the subject of pharmacopœia revision has been discussed at the evening meetings of the Pharmaceutical Society, it has been made manifest that the Committee of the General Medical Council charged with the direction of the work had to seek the assistance of practical pharmacists in order to decide the questions that presented themselves.

Practically, therefore, it is admitted that there is a necessity for the co-operation of pharmacists with medical men in the revision of the Pharmacopœia, and though the Medical Act of 1858, in providing for the preparation of that work, did not take cognizance of that necessity, experience and the example of other countries have made known the defective nature of its provisions in that respect. It is now clear that considerable advance has been made upon the opinions then prevailing on the subject, and we think it is equally clear that we cannot remain behind other countries in giving effect to the more enlightened views of the present time.

THE SPIRITS BILL.

THIS Bill has now passed through the House of Commons and was brought to the House of Lords on the 6th of August. We notice that in accordance with the motion of which Lord FREDERICK CAVENDISH gave notice the word "such" has been inserted in clause 130, page 43, so that all difficulty will now be removed as regards the use of methylated spirit in making liniments and preparations for external use.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The general half-yearly meeting of the above Association was held at the rooms, Halford Street, on Tuesday, August 3rd, 1880, the President, Mr. Edwards, in the chair. After a few remarks from the President, the report was read and adopted. The report stated that the improvement which was referred to at the last half-yearly meeting had continued, and that the result of the change in the manner of carrying on the work of the Association had been very gratifying. The papers contributed by the members on Wednesday evenings had evoked considerable interest, and those meetings had been better attended than the classes held during the last two or three sessions. The number of members had increased; but the frequent changes in the *personnel* of the Association had been found a great hindrance to its prosperity, for in numerous instances, no sooner had a member, able and willing to assist in the work, turned his attention in that direction, than by his removal to another town his services had been lost to the Association. A hope was therefore expressed that those who may occupy the places thus rendered vacant will help as much as possible to make the Society prosperous and to accomplish the purpose for which it was established. Thanks were expressed to P. Squire, Esq., F.L.S., for the gift of a copy of the last edition of 'Squire's Companion to the British Pharmacopœia;' and to the Pharmaceutical Society, who have considerably enriched the materia medica cabinet with specimens of interest and value. In conclusion, the report stated that the library had been constantly utilized, and that containing, as it does, the leading works on subjects connected with pharmacy, it is a source from which great benefit had been derived. The measure of success which has attended the efforts of the committee leads them to hope and expect still further successes in the future.

The Treasurer's report showed a balance in hand of £1 0s. 11½d.

The meeting then proceeded to the election of a committee for the ensuing session, with the following result:—Mr. Edwards, President; Mr. Shuttlewood, Vice-President; Mr. Lewitt, Hon. Secretary; Mr. Clark, Treasurer; Mr. Thirlby, Mr. Masters, Mr. Winter.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A meeting of this Society was held on Friday, August 6. Mr. Ellinor, the President, in the chair.

After a discussion on the forthcoming Pharmaceutical Conference at Swansea, the following were appointed delegates to represent the Society:—Messrs. Ellinor, Ward, F.C.S., Allen, F.I.C., F.C.S., and Maleham. Several other matters of importance were brought before the meeting, after due consideration of which the meeting was brought to a close.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The annual meeting of this Association was held on Thursday, July 15, when the President, Professor Attfield, F.R.S., occupied the chair.

The Secretary read the report of the Executive Committee, the salient points of which were that the communications read before the Association during the session have exceeded those of last session, both in point of numbers and in the predominance of those of a pharmaceutical character. The number of communications read has been twenty-eight, fourteen papers and fourteen reports. Six of the papers were pharmaceutical, four chemical, one botanical, one educational, one biographical, one physiographical. Two reports have been made on each of the following subjects:—Pharmacy, botany, materia medica, inorganic chemistry, organic chemistry, physical chemistry and analytical chemistry.

The adoption of the report of the Executive Committee was moved by Mr. H. Senier, and seconded by Mr. W. E. Bush, and carried unanimously.

Messrs. H. Senier and C. H. Hutchinson were appointed as a committee to audit the Treasurer's accounts, which they reported to be correct.

There being no further business, the Association adjourned over the vacation.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A special and numerously attended meeting of the above Association was held at its rooms, 32A, George Street, Hanover Square, on Wednesday, July 7. Mr. G. F. Snow, one of the Vice-Presidents, occupied the chair.

The evening was devoted to an interesting exhibition of microscopes by Messrs. Branson, Killick, Naylor, Parker and Tharle.

Mr. W. H. Wrenn exhibited some specimens of the rarer essential oils, also some very fine crystals of sulphate of cinchonine, amorphous koussine, etc.

Mr. T. Hardwick also exhibited some bronze medals, English and Italian photographs, etc., in which those present took great interest.

Readings, recitations and songs were given by members at intervals during the evening.

A vote of thanks being accorded to the Chairman for presiding, a very successful meeting terminated.

SOCIETY OF ARTS.

THE CHEMISTRY OF BREAD-MAKING.*

BY PROFESSOR GRAHAM, D.SC.

(*Continued from page* 147.)

Lecture V.

At last we have got our loaf in the oven, and it will remain in the oven about an hour and a half. While it is in there, I propose, in the first place, to consider some peculiarities in ovens, and then to discuss that part of the subject which comes most within my province, namely, the chemical changes produced by the action of heat on the loaf. In the common oven, in former times, and even yet to some extent abroad, the heat was obtained by burning wood inside the oven; that is to say, in that part of the oven in which the bread was afterwards placed. When the combustion of the wood had communicated a sufficient amount of heat to the walls of the oven, then the embers were taken out and the bread was put in. This is manifestly a rather cumbersome method, and I need hardly say, in a country like ours, is also an expensive one. Consequently, even long ago, coal was employed for the purpose of heating the oven, the coal being used in external furnaces. The Vienna baker, who certainly for many long years has been pre-eminently the best baker in Europe, and from whom the Parisian has learned much, years ago found out that steam, acting on the moist surface of the loaf, was able, at the high temperature of the oven, to convert the starchy matter of the surface, moistened, as I said before with water, into dextrin; in other words, by the action of heat and moisture, he found that he could convert starch into dextrin in much the same way that the greater part of the dextrin, which is now used in calico printing, or at the back of postage stamps, is also made. The Vienna baker obtains the steam in this way. The first batch of bread is common bread, of rather an inferior character, and of course in baking that bread the oven is charged with the moisture of the steam which comes from the bread. After that the rolls, moistened on the surface with water, being placed in the oven, the steam from the first batch of bread causes this glazing of the surface. Of late years the Parisian bakers have employed steam boilers, so that an injection of steam, from a boiler working under a little pressure, takes place into the oven, and such ovens, though they are not common, can be found in several places in London. I have a drawing here of an oven which will give you an idea of the character of the operation that goes on. The centre drawing represents the front of the oven as you see it with the door for the admission of bread, and a door underneath for warming up rolls and loaves previous to their introduction into the oven. On the side is the boiler with the steam gauge. You will notice the drawing has two lines indicating an intersection, at A B and C D. The drawing on the left is the section at A B, and shows the interior of the oven. The door is partially open, and there is a pipe at the side, with small apertures for the purpose of charging the oven with steam. You will notice that the floor of the oven is not horizontal, but rises slightly, the object being that when the door is opened the steam shall not fall out. Being heated, it is lighter than air, and if there is a slight incline given to the floor of the oven, the tendency of the steam is to keep in; whereas, if it is flat, there is a tendency for a considerable quantity of the steam to pass out every time the door is opened and shut. The other drawing represents a section on the line C D, which indicates, by means of a movable door, the way in which the flame coming from the furnace is sent into the oven in order to heat its stone walls. So soon as the oven has arrived at a temperature of about 400° to 450°, it is closed. In the bakeries of Mr. Bonthron, of Regent Street, and Mr. Carl Fleck, of the Brompton Road, a plan is adopted of having two ovens, side by side, so as to economize the fuel to some extent. I have not examined other ovens, but I know that besides these there are some other bakers in London who also adopt this injection method, which practically, in its first conception, was due to the Austrian baker.

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* Cantor Lectures: Delivered November and December, 1879. Reprinted from the *Journal of the Society of Arts*.

In addition to this system of baking bread by means of fuel, steam has also been employed in other processes; what is called Neville's bread, which has a considerable sale in London, I understand, is baked by means of steam at a high temperature. You, doubtless, know the character of that bread sufficiently well, and it is, therefore, not necessary that I should further allude to it.

I will pass on now to the chemical examination of the changes which take place when the bread is introduced into the oven. In the first place, the bottom of the loaf, and the side and the top of the loaf, are greatly heated by the hot surface which comes in contact with the bottom, and by the hot surfaces, which radiate the heat from the top of the oven on to the loaf. You will notice, in looking at the drawing, that the depth of the oven is comparatively slight, the object being to have the radiating surface as near as possible to the top of the loaf. So soon as the loaf has been submitted to the action of the heat, the carbonic acid gas which was in the dough expands, and by the time that gas has been heated from about 80° to 212°, which is the boiling point of water, that gas will have expanded from 1 cubic inch to 1·24, and that will indicate the amount of increase that a loaf would undergo, supposing there was no moisture. But while that amount of increase takes place, due to the expansion of the carbonic acid gas itself, there is also considerable expansion due to the fact that the gas is moist. Now, the tension of aqueous vapour at 212°, is equal to the atmospheric pressure, and therefore we get an enormous increase, due to the amount of the moisture, as well as to the carbonic acid gas itself. I said just now that the temperature of the oven ranged from about 400° to 450°. The temperature of boiling water is 212°, that is to say, provided the barometer stands at 30 inches of mercury, because, of course, there is a higher boiling point if the barometer be higher, and lower if the barometer should stand lower. Therefore, although the walls of the ovens are at a temperature of about 400° to 450°, the loaf itself is not at such a temperature. The bottom, which is resting on the hot surface, of course is considerably heated, but the interior of the loaf does not rise much above 212°. It rises doubtless slightly above that temperature, due to the resisting action of the outer surface of the crust, which adds to the resistance of the atmospheric pressure. Secondly, during this action which is going on in the presence of moisture, the cell walls of the starch are ruptured, so that we obtain from such a heating action, not starch such as we know it before it is boiled, but starch which, by the ruptured cells, lends itself readily to the action of albuminoid ferments. Thirdly, by the action of heat, some of the albuminous matter undergoes a degrading action, which is afterwards of use in the digestion process. But that is not all. Due to the action of heat and moisture, not only is there glazing by the production of dextrin on the surface, but there is also, to a slight extent, a production of dextrin in the interior of the loaf. You all know that if you were to boil a suet dumpling, for example, for a comparatively short time, the suet dumpling would not be very remarkable for its digestibility. Indeed, as in a day or two, the most favoured festival of our year will be at hand, I am reminded, by this action of the heat upon the dumpling, of the old doggrel, which I should imagine was partly composed by youth and partly by the experience of old age. That doggrel says, "Plum pudding hot, plum pudding cold." That represents, to a great extent, the desire of youth to have plum pudding, no matter whether it be hot or cold, provided there be plenty of it. But then, old age lays down this as a necessary condition, that the plum pudding should be "in the pot nine days old;" in other words, you cannot get digestible albuminoids and starch of wheat unless they have been submitted to the prolonged action of heat and moisture, and this, to some extent, takes place in the action of heat upon the loaf in the oven.

Another point I have to notice is, that coloured products are formed. I have a table on the wall,* prepared by Oudemans, showing the action of heat on malt, and you will see there that air-dried malt contains no torrefaction products, and that there are no less than 13·6 per cent. of albuminoid matters; whereas, when the malt is heated to a temperature less than the boiling point, we get 14 per cent. of torrefaction products, and only 10·5 of albuminous matter. The torrefaction or coloured products that are formed, are partly due to the action of moisture at a high temperature on soluble albuminoid matters, and partly to the dextrin and maltose sugars that have been formed in the previous panification process. Now, the more soluble products are obtained in the previous process of bread-making, the greater will be amount of colour in the final loaf. On the other hand, the less the soluble products produced by the previous bread-making process, the less will be the coloured products obtained in the oven. That is why inferior flours produce so much colour. Inferior flours, as I pointed out to you from the tables drawn up by Mr. Brown, yield to the panification process, that is, in the process where moist and moderate heat is acting on flour for a considerable time, a very large quantity of soluble products. Therefore, I say that the more soluble products obtained in the previous panification process, the greater the amount of coloured products obtained in the oven, and of course the less pleasant does the loaf look.

Another matter we ought to notice is, that by the action of heat we obtain the outside crust. This crust retains the moisture for a much longer time than if there were no crust, and lastly, the amount of moisture or water is greater the finer the flour, and, of course, *vice versâ*, and this absorption and retention of water depends upon two distinct factors. In the first place, it depends upon the higher character of the albuminoids. Albuminoids of high maturation character (such as the crude gluten, which, you will remember, I told you was composed chiefly of fibrin, and to some extent, also of glutin) absorb and retain water with great avidity, which is not the case with some other forms of albuminoids, such as albumin found in most cereals, found largely in our inferior wheats in bad seasons, but to a very small extent in really well-matured wheats grown in highly flavoured climates; the legumin and other soluble albuminoid bodies, found very largely in the *leguminosæ;* and the cerealin, which is one of the albuminoids found in the husks of cereals—of wheat especially: these soluble albuminoids do not absorb much water, nor have they much power in retaining it. Therefore, I say, that the first factor depends on the character of the albuminoids present. But there is still another, which is this, it depends also on the percentage of starch. Supposing you have a sufficiently large quantity of the hard gluten, then the higher the amount of starch, the more water will be absorbed and retained by such flour.

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* *See before*, p. 147.

This absorption and retention of water enters largely into the question of the number of loaves that may be obtained from 100 lbs. of flour. The baker, of course, reckons by the sack, but it is more convenient to take a percentage result. According to Laws and Gilbert, in 100 lbs. of bread, there will be on the average 62·8 of dry solid matter, and 37·2 of water; according to Millon, 63·7 of dry matter and 36·3 of water; according to Dumas, 55·4 of dry matter and 44·6 of water; according to Maclagan, who made a series of researches on this matter, the average amount of dry matter was 64, and of water 36. From a number of results supplied to me by many bakers, I find the average agrees pretty well with the statement of Lawes and Gilbert. To take this question from another point of view, 100 lbs. of flour will yield, according to Lawes and Gilbert, 135 lbs. of bread; according to Dumas, 130; and Maclagan, 137·7. But I need hardly say that the number of loaves obtained from 100 lbs. of wheat flour, or the number of loaves obtained from the sack, will, of course, vary according to the character of the wheat. Practically, the finer the wheat, the greater number of loaves obtained from it. It may be of interest—not to those practically acquainted with the matter, but to those who are not—to say that the number of loaves obtained from a sack of flour will vary. I am afraid, in a year like this with English wheats, the results would be rather low; but, taking more favoured circumstances, it will vary from 90 to 94; possibly, with exceedingly fine foreign wheats, more than the latter number may be obtained.

I have now done with the fermentation process, by which carbonic acid gas (I have said very little about the alcohol which is produced, as I pointed out, along with carbonic acid gas in the fermentation process) is used for the purpose of lightening the bread. I have now to refer briefly to what may be called artificial processes of producing the same evolution of carbonic acid gas, not from the flour, but from chemical substances used along with the flour. The best known of these methods is the process of Dauglish, which is still practised in London, and it may be in some other large towns of England. The carbonic acid gas in this method is obtained by the action of acid upon chalk, that is, carbonate of lime. The carbonic acid obtained by the decomposition of chalk is thoroughly well washed, and the carbonic acid and water are then mixed, in proper proportions, with the flour, and, as rapidly as possible, the dough is made, sealed, made up into loaves, and put into the oven. Now, the advantages of these artificial processes are manifest. An inferior flour is not submitted to the degrading action of the albuminoids upon the starch; we obtain no sugars, we obtain no dextrin. In other words, no action takes place, except in the oven, and, therefore, one is able to employ inferior flours by such an artificial process. I referred to this process at our last meeting, and a gentleman asked me at the end of the lecture whether I meant that those who employed the Dauglish process used inferior flours. Of course, I did not say that, nor do I say it. I merely say that one of the advantages of the invention or suggestion of Dr. Dauglish is, that we *can* make use of inferior flours. Another advantage is, that the process is a very rapid one. The whole making of bread occupies a very small period of time compared with the long, tedious, laborious operations of the ordinary fermentation plan. On the other hand, I think I am bound to mention (though this is not so much a scientific matter as one of personal opinion) what I consider the disadvantage of the process. Such a bread is manifestly less sweet than if the flour had been subjected to the fermentation process. There has been no dextrin, no sugar formed, and the albuminoids have not been lowered or degraded. Consequently, such a bread does not taste sweet; it has none of that nutty flavour, according to my taste, which a well-fermented good loaf has; and it seems to me that many other people at least must have adopted the same opinion, because it is long since Dr. Dauglish proposed this method, which theoretically seems a very excellent one, and yet, I think I am not very wrong in saying that, if we consider Europe, we shall find that a remarkably small portion of the flour of Europe is submitted to the Dauglish method, compared to the vast amount of bread made by the fermentation process; and if the bread had been so well thought of by the world at large, it ought by this time to have progressed much more than it has. Another objection which occurs to me here is this, that the bread cannot be so rapidly digested as the fermented bread; and it would be desirable that investigation should be made upon this point, because one cannot help feeling interested in the Dauglish process, on account of certain obvious merits which it has.

Other methods for producing artificial raising of bread are very numerous, and I need only name two or three of them. In the first place, there is the process by which bicarbonate of soda and hydrochloric or muriatic acid are brought to act on each other in the dough. A reaction takes place, by which chloride of sodium, or common salt, is formed, and the carbonic acid escapes, and, therefore, raises the loaf. But it is necessary that the operation should be carried on very rapidly, and it is also necessary that the exact proportions of bicarbonate of soda and hydrochloric acid should be used, so that there should be an exact naturalization of one by the other. In addition to this method, tartaric acid and bicarbonate of soda are employed occasionally; and sometimes hydrochloric acid, to which a small quantity of the acid phosphate of lime has been added, is also employed, along with the bicarbonate of soda. It is very easy to make this acid phosphate of lime. If you take a small portion of burnt bones, called bone ash, which comes so largely from the River Plate and the Rio Grande in South America, and add to it hydrochloric acid, you convert it into what is technically termed superphospate of lime, or acid phosphate of lime, and if you use an excess of hydrochloric acid, you will have a solution of acid phosphate of lime in the hydrochloric acid liquid, and this, if it be used to react on the bicarbonate of soda, will give common salt, together with phosphate of lime. The use of such agents has been recommended by many, owing to the desire, especially in the case of poor children, ill supplied with milk, that the bread should contain bone earth, or the elements of bone earth, so that the children may obtain a considerable quantity of phosphate for the purpose of building up their bone tissue which, at an early age, is so necessary. Bicarbonate of ammonia has also been employed as an artificial method of raising bread, and, of course, there are many other such artificial chemical means. The various baking powders which are so much advertised, depend on a reaction of this kind by which carbonic acid gas is employed artificially. They all of them seem to me to be open to the same objection as the Dauglish method, and they have not its advantages, except in so far as they enable one to make an aerated bread under certain unfavourable circumstances, such as at sea, or far away from the means of obtaining yeast; of course, under these conditions, they have some value.

Our bread being made, the next point one has to consider is, how it is digested. Now, digestion is a continuation of fermentation. Of course, I am using the expression fermentation in the same sense that I used it in speaking of the hydration action upon starch. I am not using the term now in the sense of the boiling fermentation, where carbonic acid and alcohol are produced, but that form in which water is added to the molecular structure of the starch, and by which sugars and dextrin are formed. The first agent which is brought to bear upon the bread is the albuminoid ferment, called by physiologists, *ptyaline*, which is found in the saliva. In order to obtain a thorough and rapid hydration of the starch, so that that starch is converted into soluble bodies, sugars and dextrin, it is necessary that the bread should be thoroughly comminuted, and we are endowed with a very wonderful apparatus for the purpose of cutting and grinding it up into a fine porous mass. At the same time, while this operation is going on, the grinding action stimulates the glands, so that during the time they pour out the secretion destined by Nature for the solution of these starchy bodies. Of course two points have here to be considered. I said we must obtain a fine, light, porous mass, and we must, therefore, so cut up or grind that bread that it should always remain a fine porous mass; that it should be thoroughly aerated, and at the same time well mixed with this albuminoid ferment of the saliva. Manifestly, therefore, we see at once that the habit, which is so common in England, of eating hot rolls and new bread, is the very opposite of what Nature has pointed out should be done. Bread which, when you press it between your finger and thumb forms into impervious balls, is not a bread which lends itself readily to the action I am speaking of; and I have been told, on good authority, that bakers, who have found out for themselves so many very interesting scientific facts connected with the whole process of panification, seldom eat new bread. Indeed, one gentleman said they never did; they wait, at any rate until the second day, until it will, in the grinding action, remain light and porous for the action of the ptyaline upon it.

Mr. Lewis has kindly heated two tubes. In my right hand, I hold a tube which contains a solution of bread, made simply by breaking it up to a fine powder, and then digesting it for two hours at a temperature of 100° Fahr. It was then filtered; nothing but water was added to the bread, and he has added some of Fehling's liquid and has boiled it. You see that there has been no reduction, or, at any rate, a very small reduction of the protoxide of copper to the suboxide. Whereas, in the other tube, the bread was comminuted into the fine condition in which it should be, as was also done in the other case, and it was then mixed with a little saliva obtained by exciting the submaxillary gland. This was warmed also, at about 90° to 100° Fahr., for about two hours, and you see the amount of sugar that has been formed. Where the saliva has been mixed with the bread, it has produced a considerable quantity of sugar. So far for the sugar. On the addition of a little alcohol, we shall be able also to see a considerable difference in the total amount of products which have been rendered soluble under the two conditions. The right-hand tube was the one submitted to the action of the saliva, and the left-hand one exhibits simply the action of water on the bread. There is in one case a considerable precipitate, and in the other very much less. I will also show you the amount of albuminoids which have been rendered soluble in the same time. While Mr. Lewis is doing that, I will make a few remarks on the necessity for all of us to husband this valuable fluid. It is not given to us to throw away, and those of you who are just about to begin manhood's life, I should certainly recommend, if possible, not to adopt the habit of smoking. But still, if you should smoke—and I do not suppose anything I may say will prevent you—I should recommend you to learn the way in which a German smokes. Any average German will smoke from morning to night, from the beginning of the year to the end, and will not expectorate once; he learns the habit of smoking without expectorating, and the result is he is none the worse for his smoking—at least, one does not see it; whereas we, in England, with our short pipes, smoke tobacco loaded with moisture—which is one of those delusions about pipe tobacco which has arisen, probably, from the interest of tobacconists. You know most people have the tobacco loaded with moisture, and keep it in a jar with a leaden cover to it. Thus considerable quantities of unburnt nicotine distil over with the moisture, and also, at the same time, tarry products and creasote; whereas when the tobacco is dry, a comparatively small quantity of these distil over into the mouth and therefore there is no necessity to expectorate. In these tubes you have, on the left-hand side, the solution which has been acted upon by some ferrocyanide of potassium and acetic acid, and that has thrown down most of the albuminoid matters. The one on the left-hand side is the solution of bread simply with water, the other on the right hand, of course, has had saliva added to it. In the left tube you see there is no precipitate, or an excessively small quantity of albuminoid matters; whereas, in the right-hand tube—due to the saliva—we have an abundant precipitate of albuminous matter. We see, therefore, that this valuable fermenting principle which we have at the very threshold of digestion, is able to convert boiled starch into sugar and dextrin with considerable rapidity, and at the same time also it breaks down, and therefore dissolves some of the albuminoids. It then passes downwards, and in the stomach and duodenum it meets with other fluids, some of which have the power also of hydrating and converting starch into sugar and dextrin, and some others have the power of dissolving the albuminoids themselves. In that way we obtain the perfect solution of the bread that we eat.

(*To be continued.*)

Parliamentary and Law Proceedings.

SUICIDE BY POISONING.

On June 24, Albert Portway, son of Mr. J. Portway, chemist, Bury St. Edmunds, committed suicide by taking poison. The deceased, who was 21 years of age, had suffered much from headache, violent sickness, and mental depression. It was stated that he had been preparing for the Minor pharmaceutical examination, and entertained fears that he should fail and that this upset his mind. The Coroner's jury found that he destroyed himself whilst in a state of temporary insanity. —*Cambridge Chronicle.*

A SUBSTITUTE FOR PAREGORIC.

IMPORTANT DECISION.

At the Town Hall, Sheffield, on Friday, July 30, before T. W. Rodgers, Esq., and David Ward, Esq., Stephen Middleton, grocer, No. 51, Harvest Lane, was summoned under the 6th section of the Sale of Food and Drugs Act, for selling 4 oz. of paregoric, which was not of the nature and substance demanded by the purchaser, being destitute of opium. The Town Clerk (Mr. Yeomans) prosecuted, and Mr. Parker Rhodes, of Rotherham, defended.

On June 25, Inspectors Brammer and Rummings, of the Health Department, went to the defendant's shop, and asked for 4 oz. of paregoric. They were not aware that the defendant sold paregoric; but, being in the neighbourhood, went in for the purpose. The defendant took down a bottle from a shelf behind him, and remarked that he was not obliged to sell any of it to them. He was told that if he refused to sell, he was liable to a penalty of £10 under the Act, and the defendant thereupon sold 4 oz. of what purported to be paregoric. He previously told the officers to look at the labels upon the bottle, which said, "Paregoric substitute, without opium. This article is guaranteed to contain no opium, or any other ingredient prescribed by the new Pharmacy Act, 1868." The defendant, in giving the officers 4 oz. of the contents of the bottle, remarked, "I give it you for what it is worth." The officers then paid 1s. and divided what they received into three portions, one of which was left with the defendant, one was reserved for themselves, and the remaining portion was at once forwarded to Mr. A. H. Allen, the borough analyst, to be analysed.

Mr. Allen said he found as the result of his analysis that the sample was destitute of opium, which was the most important ingredient in the medicine known as paregoric or paregoric elixir. The material being destitute of opium, he was of opinion that it was not paregoric.

Cross-examined by Mr. Parker Rhodes, Mr. Allen said in what was popularly known as paregoric, opium was a constituent part. The word "paregoric" signified soothing. Opium was not the only sedative known to medical science.

Dr. Hime, Medical Officer of Health, said opium was an essential part in the composition of paregoric. In its popular sense, paregoric was a medicine containing opium, and included other ingredients.

Cross-examined by Mr. Parker Rhodes: In Dr. Pereira's 'Materia Medica,' it was stated that there could be paregoric without the presence of opium, but that was not the common belief.

Mr. Parker Rhodes, for the defendant, said he was instructed to appear, not by the defendant, but by the firm who manufactured the compound. The reason it contained no opium was this:—The law prohibited grocers selling any poisonous ingredient such as opium, and in order that the paregoric might be sold to them, another and weaker article was substituted by the manufacturers, which did equally as well. The defendant was well aware of the purpose for which the officers entered his shop, and until he was threatened with a penalty of £10 he did not wish to sell them that for which they asked. He then told them frankly that he sold it for what it was worth, and showed them the label on the bottle, which said "Paregoric substitute." The officers were determined to get it, whatever it was, and they obtained that for which they asked. Several persons who were in the shop at the time strongly bore out Mr. Parker Rhodes's statement, and the maker of the compound, Mr. William Parkinson, wholesale chemist and druggist, of Burnley, spoke as to the nature of the drug.

The Bench retired to consider their decision, and upon their return into court, Mr. Rodgers said that in their opinion the defendant had done everything to show the officers that the drug they insisted upon having was not paregoric but only a substitute for paregoric, which did not contain opium. The real question in this case was whether he sold it to them as, and for, paregoric, intending to deceive, or whether he sold it for what it was. Inspectors Brammer and Rummings had not given their evidence to the satisfaction of the bench, and on behalf of the defendant there had been an overwhelming amount of testimony that could not be cast aside, that the defendant did not pass the drug off as paregoric, but only for what it claimed to be.

Alderman Ward said he cordially agreed with Mr. Rodgers's remarks, and he thought the defendant had conducted his business in a very proper way.

The case was then dismissed, and the Town Clerk asked permission to withdraw two similar cases which he had intended to have brought forward.

The Bench consented to this course being pursued.

Mr. Parker Rhodes asked for costs for his witnesses.

The magistrates declined to grant them, as they believed it would have saved much trouble, and in every way been more straightforward, if the defendant had at once told the officers when they asked for paregoric, "I don't keep the article." He had not done so, and, therefore, they could not allow costs.—*Sheffield Independent.*

ALLEGED POISONING BY A STEEDMAN'S POWDER.

On Tuesday, August 3, Mr. T. O. Brian, coroner for Plymouth, held an inquest at the Nottingham Arms, Mutley, touching the death of Ernest Jarvis, aged ten months.

Ellen Jarvis, mother of the deceased, said the child had not been very strong since its birth, and as it was not quite so well on Saturday last, a portion of a Steedman's soothing powder was given it. On the Sunday it was still unwell, and about one a.m. on the Monday morning she was aroused by the child breathing very heavily. Mr. Wolferstan, surgeon, was immediately sent for, and he came and remained with the child until 5.30 a.m., when it died. She bought the powder from Mr. Saunders, chemist, and she had given these powders very often to her other child, and they had done him good.

Mr. Wolferstan, M.R.C.S., said he had attended the child since its birth; it was a very small child, and if his orders had not been strictly attended to by the mother it would not have lived as long as it did. On Monday morning when he visited the house he found the child unconscious, and from its appearance and other signs he saw that it was suffering from an overdose of opium. He applied the usual remedies, and after about three hours the deceased revived a little, but shortly after it relapsed into its former condition, and died about 5.30 a.m. The mother said she had given the deceased a portion of a Steedman's soothing powder. He could not, however, account for the death of the child; but he supposed the powder contained a narcotic, and that the child was unusually susceptible of its influence.

The jury returned a verdict that the deceased died from the effects of a narcotic, administered through inadvertence by the mother, but exonerated the mother from all blame.—*Western Morning News.*

ROBBERY OF CHEMICALS.

At the Central Criminal Court, on Friday, August 13, before the Common Serjeant, Thomas King, Henry Harbord (a convict), William Harbord, Charles Fryer, Robert Henry Mott and Thomas Bennett, were indicted for conspiring to defraud Messrs. May and Baker, chemical manufacturers, of Battersea, and Messrs. Morson and Sons, wholesale chemists, Holborn. Mr. Poland and Mr. Montagu Williams were for the prosecution; Mr. Avory and Mr. Forrest Fulton appeared for the defence of two of the prisoners.

The case for the prosecution was as follows:—King was a night watchman in the employ of Messrs. May and Baker. From time to time he carried away large quantities of red and white precipitate and calomel, which were handed over to Henry Harbord and a man named Stevens, who have already been convicted and sentenced to five years' penal servitude, the latter being now called as a witness for the prosecution. William Harbord allowed his house at Battersea to be used as a depôt for the stolen goods, which were sold by his brother to a man named James Clarke and to Mr. Freeman, manufacturing chemist, of Kennington Park Road. The other prisoners, who were in the employ of Messrs. Morson and Sons, frequently conveyed large quantities of chemicals belonging to their masters to Stevens, who handed them to Henry Harbord to sell. In a comparatively short period, no less than 300 ounces of morphia were stolen, the prisoners realizing out of this transaction between £4 and £5 per week. The convict Stevens deposed in evidence that Fryer, Mott and Bennett frequently forwarded chemicals stolen from Messrs. Morsons by parcels delivery to Stevens's house.

Several witnesses were examined for the purpose of corroborating the evidence of Stevens.

At the close of the case the charge against Bennett was withdrawn, and he was discharged.

The jury found all the other prisoners guilty.

Sentence was respited till next session, there being other indictments against the prisoners to be disposed of.—*Daily Telegraph*.

Obituary.

Notice has been received of the death of the following:—

On the 20th of June, 1880, Mr. James Semple, Chemist and Druggist, Port Glasgow. Aged 74 years.

On the 27th of June, 1880, Mr. Joseph Silvester, Pharmaceutical Chemist, Heathside, Knutsford. Aged 76 years. Mr. Silvester became a Member of the Pharmaceutical Society in 1842.

On the 17th of July, 1880, Mr. Robert John Clark, Chemist and Druggist, Old Town Street, Plymouth. Aged 37 years. Mr. Clark became a Member of the Pharmaceutical Society in 1869.

On the 23rd of July, 1880, Mr. Edward Pearson Shaw, Chemist and Druggist, Market Place, Wakefield. Aged 52 years. Mr. Shaw became a Member of the Pharmaceutical Society in 1869.

On the 25th of July, 1880, Mr. Robert John Clarke, Chemist and Druggist, Snettisham, Norfolk. Aged 60 years.

On the 31st of July, 1880, at The Elms, Leominster, Mr. Thomas Cooper Lewis, Pharmaceutical Chemist, Sheep Street, Rugby. Aged 50 years. Mr. Cooper became a Member of the Pharmaceutical Society in 1856.

BOOKS, PAMPHLETS, ETC., RECEIVED.

ALPHABETICAL MANUAL OF BLOWPIPE ANALYSIS: showing all Methods Old and New. By Lieut.-Colonel W. A. Ross, late R.A. London: Trübner. 1880. From the Publishers.

PROFESSIONAL BOOK-KEEPING. A Treatise for Non-Traders. By WILLIAM JOHN GORDON. London: Wyman and Sons. 1880. From the Publishers.

TABLES FOR THE ANALYSIS OF A SIMPLE SALT: for Use in School Laboratories. By A. VINTNER, M.A. London: Longmans. 1880. From the Publishers.

GRUNDLAGEN ZUR BEURTHEILUNG DES TRINKWASSERS. By Dr. E. REICHARDT. Fourth edition. Halle a S.: Buchhandlung des Waisenhauses. 1880. From the Publishers.

THE WORKSHOP COMPANION, a Collection of Useful and Reliable Recipes, Rules, Processes, Methods, Wrinkles and Practical Hints for the Household and the Shop. New York: Industrial Publication Company. 1879. From the Publishers.

Notes and Queries.

[666]. ESSENCE OF COCHINEAL.—Perhaps the following recipe for preparing a really good liquid cochineal that will keep an indefinite period without change may be useful to Mr. Cottrill, in reply to his request for information on the subject, as I have not yet found any formula to equal it:—

℞	Cochineal	2 ozs.
	Subcarbonate of Potash,	
	Alum,	
	Cream of Tartar, of each . . .	2 ozs.
	Distilled Water	20 ozs.

Boil the cochineal and salts of tartar together for about ten minutes, then stir in gradually the cream of tartar and alum, strain through muslin and afterwards filter through paper. To the filtrate add ½ a pound of lump sugar and dissolve with a gentle heat. Sugar is the great preservative agent in this case, and I do not remember ever meeting with a liquor so prepared that showed any sign of change.

35, *Baker Street, W.* A. W. POSTANS.

[670]. WRITING INK.—Perhaps the following formula, taken from the 'Year-Book of Pharmacy' for 1874, may suit "Nemo's" purpose:—

℞	Acid. Pyrogallic.	1 part.
	Pulv. Gum. Arabic.	3 parts.
	Ammoniæ Vanadiate	3 „

These to be mixed in a mortar and sufficient water to be added. This forms an intensely black ink.

J. S. S.

[670]. WRITING INK.—"Nemo" will find the following in Gray's 'Supplement to the Pharmacopœia':—

℞	Bruised Nutgalls	12 parts.
	Copperas (slightly calcined) . .	4 „
	Gum Arabic	4 „
	Water	120 „

Mix them together in a stone bottle and let them stand for two or three weeks, shaking the bottle from time to time. Then pour off the clear liquor and a little creasote to prevent mouldiness. "374."

[671]. PERFUMED CARBOLIC ACID.—Will any reader inform me of a method by which carbolic acid can be perfumed so as to render it more pleasant for disinfecting purposes, and yet not destroy its properties? I have tried essential oils but find that on mixing with water it becomes turbid, a circumstance I wish to avoid.

HYPOCRATERIFORM.

[672]. STORM GLASS.—Would some reader kindly give me a receipt for a storm glass? That in 'Beasley's Receipt Book' I cannot get to answer; it seems to have either too much camphor or water. A. E. LOMAX.

CAMPHORIC ACID can be produced by boiling camphor with 15 or 16 parts of strong nitric acid, in a suitable glass vessel, for twenty or twenty-four hours, when, upon cooling, the camphoric acid will be found floating on the top of the acid as a crystalline cake. This is removed and carefully washed with ice-cold water, when it will be found to consist of a mass of acicular snow-white crystals.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

Replies.

[435]. In answer to J. J., I would suggest the boiling of the required quantity of eserine in a few gttæ of water in a test tube to produce a perfectly smooth ung.

W. J. B.

[435]. Eserine sulphate may be readily incorporated with a fatty basis for ointments by previous solution on the slab in a few drops of water, the alkaloid being very soluble in that menstruum.

R. H. PARKER.

[436]. Has "Tyro" tried treacle and oil of cloves in the proportion of 10 parts of treacle and 1 part of oil of cloves? or conf. rosæ? "374."

[436]. Water is the best excipient for pulv. ext. coloc. co. and pulv. pil. coloc. co. If the pills have to be kept long, equal parts of water and glycerine may be used and the pills enclosed in a bottle. The glycerine prevents the pills from becoming insoluble, while if made fairly hard they do not lose their shape, because the glycerine cannot exercise its hygroscopic power to any great extent when bottled.

R. H. PARKER.

[436]. "Tyro" will find a very small quantity of dec. aloes co. conc. the best excipient for pil. and ext. coloc. co. I have made numbers of pills with it and have never found them lose shape.

PILL-DRIVER.

[437]. I should think that the ointment must be of a greyish colour, on account of the mercury contained therein. "374."

[437]. Probably the prescriber was not aware of the fact that ung. hydrarg. nit. soon loses its yellow colour when mixed with lard. Physicians often erroneously forecast the colour of a mixture from that of its constituents. R. H. PARKER.

[438]. I believe there is no better excipient for pepsine pills than glycerine.

"374."

[438]. In reply to "Nemo," equal parts of glycerine and mucilage form a very good mass with pepsine. Glycerine alone makes the pill too soft, and on keeping they swell and perspire.

PILL-DRIVER.

[438]. I do not think that a better excipient for pepsine than glycerine is a desideratum. The only objection is the hygroscopic nature of glycerine, which may be easily counteracted by enclosing the pills in a bottle.

R. H. PARKER.

[438]. In reply this query, our formula for pepsine pills is—

Pepsine	gr. iij.
Pulv. Acaciæ	gr. ss.
Syr. Simplex	q. s.

And the result is a very firm and easily manipulated mass.

A. J. HEALD.

Queries.

[439].

Zinci Oxyd.	0·5
Ung. Emoll.	40·0

Should the above make a soft ointment?—as it was returned as too hard for use when sent out. The ung. emolliens was prepared according to Chevallier's formula. It had previously been dispensed on the continent.

NEMO.

[440].

℞	Ferri et Ammon. Cit.	℈iij.
	Æther. Chlor.	ʒj.
	Ess. Menth. Pip.	♏x.
	Ol. Morrhuæ	ad ℥iv.

℥ss. bis vel ter die sumend.

Is it possible to make a presentable mixture without any addition? If not what would be justifiable?

N. J.

[441]. M. L. R. would be glad to know what is the best excipient for the following:—

Ol. Menth. Pip.	gt. xviij.
Thymol	gt. vj.

Ft. pil. xij.

They have been made up with soap and magnesia.

[442]. A prescription is offered for dispensing:—

Ung. Hyd. Iodi.

Which should be sent, the protoiodide or the biniodide?

A JUNIOR.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

A PROTEST AGAINST REDUCING PRICES.

Sir,—As the recent decisions in favour of co-operative trading may incline some of your readers to make greater efforts to compete with the stores, and as there is a great tendency to lower prices at the present time, I wish to point out the inadvisability (as far as my experience goes) of attempting to compete with stores and other large establishments by reducing prices, unless we can supply goods at the same rate as they do, which of course we cannot. After carefully watching the matter for more than fifteen months, and trying the experiment in certain cases, I have come to the conclusion, and shall be glad to hear that others have done the same, that it is no use meeting the store price half way, for the public will still go to the cheapest—or what they think the cheapest—market and simply make a convenience of the local higher priced trader, who, therefore, might as well get full price for what he does sell. I can mention the instances of three articles where such has been the case, viz., seedone, apollinaris, and Allen's hair restorer, to say nothing of smaller priced articles. On seedone, which I thought at 6*s*. 6*d*. per dozen was cheap enough to please everybody, the public can now save 1*s*. a dozen by buying at the stores, and do so. With regard to apollinaris I have found an unreasonable preference shown for paying 23*s*. for fifty bottles at the stores, and paying me 8*s*. per dozen for odd half dozens, when they run out of it (which is pretty often), rather than for buying of me for 25*s*., and having a constant supply. Mrs. Allen's hair restorer, again, I used as a test article and have sold at all prices from 4*s*. 6*d*., but have not thereby increased my sale nor reduced that of the stores. So far I have referred to purely commercial transactions, but in dispensing we have less cause for reducing prices to keep from the stores people who when ill must have their medicine prepared in the neighbourhood where they reside. In reply to those who would ask how we can compete with the stores, I would say that by the exercise of virtues which are somewhat deficient at those establishments, viz., attention, civility, neatness and dispatch, and by maintaining towards our customers a just appreciation of our technical knowledge and responsibility, we shall retain the confidence and patronage of an appreciative though exacting public. This I contend is a more dignified and consistent course than encouraging the sale of quack medicines and other articles of unknown composition, which as educated pharmacists neither is it our duty nor to our advantage to do, and whereby we shall only lose caste with many people. Let us, therefore, give up the short-sighted, erroneous and derogatory policy of underselling, and be firm in our demand for such remuneration as experience has shown not to be exorbitant or unreasonable. Those who have already reduced prices and may think they have done so wisely because they have attracted some custom from their neighbours will not I fear be able to retract, but the hope of deterring any who may be contemplating doing so is my excuse for trespassing so much upon your valuable space.

St. John's Wood. J. J. CHAPMAN.

THE PHARMACY ACT AND ASSISTANTS.

Sir,—Now that the interpretation of the word "person" in the Pharmacy Act, 1868, means the actual compounder or seller of poisons, it is full time that those of us who are on the register of chemists should look the matter boldly in the face, and see whether we have not misread the intention of the Act as appertaining to ourselves and our assistants. We must confess that hitherto we have considered it perfectly legal to open half a dozen shops, and put unqualified assistants to manage them.

In clause 1 of the Act, 1868, it says:—"It shall be unlawful for any person to sell." Does it really mean employer as well as assistant? I certainly think it does, otherwise, why does it say immediately after, "or keep open shop for retailing or compounding poisons?" "Keep open shop" evidently means that the actual owner of the shop must also be qualified, and that it is neither legal for the master to employ an unqualified assistant, nor for an unqualified person to be the owner of such a shop. The meaning of the Act is also wide enough to include the non-employment of unqualified persons in any surgery, hospital and public institution.

Clause 16 reserves the rights of certain persons:—"Nothing hereinbefore contained shall extend to, or interfere with, the business of any legally qualified apothecary." That means that if they choose to do the dispensing themselves, it must be done by their own hands, and not by a boy in buttons, a first year student, or his better half, unless such person be legally qualified.

Clauses 3 and 4 explain the meaning of chemist and druggist, and who are entitled to be registered under this Act. It includes masters as well as assistants, so that no hardship should be felt too severely in the first instance by anyone from its provisions. Seeing that it all through provides for the assistants, it shows clearly that in future assistants so employed must be qualified, otherwise there is no guarantee to the public as intended by the Act. If this is not the intention of the Act, the sooner a fresh one is introduced to Parliament, and its meaning made more definite, the better for the protection of the public, and of those chemists already on the register, whether employers of, or engaged as, assistants. It would also be advisable to introduce a clause something like the following:—"That each bottle of medicine or packet of poison should bear the signature of the dispenser or seller, and that the word 'poison' should be left out after compounding," for often the mistake when it occurs is from the misreading of the prescription, or the wrong ingredient is used through ignorance, and not because any poison is ordered in it.

And, "that whenever a qualified assistant changes his situation, he should send a notice of such a change to the registrar," unless clause 10 in the present Act provides for it. We often hear employers saying that there is dearth of assistants, but this is entirely due to the employment of qualified assistants to do work which has nothing whatever to do with the business of a chemist. If we employ qualified assistants only for our legitimate business and fill up their time by doing other work, instead of giving the preference to unqualified ones, these qualified men will soon recognise their position, and demand a fair remuneration for their services at the expense of the public, and those who cannot now afford to keep assistants will, I hope, in future find the dispensing of prescriptions more remunerative and more equalized, and thereby prevent qualified men seeking a living by being driven to illegal prescribing, dentistry, etc. The law was never intended to protect only the special few, but the public and all those on the register only. We shall then in a short time hear no more of speculative chemists and their numerous establishments, nor co-operative dispensing, than we now hear of co-operative surgeons, solicitors or barristers.

I also think that if the Pharmaceutical Society communicated with the Medical Council, they might introduce a clause in the next Medical Bill to compel legally qualified practitioners to either write or have printed on their prescriptions their name and address. It may be the means of preventing illegitimate prescribing, and certainly for the ready communication, if need be, by the dispenser with the prescriber.

WEST END.

COUMARIN IN ORCHIS MILITARIS AND SIMIA.

Sir,—To the British plants *Anthoxanthum odoratum*, *Asperula odorata* and *Hierochloe borealis*, known to contain coumarin, two more may be added, the closely allied orchids, *O. militaris* and *Simia*. Baxter, in his 'English Plants,' alluded to their "delightful fragrance, especially when drying," this being almost exclusively owing to coumarin, the unsized paper used in preserving specimens retaining the odour for a long time.

The true military orchis is recorded from Oxon, Berks, Bucks and Herts. The monkey orchis (*Simia*) only from Oxon and Berks, and in the latter county is queried in 'Topographical Botany,' as being probably extinct. I found last year a single specimen in Berks; this year, in company with Mr. Bolton King, of Balliol College, although we found a few specimens of both species in Oxon, our search was unsuccessful in Berks. These orchids have many intermediate forms, widely different as true *Simia* is from *Militaris* in appearance, it being much the more beautiful plant. I am rather inclined to think the intermediate forms are hybrids, as where *Simia* alone occurred they were all typical plants, but where both occurred some specimens of *Simia* evidently approached *Militaris* in appearance.

It would be interesting to know whether the Kentish military orchis, *O. fusca*, botanically so closely allied to the foregoing species, also contains coumarin; my own dried specimens give no trace of it.

118, *High Street, Oxford.* G. C. DRUCE.

ASSISTANTS IN THE SOUTH OF FRANCE.

Sir,—In case the letter from Mr. Boutell which appeared in your last issue should cause any assistants to desist from going to France, will you kindly grant me a few lines?

Mr. Boutell's warning against one pharmacien has unfortunately cast suspicion over all, and for the sake of those who have not been in the South, as well as to clear the generality of employers there, he ought to have called the *loup blanc* by his name.*

Mr. Boutell ought to know besides that Englishmen have a practical appeal against injustice, and can obtain substantial reparation if wronged.

Indeed, the advantages of situations in the South of France are so great that none need hesitate if they avail themselves of Mr. Boutell's experience and offer of advice. Assistants are well paid, and treated with gentlemanly respect. They are entrusted with liberty of action and judgment, which English employers would do well to grant, for it causes them to take a pride and a pleasure in doing a large business.

The "English chemist" is looked up to by the thousands who winter in the South as an "institution" of public utility, and so attached does he frequently become to the business, to the proprietor, to the customers, and to the gentle clime, that he can hardly bring himself afterwards to settle again in England.

16, *Coleman Street, London, E.C.* GEORGE WEDDELL.

J. B.—There is an Act regulating the practice of pharmacy in the State of New York, as is the case also in several of the other North American States. Neither a "Major" nor a "Minor" man would have a right to carry on business in one of such districts unless he has complied with the requirements of the respective legislation.

James.—A recipe for "Pick-me-up" was repeated in the number for September 27 last, p. 260.

Vis.—We do not think the marks can be removed without a surgical operation.

R. A. Hoyle.—(1) *Pyrola*, probably *P. secundiflora*. (2) *Plantago*, probably *P. lanceolata*, but we cannot say without the leaves. (3) *Galium verum*. (4) *Centaurea nigra*. (6) *Agrimonia eupatoria*. (7) *Lychnis arvensis*. (9) *Hypericum*, probably *H. quadrangulum*, but impossible to say from such a scrap. (10) *Juncus Gerardi*. One specimen without a number appears to be *Epipactis atrorubens*. Nos. 5 and 8 not received. Our correspondent is requested to send in future entire specimens when not of large size, or at least stem leaves as well as flowers, and not more than six specimens at a time.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Davy, Chapman, Dispenser, J. H. J., W. B. S.

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* This was done by Mr. Boutell; but it is not our practice to publish names in such cases.

NOTES ON INDIAN DRUGS.

BY W. DYMOCK.

(Concluded from page 22.)

CYPERUS ROTUNDUS, *Linn.* CYPERACEÆ. *The tubers.* *Vernacular*: MOTHA (Hind., Beng., Bomb.); KORAI (Tam.). C. PERTENUIS, *Roxb.*: NÁGARMOTHA (Hind., Bomb., Beng.); KORIAK-KIZHAN-GU (Tam.).

History, Uses, etc.—These two plants, which are considered by botanists to be only varieties of the same species, produce aromatic tubers which have long been in use in Hindu medicine under their Sanskrit names of 'mustaka' and 'nagarmustaka.' They are considered to be diaphoretic, astringent and stomachic, and are prescribed in febrile affections and derangements of the bowels. The nagarmotha is much used as a perfume. The Arabian and Persian writers describe several species of *Cyperus* under the names of 'suud' and 'mishk-i-zamin.' They consider the tubers to be attenuant, diuretic, emmenagogue, lithontriptic and diaphoretic, and prescribe them in combination with other remedies in febrile and dyspeptic affections. Alone it is recommended in a number of minor ailments; one ounce is said to be an efficient anthelmintic.

Description.—The ovoid or nearly round tubers of *C. rotundus* are developed upon a thin underground stem; externally they are black, scaly, and give off numerous fine rootlets; at their summits the remains of leaves and often one or more small tubers may be seen. The substance of the tuber is white and spongy; it has a faint aromatic odour much like that of *Acorus calamus*. Nagarmotha, which is the kind in general use, consists of elongated simple or branched tubers, generally about 2 inches long and ½ inch in diameter. The external surface is marked by a number of annular ridges and is almost concealed by the remains of leaves. When these are removed the colour of the tuber is a deep brown-black. A few wiry rootlets arise from its under surface, and at the lower end is a portion of the underground stem. The substance of the tuber is hard and of a reddish-white colour; it is divided into a central and cortical portion, the latter being of a darker colour. The odour is strongly aromatic, like *Acorus*, but somewhat terebinthinate.

Microscopical Structure.—The outermost layer of the cortical portion is composed of large bundles of reddish-brown stony cells separated from one another by interspaces; within it are from 6—8 rows of very thick-walled, empty cells; next a tissue of thick-walled cells, most of them full of large starch granules, but some containing essential oil and probably resinous matter. The central portion of the root is separated from the cortical by a single row of small yellow stone cells; it is composed of thick-walled cells, full of starch like those in the cortical portion, but differs from it inasmuch as many of the cells contain red colouring matter. Large vascular bundles abound in the root; some of them are surrounded by a layer of stony cells.

Commerce.—Two kinds are met with in this market, Surat and Kattiawar; the first is heavier and more aromatic than the second. Value, Surat Rs. 2 per maund of 37½ pounds. Kattiawar Re. 1¼.

HERMODACTYLUS. COLCHICACEÆ. COLCHICUM Sp.? *Vernacular*: SOORINJAN (Hind., Bomb., Beng., Tam., Arab.).

History, Uses, etc.—The Hermodactyl or "Finger of Hermes," was unknown to the early Greeks; it appears to have been first used medicinally by the Arabs or later Greek physicians; it was first mentioned by Alexander of Tralles, who flourished A.D. 560 lib. xi. It is deserving of special notice that under the name of surugen or hermodactyl, Serapion comprehends the κολχικον and εφημερον of Dioscorides and the ερμοδακτυλος of Paulus Ægineta (Pereira, vol. ii., pt. I., p. 166). Mesue and other early Arabian writers describe three kinds of hermodactyl, the white, yellow and black. In this they are followed by most of the more recent Mahometan writers. Meer Muhammad Husain tells us in his 'Makhzan' that the white is the best and that it is not bitter, next the yellow; both may be used internally. The black, he says, is poisonous and only to be used externally. He describes the hermodactyl plant as having leaves like a leek and a yellow flower; it is called in Persia 'shambaleed.' The black variety, he says, has red flowers. Mahometan physicians consider the drug to be deobstruent, alterative and aperient, especially useful in gout, rheumatism, liver and spleen. In gout they combine it with aloes; with ginger and pepper it is lauded as an aphrodisiac; a paste made of the bitter kind with saffron and eggs is applied to rheumatic and other swellings; the powdered root is sprinkled on wounds to promote cicatrization. European physicians in India who have tried the drug consider the tasteless hermodactyl to be inert or nearly so and the bitter to have properties similar to colchicum (confer. 'Phar. of India,' p. 246).

Description.—Surinjan-i-sheereen, or tasteless hermodactyl. Speaking of this drug, as furnished to him from India by Dr. Royle, Pereira says. "In their general form these corms resemble those of *Colchicum autumnale*. They are flattened, cordate, hollowed out or grooved on one side, convex on the other. At their lower part (forming the base of the heart) is a mark or disk for the insertion of the root fibres. Their size varies; the specimens I have examined were from ¾—1½ inch in length or height, 1—1½ inch in breadth, and about ½ an inch in depth. They have been deprived of their coats, are externally dirty yellow or brownish, internally white, easily broken, farinaceous, opaque, odourless, tasteless, or nearly so, and worm eaten. They agree precisely with hermodactyl furnished me by Professor Guibourt.

"Surinjan-i-talkh or bitter hermodactyl. The corms of this variety are distinguished from the preceding by their bitter taste, their smaller size, and by having externally a striped or reticulated appearance. Their colour for the most part is darker; in some specimens it is blackish. One corm is ovate-cordate, 1 inch in height or length, ¾ of an inch broad and about ¼ inch thick, grooved or hollowed on one side, convex on the other; it is of a brownish-yellow colour, semi-transparent, has a horny appearance and is marked by longitudinal stripes, indicating a laminated structure. A second is opaque, amylaceous, reticulated externally, white internally, less flattened, and of a remarkable shape, the concave or hollow side of the corm being continued half an inch below the mark for the attachment of the root fibres" ('Materia Med.,' vol. ii., pt. I., p. 167). Pereira's description agrees exactly with the hermodactyls of Bombay.

Microscopic Structure.—The starch grains of the tasteless hermodactyl are large and muller shaped.

Chemical Composition.—Le Canu has analysed the tasteless variety and obtained the following result: starch (forming the bulk of the drug), fatty matter, yellow colouring matter, gum, supermalates of lime and potash and chloride of potassium. The bitter kind does not appear to have been examined.

Commerce.—The hermodactyls are imported into Bombay from the Red Sea ports. Value Rs. ¼ per lb.

Substitute.—The sliced bulb of the true narcissus, imported from Persia, is sold in Bombay as bitter surinján. It may be at once detected by its larger size and tunicated structure. The taste is bitter and acrid, the substance amylaceous and very similar to that of the hermodactyl. It is used as an external application and according to the author of the 'Makhzan' has properties very similar to those of surinjan-i-talkh. Value annas 3 per lb.

SMILAX CHINA, *Linn.* SMILACEÆ. *The root. Vernacular*: CHOB-CHINI (Hind., Beng., Bomb.); PARINGAY-PÚTTAY (Tam.).

History, Uses, etc.—China root is described in native works on materia medica as a new medicine. It appears to have been introduced into India from China by the Portuguese before the middle of the sixteenth century. The Arabs call it khashab-us-sini; in India it is universally known by its Persian name, chub-chini (China wood). The author of the 'Makhzan-ul-adwiya' has a long article upon its medicinal virtues. He also notices particularly the variable appearance of different samples of the drug, and directs that which is heavy, of a rosy colour, and free from knots, to be selected. He tells us that the fresh root is sometimes brought to India. Some of this he planted at Moorshidabad, A.H. 1178; it produced a climbing stem with small elongated leaves, not unlike a bamboo. After a year's time he dug it up, but found that the roots had degenerated, and did not retain the qualities of the China article. Chob-chini, though now little used in Europe, still retains its celebrity in the East, and is consumed in enormous quantities both in India and China, the natives considering it to be antirheumatic, antisyphilitic, aphrodisiac and demulcent.

Description.—The tubers of chob-chini, which are formed upon the fibrous roots of the plant, are of the shape and size of an elongated kidney potato somewhat flattened, knotty, covered with a rusty coloured bark, sometimes smooth and shining, sometimes rough; internally their substance is of a pinkish-white colour, hard and farinaceous, insipid, mucilaginous and inodorous. The drug is usually peeled and trimmed, and consequently is of irregular form, resembling a piece of soft pinkish-white wood.

Microscopic Structure.—The bark consists of thick-walled dark-brown brick-shaped cells, which contain bundles of crystalline needles and resinous matter. The bulk of the tuber is made up of a parenchyma, the cells of which are large, thin-walled and loaded with starch; some pink colouring matter is also present. The starch grains are large, and have a radiate hilum. The vascular system is scalariform, and is associated with porous wood cells.

Chemical Composition.—No active principle has been separated.

Commerce.—The drug is brought to Bombay from Chinese ports and Singapore by the coasting steamers. Value, unpeeled, Rs. 3—4 per maund of 37½ lbs.; peeled, Rs. 9.

ERIODICTYON CALIFORNICUM.*

BY WILLIAM C. HOLZHAUER.

The leaves, exhausted by stronger alcohol and then by water, yielded the following results:—

1. The alcoholic percolate, evaporated to the consistence of an extract, yielded, by distillation with water, a small amount of volatile oil, lighter than water, of a pale straw colour, aromatic taste and odour, but slightly resembling that of the leaves. The distillate was neutral to test paper. On boiling the alcoholic extract with water and allowing the liquid to cool, a crystalline substance, of a yellowish-white colour and of a feathery appearance, deposited, destitute of taste and odour, insoluble in cold water and benzin, sparingly soluble in hot water (the solution having a slight acid reaction), very soluble in chloroform, ether and alcohol.

No alkaloids could be detected in the aqueous decoction.

The remainder of the aqueous decoction was then treated with a solution of acetate of lead, as long as a precipitate was thereby produced; then filtered. The precipitate, having previously been thoroughly washed with cold water, was then diffused through alcohol and decomposed by means of sulphuretted hydrogen, filtered, and the filtrate evaporated to dryness at a low temperature. The residue was a brittle substance, of a light brown colour, having an astringent, sour taste, proven to be tannin, the alcoholic solution of the tannin being perfectly clear, while that of the aqueous solution was turbid, and on the addition of ammonia or potassic hydrate turned to a dark brown colour and became perfectly clear. The tannin gives a green precipitate with chloride of iron, acquiring a dirty appearance on standing.

2. Previously having treated the leaves with alcohol, they were then percolated with water. The percolate was of a dark brown colour, bitterish astringent taste and had a slightly acid reaction. After concentrating the percolate a part of it was treated with absolute alcohol, producing a precipitate of a dark brown colour, wholly soluble in water, and proven to be gum associated with brown colouring matter. The presence of sugar was detected by means of Trommer's test.

No alkaloids could be detected. A portion of the percolate was then treated with a solution of acetate of lead as long as a precipitate was thereby formed. The precipitate, collected on a filter and thoroughly washed with water, was then diffused through alcohol and decomposed by sulphuretted hydrogen, filtered, and the filtrate slowly evaporated to dryness by means of gentle heat. The product obtained was tannin, similar in appearance and corresponding in all its reactions to that obtained from the alcoholic percolate.

3. A fresh quantity of leaves was exhausted by ether.

The ethereal percolate was allowed to evaporate spontaneously to the consistence of syrup.

On boiling this with water a resinous mass was precipitated. The supernatant liquid was of a pale straw colour, slightly aromatic taste and odour and of an acid reaction. Evaporating the supernatant liquid and allowing to cool, crystals were obtained similar to those of the alcoholic extract, the quantity being too small to allow further investigation.

Examination of the Resinous Precipitate.

By treating with stronger boiling alcohol and allowing to cool, a soft, greenish, waxy substance separated, forming a pellicle. This substance was freed from colouring matter by continued washing with cold alcohol. The residue was proven to be vegetable wax, possessing a slightly greenish tinge. After treating the resinous precipitate with boiling stronger alcohol there remained a soft, sticky substance, having neither taste nor odour, but slightly soluble in benzin and ether, readily soluble in chloroform, and from this solution was reprecipitated on the addition of alcohol, not volatile, burning with a sooty flame, which experiments prove its being identical with caoutchouc.

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* From the *American Journal of Pharmacy*, August, 1880.

The remaining alcoholic liquid was of a dark green colour; after boiling and then digesting this liquid for twenty-four hours with animal charcoal, filtering, and subsequently evaporating by gentle heat, a brittle resin was obtained of an amber colour, aromatic, slightly bitter taste and faint odour.

GLYCERIN CEMENT.*

Hirzel obtained, in 1869, by triturating litharge with glycerin, a mass which he found useful as a cement for vessels containing benzol, ethereal oils, etc., as it possessed the property of soon hardening. During the same year Pollack recommended the same mass as a cement for stone and iron ware, and pointed out that it was attacked only by strong acids; also, that its durability is the greater the more water the litharge had absorbed, since the latter when entirely dry yielded a cement of feeble adhesiveness only. Rost, in 1870, found this cement proof against concentrated [?] and diluted acids, alkaline lyes, ether, alcohol, benzol and carbon disulphide.

The somewhat contradictory statements regarding the power of resistance against acids of this cement, as well as the desire to find out whether glycerin entered into a chemical combination with litharge, led Theodor Morawski to investigate the subject. Regarding the chemical combination, we may briefly state that he actually found this to be the fact. He obtained a definite compound, crystallizing in fine needles, which was found to be a glyceride of lead, of the composition $C_3H_6PbO_3$. But this compound, when isolated, is not of great stability, and would scarcely interest our readers. Our object is to draw attention to the practical applicability of the compound as a cement.

From a large number of experiments instituted to ascertain the most favourable conditions for the production of a perfect cement, the author obtained the following results:—The *hardest cement* is produced by triturating 50 grams of litharge with 5 cubic centimetres of glycerin. If more glycerin is used the mass hardens much more slowly and imperfectly.

The small proportion of glycerin, however, makes it impracticable to prepare large quantities of the cement at a time. For this purpose it will be necessary to take more glycerin, in order to facilitate the trituration. But as it was also proved that the addition of a small quantity of water produced an equally durable cement, provided the proper proportions are observed, he found, after many trials, that the most favourable results are obtained by adding 2 volumes of water to 5 volumes of glycerin (sp. gr. 1·240); 6 cubic centimetres of this liquid are incorporated with 50 grams of litharge. This mass requires a shorter time than any other proportions to produce a hard cement, ten minutes only being required to harden moderately, while after two hours it becomes even harder than any mixture containing litharge with glycerin alone. But after a few days the latter compound (prepared without water) overtakes the former in hardness and remains so. If it is desired to produce a cement which rapidly hardens and still has considerable firmness, it is advisable to use water with the glycerin.—*Dingler's Polyt. Journ.*, 235, 213.

This form of cement appears to be applicable for many purposes in the laboratory as well as in drug houses. It may be used as luting for joints or as cement for stoppers, and probably also for mending stone, wedgewood and porcelain ware. Of course, it should not be forgotten that it contains lead.

PRESENTATION TO PROFESSOR ATTFIELD.

On Wednesday afternoon, at the conclusion of the proceedings of the British Pharmaceutical Conference, held at Swansea,

Mr. Schacht rose and said: Mr. President, a duty has come to me by the accident of things, the responsibility of which I certainly feel to be very great; but I confess I am able to face it all the more readily because of the great personal gratification which accompanies it. It will be remembered that on the occasion of our meeting last year at Sheffield it was announced by our Senior Honorary Secretary that it would be impossible for him to fulfil any longer the duties appertaining to that office, and he merely yielded to our urgent solicitations to continue them for another year on the clear understanding that at this meeting his official connection with the Conference as its Honorary Secretary should terminate. When that announcement was made, but one feeling seemed to animate the minds of all members, and though at first something like a sensation of dismay obtruded itself lest we should find more difficulty than was subsequently experienced in replacing so able an officer, that was speedily replaced by one unanimous feeling of gratitude to Professor Attfield for the great services he has rendered to the Conference. That sentiment naturally suggested that some formal expression should be given to it, and that idea soon took the form of a resolution that on this occasion a formal expression of our feelings should take place. Since on that occasion I had the honour to occupy the place now so ably filled by you, sir, I naturally became the Chairman of the Committee appointed to carry out the resolution, and hence the somewhat prominent part which I am now called upon to occupy in this matter. For many years I have had the pleasure of an intimate acquaintance with our friend, and charging my memory to strict accuracy, I can trace throughout all my knowledge of him nothing but one steady, constant effort to lead a good and useful life. As to its goodness, this is not, perhaps, the place to speak, and I will not dilate upon it further than to say that I believe that side of his character to be the mainspring of the other. It may not be inappropriate, perhaps, to say just a word or two on the point of Professor Attfield's usefulness in his public life, which is, indeed, the cause of what we are now doing, and explains the enthusiasm with which the project has been received. Broadly speaking, it occurs to me that the usefulness of our friend's life has consisted in this, that he first of all achieved a high and distinguished position for himself, and from that moment he has endeavoured to hold up both for our admiration and achievement that higher life of mental culture which is so plainly open to us in the very nature of our calling, but which we are very prone to forget in the experiences of business. It seems to me it has been in that constant protest against pharmacists sinking into anything like perfunctory drudges, and in his recommendation of the only genuine remedy for that, viz., that each man should do something, or at least try to do something, for the general good, that the main influence of Professor Attfield has rested. Beginning his pharmaceutical work somewhere about 1854, he carried away the only two medals which the school then offered its patient and industrious students; he took the two medals in his year, and soon after became director of the laboratory, and finally, Professor of Practical Chemistry. Throughout the time he has held this appointment his usefulness and success in that capacity can be testified to by scores of our most eminent pharmacists, and the secret of his success seems to have been that he has adopted the scientific method of teaching his own science, and has steadily persevered in avoiding all those apparently royal roads which commend themselves to some to their own delusion, and has endeavoured constantly to urge that one steady course through the narrow way that leads to right. And for this, not pharmacists only, but the whole public, ought to feel, so far as they know the facts, something like gratitude. But possibly the most interesting point in our friend's career was that at which he allowed himself to become the chief Honorary Secretary of this Conference. He, I am sure, would not wish me to attribute the whole success of this organization to his labours. He was associated in those days with men who had always been faithful to the cause, some of whom I see around me now, whilst some of them have gone to their rest; but all were earnest in their endeavours to promote an organization which was aiming, as they thought and as he thought, at advancing the highest interests of pharmacy. They all laboured earnestly, but I am sure those gentlemen, and all who laboured with them, would wish me to say that they regard Professor Attfield's labours as the most prominent, and that they would accord to him a very large portion of the honour due to those who carried the infant through its early days into maturity. This project was initiated a year ago, and during the interval I am happy to remind you that Professor Attfield has received perhaps the highest reward which a scientific Englishman of the present day can seek. He has received the blue ribbon of science in being elected a Fellow of the Royal Society. But I am sure it will be gratifying to you all to remember that this little testimonial was initiated before the recognition of Professor Attfield's claims on the part of the governing body of the Royal Society. I am sure you will all feel glad when I have finished, and I will, therefore, detain you no longer than to read this scroll which is supposed to accompany the presentation of some volumes of general literature, which are at present in London, where an opportunity will be presented to those who feel curious to see them to do so during the next few weeks, as they are too bulky to be brought down here:—'Presented, with about five hundred works of general literature, to John Attfield, Ph.D., F.R.S., Professor of Practical Chemistry to the Pharmaceutical Society of Great Britain, etc., by Members of the British Pharmaceutical Conference, in token of their goodwill and hearty appreciation of his services as Senior Honorary Secretary of the Conference from it foundation in Newcastle-on-Tyne in 1863 to its meeting at Swansea in 1880.' That is signed by myself as Chairman, F. B. Benger, Henry B. Brady, T. Hyde Hills, Theophilus Redwood, Richard Bremridge and Michael Carteighe, Honorary Secretary, as representing the large number of gentlemen who contributed to the memorial. I beg, with your permission, sir, to hand it to Professor Attfield.

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* Reprinted from *New Remedies*, June, 1880.

Professor Attfield, as soon as the cheering had subsided, rose and said:—Mr. President, Mr. Schacht, and gentlemen, I accept your very handsome testimonial with feelings of pleasure and of satisfaction which are simply inexpressible. As you have said, seventeen years of the prime of my life have been devoted, shoulder to shoulder with such honoured colleagues as Reynolds, and Brady, and Schacht, with Presidents who still gladden us with their presence, and Presidents who have passed away, to the founding, developing, and maintaining of the British Pharmaceutical Conference. My great reward—the greatest reward, as a matter of course—is seen in the great success of our joint labours. That success is great. We have, officers and members together, contributed, during the seventeen years of the life of the Pharmaceutical Conference, to the stock of pharmaceutical knowledge four hundred original investigations, and we have done that without impoverishing in the slightest degree any other agency for the prosecution of original research. We have annually given opportunities for the leading chemists and druggists of Great Britain and Ireland to assemble together and exchange thoughts and opinions on pharmaceutical matters, and by the generous aid of the local members in the towns we have visited have given them opportunities for friendly intercourse and good-fellowship, and these things have had the happiest results. And lastly, for the past ten years, we at all events have given to every one of our members not only the ordinary advantages of membership in a great association, but a record of the pharmaceutical discoveries made throughout the whole world, in the form of a 'Year-Book,' which itself has been, I think, at least double the value of the annual subscription. I say again, my great reward is in contemplating the results of these, our joint labours. But, gentlemen, to have one's life work appreciated and recognized by those for whom it has been more immediately undertaken and continued is extremely gratifying, and, therefore, I thank you from the depths of my consciousness for this most delightful present. Gentlemen, my wife will thank you, and my children will thank you too, for they are just entering on the paths of general literature; and my library, although fairly well reflecting science, is not rich in those very works of general literature with which you now present me. I myself, at the age of fourteen, or a few weeks over, went from my school books straight to the study of works of chemistry, botany, pharmacy, and materia medica; but, like Enoch Arden, I have desired that my children should have even a better bringing up. And as for my wife, of whom I am sure I may say, 'many daughters have done virtuously, but thou excellest them all,' I have long determined that she, now that the cares of teaching and training are getting less, should have the opportunity of having at command the works of those authors which a busy life (busy as mine) has only allowed of her having a partial acquaintance with, and you, by this present you now make me, enable me to realize one of my most cherished hopes. Gentlemen, I can only say that you could not possibly have gratified me and my family more than by publicly recognizing this work that I have done, the loving labour that I have undergone for you and for pharmacy, and you could not possibly have chosen a better mode of showing your appreciation.

Loud applause greeted the conclusion of the above brief, but very effective address, and the proceedings concluded with three cheers for Professor Attfield.

The Pharmaceutical Journal.

SATURDAY, AUGUST 28, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE BRITISH PHARMACEUTICAL CONFERENCE.

The British Pharmaceutical Conference has during the past week marked the seventeenth year of its existence by extending its travels to the Welsh principality, the only portion of the British Islands previously unvisited by it in the course of its annual meetings. And although doubtless the attendance was unfavourably influenced by the difficulties which lie in the way of reaching Swansea from many parts of the kingdom, as well as the fact that neither the town itself nor its hotels present attractions which would tempt a tired pharmacist to spend a portion of his hard-earned holiday in breathing a smoke-laden atmosphere, there was, nevertheless, sufficient in the hearty welcome given by the local committee and in the interest of the business done to repay well those who did make the venture.

At the commencement of the proceedings a tolerably long list of delegates from various societies was read over, but unfortunately very many of those named were conspicuous only by their absence. The Pharmaceutical Society of Great Britain was represented by the President, Vice-President, and three other members of Council, but neither the Secretary, the Assistant Secretary, nor—with the exception of Professor Attfield—the Professors of the School of Pharmacy put in an appearance. The Pharmaceutical Society of Ireland was wholly unrepresented. American pharmacy, however, was for a time represented by Professor Maisch; but having, as Secretary of the American Pharmaceutical Association, to be present at the coming meeting at Saratoga he was compelled to take his leave before the termination of the Conference.

The report on the state of the finances shows a balance of over five hundred pounds, a kind of white elephant apparently, since only one application has been made during the year for a money grant in aid of research. Whether or not it be by reason of the opening up of other and more fertile hunting grounds for the seekers of grants in aid that the funds at the disposal of the Conference are thus disregarded we cannot say, but it is evident that some five hundred pounds is now going a begging, and that there is an opportunity for some one to devise a means by which it may be applied to a purpose useful to pharmacy.

The death of Mr. Stoddart was naturally referred to in feeling terms in the report, not only by reason of his helpful connection with the Conference from its inception, but also because he had so highly distinguished himself in various ways as to make his loss a special matter of regret, requiring expression in the manner unanimously agreed to by the meeting in accordance with the proposal of Mr. Reynolds and Mr. Brady.

The retirement of Professor Attfield from the position he has filled so long and so ably was another regretful feature, which contributed to make the report of the Executive Committee more than ordinarily gloomy.

The Presidential Address is this year a deviation from the course usually followed on such occasions, and though it cannot be said that the address presents any very obvious utilitarian features, it affords material for thought, and at a time when pharmaceutical affairs are in such a high state of tension, when the future of a large section of the trade is, to say the least, so unpromising, it was probably expedient to abstain as far as possible from the discusion of trade interests and from stirring the troubled waters of pharmaceutical politics.

The first paper read formed the conclusion of the series of reports on the investigation of the aconite alkaloids, carried out by Dr. C. R. Alder-Wright, with the aid of grants from the Conference. In this instance the material operated upon was the fresh herbaceous portion of *Aconitum Napellus*, grown at Foxton, in Cambridgeshire, the method of operating being the same as that described in last year's report. The alkaloid obtained by evaporation from the ethereal solution could not be made to crystallize or yield crystalline salts, though from its activity it appeared to contain a notable amount of the alkaloid which Dr. Wright regards as true aconitine. Judging from analysis, its composition was inferred to be substantially the same as that of the mixed alkaloids obtained from the roots of *A. Napellus*. The uncrytallizable character of this mixture of alkaloids was ascribed to the larger amount of amorphous bases preventing crystallization. The experiments made by Dr. Wright appeared to show that, though the dry herb did not contain very much less total alkaloid than the equally dry root, the percentage of aconitine in the alkaloid obtained from the herb was much less than in that obtained from the root. This result, however, cannot be regarded as representing the invariable proportion of the alkaloids, since it is inconsistent with the observation of Mr. Williams that sometimes no crystallizable alkaloid is to be obtained in operating upon the roots. This apparent variability would appear to show that it is desirable to make further experiments with a view of ascertaining how far the amount of crystallizable aconitine may be influenced by differences in the age of the roots, or by differences in the soil and climate in which they are grown. Dr. WRIGHT considers that experiments of this kind, as well as those necessary for ascertaining the precise method of treatment and the menstrua best suited for separating crystallizable aconitine economically on the large scale from the non-crystallizable alkaloids associated with it, cannot readily be carried out by the scientific chemist in his laboratory. It appears therefore that this investigation still leaves unsatisfied the want which, on a previous occasion, we pointed out as being the most pressing, namely, a means by which the peculiar substance possessing powerful physiological activity can be practically separated from the less active substances associated with it. Until this is done, there is no prospect of being able to satisfy the demand that exists for a more definite form of aconitine for medical purposes.

In Professor FLUCKIGER's paper on "The Essential Oil of Buchu Leaves," he pointed out that the oil contains a crystalline substance analogous to carbolic acid, to which he gives the name "diosphenol." The liquid portion of the oil, chiefly distilling between 205° and 210° C. possesses an odour very like that of peppermint. This oil is destitute of rotatory power, and has a composition approximately represented by the formula $C_{10}H_{18}O$. It also appears from some experiments made by Dr. POWER that this compound is contained in the oil in the form of a compound ether. Professor FLUCKIGER did not find that the specimen he operated upon contained salicylic acid. In connection with this paper it may be mentioned that in 1865 Mr. UMNEY pointed out, in a paper read before the Students' Association at Bloomsbury Square, the existence in the oil of *Barosma betulina* of a crystalline substance, of which he obtained 500 grains from 20 fluid ounces of the oil. It is to this substance that the greenish coloration of the oil with ferric chloride is to be ascribed.

Dr. POWER then read a paper by Professor FLUCKIGER and himself on "The Constituents of Peppermint Oil." In operating upon Mitcham oil obtained from SCHIMMEL and Co., of Leipsic, which had been deprived, by repeated rectification, as completely as possible of menthol, about 10 per cent. of an oil was separated, which had not before been investigated. The greater portion of it distilled between 165° and 175° C., and had a composition intermediate between the formulæ $C_{10}H_{16}$ and $C_{10}H_{18}$. When purified by distillation over metallic sodium it was divided into two fractions of specific gravity ·859 and ·856. By the distillation the peppermint odour was lost, and gave place to that of freshly distilled oil of turpentine. A small portion of the oil, of a somewhat viscid character, was distilled over at a higher temperature, and is considered to be represented by a multiple of the simple formula $C_{10}H_{16}$, probably $C_{15}H_{24}$. According to these results the liquid portion of Mitcham peppermint oil would appear to consist of isomeric and polymeric terpenes. The authors were unable to isolate the substance which forms a crystalline compound with alkaline bisulphides when some samples of peppermint oil are operated upon in this way. It is considered as probably having a boiling point approximating to that of menthol and to be the cause of the remarkable colour reaction and fluorescence displayed by fresh oil of peppermint when left in contact with a few drops of nitric acid (1·20), since this reaction is not given by the terpenes nor by menthol. In the discussion that followed attention was directed to the necessity of ensuring in investigations of this kind that the material operated upon is free from any kind of adulteration, and in illustration of the fact that it was not always sufficient to purchase what is represented to be the best commercial article, Mr. REYNOLDS referred to the glover mentioned by SOUTHEY, whose worst gloves were distinctly known as "best," and who had four other kinds, which he called "better than best," "better than better," "best of all," and "real best." Mr. UMNEY also pointed out that from the crude manner in which the distillation of oil of peppermint is carried out it was to be expected that even genuine samples would contain more or less empyreumatic materials, unless they were again carefully rectified by distillation with water.

In a paper upon "The Discoloration of Syrup of Iodide of Iron," Mr. T. B. GROVES dealt with the inconvenience arising from this liability to alteration, which so frequently gives rise to doubts whether medicine containing this preparation has been correctly dispensed. Mr. GROVES illustrated this by stating that he had been found fault with for supplying a colourless and flavourless article to a customer who had previously been furnished with a discoloured syrup, though for no better reason probably than GEORGE THE FIRST's cooks were complained of for not supplying the royal table with oysters so high in flavour as those to which His Majesty had been accustomed in Hanover. As a means of remedying this inconvenience, Mr. GROVES suggested that a minute trace of phosphoric acid should be added in making the syrup, in order to ensure the action formerly pointed out by him in the PHARMACEUTICAL JOURNAL,* and, though as he remarked, this plan would be considered hateful and unorthodox by some, many will be glad to learn how of two evils to choose the lesser. In the discussion that followed the reading of this paper attention was chiefly directed, by a remark from the President, to the importance of the character of the sugar used for making syrups. It was shown that the greater part of the sugar met with in commerce is beet root sugar, which will not do for the manufacture of syrup of iodide of iron. In reference to the difference between the sugar from beet root and that from the cane Mr. ANDREWS stated that he knew it as a fact that they differed in solubility and that he had commenced a series of experiments upon the subject. The contamination of beet sugar with ultramarine was also referred to by Dr. SYMES, who was of opinion that by proper treatment it could be rendered as fit for use as cane sugar. Upon Professor ATTFIELD's suggestion it was understood that Mr. ANDREWS undertook to follow up the subject experimentally, and, therefore, we may now look forward to having this difficulty removed.

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* Vol. ix., 2nd series, p. 421.

At the conclusion of the discussion following Mr. GROVES's paper, the Conference was adjourned until 2.30, and in the interval the members partook of lunch in the garden adjoining the Institution.

The next paper read on resuming the business proceedings was contributed by Dr. DE VRIJ, whose valuable services in connection with the introduction of the cinchona tree into India and the manufacture of "Indian quinine" have recently been recognized in the conferring upon him the dignity and distinction of a Companion of the Star of India. It described a method for the detection of amorphous alkaloid in citrate of iron and quinine, based upon the solubility of the oxalate of that base in water and the consequent yellow coloration to be observed when an adulterated sample is operated upon as described in detail in the paper. A somewhat discursive discussion followed the reading of this paper, in the course of which it was pointed out by Mr. UMNEY and others that the amorphous alkaloid sometimes found in citrate of iron and quinine may be due to the alteration of quinine during the manufacture of the preparation. By some it was also considered that this result arose from the defective nature of the Pharmacopœia process. Mr. FLETCHER recommended the plan of tasting the preparation as being, in his opinion, a convenient method of detecting the presence of amorphous alkaloid by its peculiarly unpleasant bitterness.

In Dr. SYMES's paper on "New and Unofficinal Preparations," attention was drawn to the practical inconvenience arising from the want of any authoritative formulæ for the novel preparations which are now so frequently employed by medical men. By reference to the various strengths of tincture of gelsemium and hydrobromic acid, he illustrated the embarrassment that may be caused in dispensing, and he suggested that the formulæ for such preparations should be regulated by the decision of some such authority as the Medical Council. Although the removal of uncertainty by the adoption of such a plan would be very desirable, it cannot be overlooked that there are considerable difficulties to be encountered. As stated by Mr. GREENISH, many of these preparations are too insignificant and too ephemeral in their application to merit any such official cognizance, and if the merits of new articles of materia medica and new preparations are to be decided by experience, it is precisely during the intervening period that the difficulties referred to by Dr. SYMES would remain unprovided for. Possibly some conjoint action of members of the medical profession and representatives of the Pharmaceutical Society might be devised that would ensure that prescribers ordering new preparations would have their wishes carried out, and that at the same time dispensers should be at no loss to ascertain what those wishes were. At any rate the question is one that deserves attentive consideration on both sides.

In a paper on the "Cultivation of Calisaya," Mr. J. E. HOWARD described comparatively the conditions under which this tree is grown for the production of cinchona bark in Java, Ceylon, the continent of India and South America, and brought forward statements of various authorities to show the extent to which the supply of rich quinine-yielding bark might be expected to increase. As introductory to this, Mr. HOWARD described the examination of a small tree of *Calisaya Anglica*, which had been killed by canker in his conservatory, after attaining in eight years a height of seven or eight feet. He considers the source of mischief to have been situated in the root, but was not able to learn anything very definite respecting it. In Java, where the *Ledgeriana* grows so well and yields such rich bark there is no canker; but it appears that there are few parts of Ceylon where this tree can be grown so as to yield bark so rich in alkaloids, while on the Neilgherries the bark is of excellent quality and commands a high price, although the trees grow bushy and spindly. In Bolivia, again, where calisaya has been cultivated in its native locality, at the suggestion of Mr. LEDGER, within the last thirty years excellent results have been obtained. Mr. HOWARD, however, thinks that none of this bark, as imported into London, had the appearance or was so rich in alkaloid as the true Ledgeriana, possibly in consequence of the seed not having been selected with such skill as that collected by Mr. LEDGER's servant MANUEL. For this reason therefore, the cultivation of calisaya in Bolivia cannot be expected to yield such remarkable results as it has done in Java especially. The same circumstance also points to the importance of selecting superior sorts in establishing or extending plantations in India. Effectual drainage and high cultivation are also essential conditions to be provided for. In Ceylon as in Java it has been found that the Ledgeriana surpasses all other kinds in yielding bark containing a large amount of quinine. On the whole, therefore, Mr. HOWARD thinks that true calisaya, as introduced by Mr. LEDGER, will continue to assert its supremacy there as elsewhere. But he also points out that, according to Mr. McIVOR, Ceylon is wanting in the deep rich soils to be found in India, and that since, according to the same authority, cinchonas are very liable to canker when the roots get down to the subsoil, there is for this reason less promise of future results in Ceylon than there is on the Neilgherries.

It is indeed to this cause that Mr. **Howard** ascribes the death of the calisaya tree grown in his greenhouse, and perhaps it is not going too far to infer that Mr. **Howard**'s mention of the death of that tree, and his conjecture as to the cause of it, may be intended to operate in some degree as a check upon the enthusiastic expectations entertained as to the future results of the cultivation of calisaya in Ceylon. In reference to these prospects Mr. **Howard** quotes the calculations of Mr. **Dobree**, published in the *Ceylon Observer* of last June, which point to an annual production of about ten million pounds of bark in about five years' time, and predict that the total production of cinchona bark will in 1885 exceed the total demand in 1876-78 by nearly eleven million pounds. Mr. **Howard** thinks these calculations far too sanguine even as regards quantity, and in any case, he thinks that one feature more likely to become manifest in 1885 is that the representatives of quinine manufacturers attending the sale-rooms at that time will distinguish with the pencil-note "rubbish" many of the consignments of Ceylon bark.

Closely connected with the subject of the foregoing paper was the exhibition, by Dr. **Paul**, of a peculiar kind of cinchona bark, with the object of showing that it is now no longer possible to arrive even at an approximate conclusion as to the value of a sample of bark from mere visual examination. Leaving out of account the fact that the officinalis, or crown bark, now coming from India contains a large amount of quinine, while that hitherto known as "crown bark," or "Loxa bark," from South America seldom contains much, if any, it is also to be noted that amongst the bark derived from South America it is equally impossible to judge of the value of a sample from its outward appearance alone. The old landmarks are no longer sufficient for indicating whether a bark is worth only a few pence a pound or the same number of shillings. Thus, for instance, the official "yellow bark," or "flat calisaya," of the present day is rarely what it used to be, but, on the contrary, seldom contains much or any quinine at all, and only a little cinchonine. On the contrary it often happens that bark of unusual or novel characters comes into the market containing an amount of quinine and other alkaloids that renders it intrinsically very valuable. In the case of the specimen exhibited this fact was well shown, for to all appearance it was of little or no value. It represented a somewhat considerable parcel of bark that was imported in June, 1879. It did not recommend itself for making pharmaceutical preparations and quinine manufacturers were disinclined to buy it at any price. However, the analysis of the bark gave it a different character, showing that in addition to mere traces of quinidine, cinchonidine and cinchonine it yielded nearly 2½ per cent. of sulphate of quinine, so that for either or both of the purposes above referred to it was an excellent bark, notwithstanding its unfavourable appearance.

The last paper read at the second sitting of the first day's meeting was on "Ipecacuanha Wine," by Mr. J. B. **Barnes**, in which he recommended, as an improvement in the preparation of ipecacuanha wine, a modification of the plan proposed by Mr. **Carteighe** for the preparation of an oxymel of ipecacuanha. Mr. **Barnes** evaporates the acetic extract of ipecacuanha to dryness, digests the residue in a proper proportion of sherry for forty-eight hours and filters. By this means he obtains a rich brown solution which has been kept for eight months without throwing down any of the unsightly muddy sediment which is well known to be formed when the ipecacuanha wine of the Pharmacopœia is kept for a few weeks.

The meeting was then adjourned until half-past ten on Wednesday morning, and in conformity with notice given by Mr. **Grose**, the local Vice-President, most of the members present assembled at half-past six on their way to inspect first the Hafod copper smelting works and mills of Messrs. **Vivians** and **Sons**, who make, besides ingot and sheet copper, sulphuric acid and artificial manures, and then the Landore tin-plate works. In both these establishments every attention was shown to the visitors and every possible opportunity afforded for seeing the details of the operations.

On the reassembling of the members on Wednesday, Mr. **Brady**, after apologizing for his departure from the generally observed rule of producing a written paper, proceeded to give an account of his experiences of pharmaceutical interest during a recent journey to Ceylon and Japan. One of the points to which his attention was directed was the cultivation of cinchona in the former island and some of the conclusions he arrived at were very different from the statements that had been published, although it must be admitted that these were based upon later information. In reference to the cultivation of cinchona he observed that mossing is not carried out in Ceylon, for the reason that it promotes the destruction of the trees by ants, and he did not enter upon the consideration of the profitable nature of cinchona cultivation, because that had already been done in a much more commercial paper. The cultivation of vanilla was next referred to, and one case mentioned in which the rows of plants had an extent of no less than three miles. It may here be noted that the development of this business seems likely to be more rapid than profitable, for while the price of vanilla not long ago was 70*s*. per pound, it is now down as low as 10*s*. Assam tea and Liberian coffee were two other products mentioned as being successfully grown in Ceylon; but the cultivation of ipecacuanha was described as affording less promise. Mr. **Brady** then proceeded to give an interesting account of the cinnamon cultivation in the island, stating that he had been quite unable to trace the origin of the three different kinds of cinnamon bark met with in this market. In the course of his inquiries he was informed that there were not only three, but no less than fifteen varieties. The distillation of cinnamon oil was described as being carried on in a most primitive manner. One of the prominent features of Ceylon vegetation was the occurrence of cocoa-nut palms, which always grow freely near human habitations, a fact that was explained to Mr. **Brady** as being due to the promotion of their growth by smoke; and if that alone were a sufficient explanation, it might be worth while to make an experiment in the cultivation of cocoa-nut palms in and around Swansea. The extraction of oil from the cocoa nuts was described as having been carried to a high degree of perfection; and, although some considerable degree of mystery appears to be maintained as to the way in which this is done, the result would seem to be merely a natural consequence of the rational use of suitable machinery. Mr. **Brady** mentioned that, though cocoa-nut oil is habitually known to us as a solid fat, it was never met with in Ceylon in any other than the liquid form, which it was impossible to persuade the native Cinghalese was any other than its invariable condition. This striking effect of the difference in the physical character of a material produced by the influence of climate had a parallel in an experience of the speaker in Algeria as to the local idea of water, where on telling a native that in England it was possible to walk across the water in winter, his statement led to the remark, "If these Franks will tell you this no wonder they come here with the Bible." Among the points of interest that Mr. **Brady** came across in Japan was an ingenious form of still for making peppermint water, a figure of which will be given in a future number. In the discussion that followed, Mr. **White** ineffectually endeavoured to open up the question of the profit arising from cinchona cultivation, and Mr. **Wootton** as ineffectually sought to interest the meeting in the subject of the obstacles alleged to be presented by the Japanese to the importation of chemicals from this country. It was evidently felt that there were two sides to this latter subject, and that it would be wise to leave it to to be dealt with by those who were more specially interested. In reference to the distillation of cinnamon oil in Ceylon, it was suggested by Mr. **Umney** that taking as a precedent the extraction of cocoa-nut oil, it would be desirable that the Ceylon growers imported a distinguished pharmacist to distil the cinnamon oil, or at any rate someone who would understand how to do it.

Mr. **Greenish**, in a "Note on Indian Henbane," prefaced his remarks by stating how desirable it was that the numerous vegetable products introduced from tropical and other countries should be thoroughly examined in order to ascertain whether or not they contain any active principle. Having regard to the growing scarcity of biennial henbane leaves, he had undertaken the examination of a sample of Indian henbane leaf, which had a very intense persistent odour. Having only a very small quantity, he had prepared a tincture, and was inclined to think that India would possibly supply this therapeutic agent of more valuable character than that of home growth. In commenting upon this paper, Mr. **Reynolds** referred to the introduction of hyoscyamine by **Merck**, mentioning that it was usually made from the leaves, and that what was made from the root was often disappointing in its effects. Mr. **Umney** expressed the opinion that this product was really obtained from the leaves of the annual henbane and that the direction of the Pharmacopœia to use the biennial variety was "mere moonshine." Incidentally Dr. **Symes** remarked that he claimed the opinion just expressed by Mr. **Greenish** as a support of the suggestion he had already made that new drugs deserved careful attention. Mr. **Gerrard** complained that the products obtained in this way were too often only curiosities and not commercial articles.

Mr. A. H. **Allen** communicated some further notes on petroleum spirit, describing some methods which he considered calculated for distinguishing between true petroleum spirit and the analogous volatile liquid obtained from shale oil.

Mr. **Greenish** exhibited a sample of cayenne pepper, possessing all the external properties of true cayenne as grown and ground in Natal, but having an oily appearance that seemed artificial and communicating to the paper in which it was folded a greasy stain of a reddish-yellow colour. It was moreover quite destitute of pungency. In this respect it seemed very much to resemble, as pointed out by Mr. **Brady**, the mild capsicum commonly used in Hungary as a spice under the name of "paprika."

Mr. **Naylor** then followed with some notes upon the green extracts of the Pharmacopœia, the details of which were too copious to admit of special reference to them here, beyond stating that Mr. **Naylor** is in favour of the production of these extracts by evaporation *in vacuo*.

Mr. **Fletcher** then called attention to the presence of arsenic in the tincture and solution of perchloride of iron, and other articles in the preparation of which hydrochloric acid is used. He also described an indirect method for the gravimetric estimation of minute quantities of arsenicum, which consisted in treating the substance to be examined in such a way as to convert any arsenicum that it might contain into arseniuretted hydrogen, passing the gas through solution of nitrate of silver and weighing the reduced silver. Mr. Fletcher gave the preference to this method over those of Levol and Herapath because the weight of the silver to be weighed is about nine times as great as that of the arsenic to be determined. Some doubt, however, appears to exist as to whether the whole of the arsenic in any substance to be examined would be converted into arsenietted hydrogen by the action of zinc and hydrochloric acid, although the figures given by Mr. Fletcher as representing the results obtained when operating on very small quantities appeared to show that the process is trustworthy.

In Mr. Gerrard's paper on emulsions he recommended the use of powdered gum acacia as the emulsifying agent, and gave practical illustration of his mode of operation as well as formula for the preparation of various emulsions.

A paper by Mr. Thresh, on the determination of the strength of alcoholic solutions of chloroform was then read, as well as a report on commercial specimens of sal volatile and chloric ether, in which the results of the application of his method were detailed. After showing the wide differences between the preparations supplied and used under the names sal volatile and chloric ether, Mr. Thresh dwelt upon the desirability of observing greater uniformity, and in the discussion that followed, the need of establishing some kind of authority that would be recognized and that would be effectual in attaining such a result was generally admitted.

Mr. Woodland's report on the strength of commercial specimens of aqua lauro-cerasi was essentially a reiteration of data published by Mr. Umney in this Journal in the year 1869. They showed that this preparation is uncertain in every way, and is so thoroughly unsatisfactory that it is high time it was expunged from the British Pharmacopœia.

The concluding paper, also by Mr. Woodland, was a report on the strength and purity of the alkaline solutions of potash and ammonia met with in pharmacy.

The next business was the discussion as to the place of meeting in 1881, and as a matter of course the choice fell upon York, from which city a formal invitation had been sent by Mr. Ralph Dawson, and was personally supported by Mr. Clark. The new President proposed by the Executive Committee was Mr. Richard Reynolds, of Leeds, and the new Vice-Presidents were Professor Attfield, Messrs. Davison, of York, and Umney, of London; as General Secretary, Mr. Michael Carteighe, of London, and as Local Secretary, Mr. Joseph Sowray were nominated and all were elected by a unanimous vote. Various votes of thanks were then passed. One of them, on the motion of Mr. Brady, seconded by Mr. Savage, expressing appreciation of the services so kindly rendered by the Local Committee, and especially by Messrs. Grose, Hughes, and Williams, in providing for the reception and accommodation of the members. Another, proposed by Mr. Chipperfield and seconded by Mr. Hughes, who was unable to resist the temptation of addressing the meeting in the Welsh language, recognized the ability and courtesy with which Mr. William Southall had conducted the business of the meeting.

The general business of the Conference having been thus brought to a conclusion, shortly after five o'clock Mr. Schacht, at the request of the President, proceeded to the presentation of the testimonial to Professor Attfield, the details of which will be found on p. 171.

In the course of the evening, at the invitation of the Local Committee, some of the members went for a marine excursion round the Bay.

On Thursday morning those pharmacists who bestirred themselves sufficiently early, and could, unaided by the spectroscope, descry the sun through the sulphurous mist that invariably overhangs Landore, east of Swansea, were unanimous in deciding that although the Local Committee in its wisdom had abandoned the idea of an excursion by water, still there was every prospect that more or less of that fluid might persist in accompanying them and their friends. These forebodings, however, deterred but few, and the members, accompanied by many of the fairer sex, made a start at 11 from the Royal Institution. Coaching westward through the town, and passing the pretty villa residences that line the road, they soon fancied themselves away from the devastating effects of copper smoke. Within a quarter of an hour a full view of the Mumbles was obtained, passing through Sketty Village, where abundance of honeysuckle skirted the road. A view of the bay was followed in quick succession by the pretty valley in which is the railway station of Killay. No sooner, however, was an attempt made to cross Fairwood Moor than the rain descended in such quantity as to obscure the clear-sighted vision of the guide, Mr. Grose, and to effectually prevent him from pointing out the grouse in the surrounding heather. Nothing daunted, the journey was continued; the old castles of Kilvrough and Pennard were passed, and upon reaching Penmaen the sun once more shone, and the rain disappeared for the day. From the coach road a fine view was obtained of Three Cliff Bay, Cefyn Bryn and Oxwich Burrows. Penrice Castle, the seat of Mr. Talbot, M.P., was reached about two, and the excellent enrichments of the mosaic mantelpieces and the pictures were much admired. Here the botanists enjoyed their favourite pursuit, and found during their ramble through the park to Oxwich beach *Origanum vulgare*, *Lappa minor*, *Centranthus ruber*, *Mentha rotundifolia*, *Campanula Trachelium*, *Œnantha crocata*, *Cichorium Intybus*, *Epilobium hirsutum*, *Menyanthes trifoliata*, etc.

Through the kindness of the Rev. Mr. Jenkins, Vicar of St. John's, luncheon was served on his lawn, and his church on the edge of the beach was visited by many. The parties here divided, the ladies coaching, others walking for a mile or two along the beautiful sandy beach, while the more robust wended their way through the wood. All, however, arrived at the Gower Union House, which had been kindly placed at the disposal of the Committee by the guardians and here the whole party appreciated a very excellent "high tea" and indulged in humourous speeches, some in Welsh, complimentary of Mesrrs. Hughes and Grose, and other local friends. At dusk, the excursionists retraced their way, and arrived safely at Swansea soon after ten o'clock, much pleased with their trip.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

Wednesday, August 4, 1880.

Present—Professor Tichborne, President; Dr. Aquilla Smith, Vice-President; Sir George Owens, M.D., Dr. Collins; Messrs. Bennett (Kingstown), Brunker, Goodwin, Harrington (Cork), Hayes, Hodgson, Holmes and Simpson.

The minutes of the meeting held on July 7 were read and signed.

Read letters from Messrs. Ennis and Son, solicitors, giving report of result of legal proceedings in the four cases in which prosecutions were instituted by this Society, in all of which the Society was successful.

Read a letter from Professor Attfield, asking the names of the delegates from this Society to the Pharmaceutical Conference, to be held at Swansea, on Tuesday, August 24, 1880.

Professor Tichborne, President, and Messrs. Bennett and Brunker were appointed delegates.

Read a letter from Professor Attfield presenting, on the part of the Executive Committee of the British Pharmaceutical Conference, a set of the 'Year-Books of Pharmacy,' ten volumes, to this Society.

Proposed by Mr. Holmes, seconded by Mr. Bennett, and resolved:—

> "That a vote of thanks is hereby passed to the Executive Committee of the British Pharmaceutical Conference for the ten volumes of the 'Year-Book of Pharmacy,' presented through Professor Attfield to the Pharmaceutical Society of Ireland."

Read a letter from Mr. Thomas C. Devlin, of Belfast, asking, on the part of his brother, Mr. Frederick W. Devlin (now in South Africa) for a duplicate certificate as pharmaceutical chemist, the original having been destroyed by fire at their premises in Belfast.

Mr. Devlin to be informed that an attested copy of the entry of his brother's name in the Register will be sent to him at a cost of five shillings, should he so desire it.

Read a letter from Mr. Michael J. O'Brien, of Roscommon, requesting that the Preliminary examination passed by him at the Apothecaries' Hall, Dublin, be recognized, in accordance with resolution on page 73 of the Calendar.

Registrar to inform him that the reply from the Privy Council is daily expected by this Council, and that on its receipt he shall be communicated with.

The Inspection Committee reported that they had visited the laboratory of the Peter Street School of Medicine, and that it is sufficiently provided with appliances for instruction in practical chemistry.

Proposed by Sir George Owens, seconded by Mr. Hodgson, and resolved:—

> "That the name of the Ledwich School be forwarded by the Registrar to the Privy Council to be added to the list of schools recognized by this Council."

The report of the examinations for the licence to act as pharmaceutical chemists, held on July 7, was laid on the table.

The following eight candidates had presented themselves, and all had passed the examination:—

John Abernethy, High Street, Lurgan.
Patrick James Bacon, John Street, Kilkenny.
Peter F. Baikie, 68, Grafton Street, Dublin.
Joseph Bolton, 107, Grafton Street, Dublin.
Joseph Eldon, 19, High Street, Portadown.
Michael Joseph Fottrell, 70, Kenilworth Sq., Rathgar.
George Moore, Killylea, Co. Armagh.
Patrick Nangle White, 19, Castle Street, Sligo.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

The Seventeenth Annual Meeting of this body commenced its sittings on Tuesday, August 24, at the Royal Institution, Swansea, Mr. W. L. Southall, F.L.S., in the chair.

At the commencement of the proceedings, Mr. N M. Grose, the Local Vice-President, in the name of the chemists and druggists of Swansea and South Wales, welcomed the members of the Conference to Swansea. He said he hoped the meeting would prove both pleasant and profitable. He had much pleasure in announcing that, in addition to the local arrangements stated on the programme, the members of the Conference would be able to obtain tickets for any of the local museums, and if any who were able to remain until Friday would like to visit a coal mine, there would be an opportunity provided for their doing so.

Reception of Delegates.

Professor Attfield, Ph.D., F.R.S. (Gen. Sec.), then read the following list of delegates:—

From the *Pharmaceutical Society of Great Britain.*—The President (Mr. Greenish), Vice-President (Mr. Schacht), and Messrs. Andrews, Symes and Savage.

From the *Pharmaceutical Society of Ireland.*—The President (C. R. C. Tichborne, Ph.D., LL.D.), and Messrs. H. Bennett and J. E. Brunker, M.A.

From the *Brighton Association of Pharmacy.*—Messrs. W. D. Savage, T. Billing and Marshall Leigh.

From the *Bristol Pharmaceutical Association.*—Mr. Schacht.

From the *Exeter Pharmaceutical Society.*—Mr. G. Pasmore.

From the *Glasgow Chemists and Druggists' Association.*—Messrs. T. Davison and Rait.

From the *Leeds Chemists' Association.*—Mr. Reynolds.

From the *Leicester Chemists' Assistants and Apprentices' Association.*—Mr. T. W. Clark.

From the *Liverpool Chemists' Association.*—Dr. Symes and Messrs. A. H. Mason and R. Sumner.

From the *Manchester Chemists and Druggists' Association.*—Messrs. F. B. Benger, F.C.S., and L. Siebold, F.I.C., F.C.S.

From the *Sheffield Association.*—Messrs. Ward, Ellinor and Maleham.

From the *York Chemists' Association.*—Mr. Clark.

The President said that, in addition to the above list, the Conference was also favoured with the presence of a distinguished visitor from the other side of the Atlantic, Professor Maisch, of Philadelphia, whose name was well known to all present, not only as an independent investigator, but also as author, in conjunction with Mr. Stillé, of a book which had attained a very high reputation.

Professor Maisch said he was very pleased to be able to meet the Conference, and only regretted that having already made arrangements to leave England immediately he should not be able to remain throughout the meeting.

The Assistant-Secretary read the following report of the Committee:—

Report of the Executive Committee.

Your Committee have met on several occasions since the last general meeting of the Conference, and amongst other matters of importance have carefully considered and discussed the advantages and disadvantages of continuing to hold the annual meetings in the same town and practically at the same time as the meetings of the British Association. The following is a summary of the opinions expressed on both sides.

It was pointed out that considerable difficulty is often experienced by local officers who are on the organizing committees of both bodies; that much inconvenience is

FINANCIAL STATEMENT, 1879–80.

THE GENERAL FUND.

THE SENIOR HON. SECRETARY IN ACCOUNT WITH THE BRITISH PHARMACEUTICAL CONFERENCE.

Dr.	£	s.	d.
To Sale of Year-Books by Secretary	7	17	6
„ „ „ Publishers	29	0	0
„ Advertisements in 1877 vol.	2	14	6
„ „ 1878 vol.	12	0	6
„ „ 1879 vol.	103	12	0
„ Subscriptions from Members	799	11	6
	£954	16	0

Cr.	£	s.	d.	£	s.	d.
By Expenses connected with Year-Book:—						
Butler and Tanner for printing, binding, and banding	£408	7	5			
Editor's Salary	150	0	0			
Messrs. Churchill:—						
Commission on Advertisements	29	11	9			
Advertising Year-Book	2	18	0			
Delivery to Members	67	17	1			
Foreign Journals (Nutt)	3	7	9			
				662	2	0
„ General Printing:—						
McCorquodale and Co.	3	10	0			
Stevens and Richardson	15	12	6			
Parkins and Gotto	2	3	1			
				21	5	7
„ Directing Circulars and Envelopes				5	7	3
„ Assistant-Secretary's Salary				40	0	0
„ Postage (about 11,500 letters)				47	16	0
„ Sundries				11	17	11
„ Expenses of Meeting at Sheffield				15	11	3
„ Balance to Treasurer				150	16	0
				£954	16	0

THE HON. TREASURER IN ACCOUNT WITH THE BRITISH PHARMACEUTICAL CONFERENCE.

1879. *Dr.*	£	s.	d.
To Balance in hand on July 1	112	4	5
July. To Dividend on £250 Consols	3	13	6
1880.			
Jan. To „ „	3	13	6
June 30. To Cash from Hon. Sec.	150	16	0
	£270	7	5

1880. *Cr.*	£	s.	d.
June 30. By Balance	270	7	5
	£270	7	5

Assets July 1, 1879		£	s.	d.
	Cash in hand	270	7	5
	Consols (stock)	250	0	0

THE BELL AND HILLS LIBRARY FUND.

THE HON. TREASURER IN ACCOUNT WITH THE BRITISH PHARMACEUTICAL CONFERENCE FOR YEAR ENDING JUNE 30, 1880.

1879. *Dr.*	£	s.	d.
To Balance in hand on July 1	4	19	7
July. To Dividend on £350 Consols	5	2	9
1880.			
Jan. To „ „	5	2	9
	£15	5	1

1880. *Cr.*	£	s.	d.
By Balance	15	5	1
	£15	5	1

Assets July 1, 1880		£	s.	d.
	Cash in hand	15	5	1
	Consols (stock)	350	0	0

Examined and found correct, G. ELLINOR, Sheffield. J. LLOYD, Swansea. *Auditors.*

often felt by members of the two bodies on the Conference excursion day; and that it is frequently impossible to obtain adequate hotel accommodation, especially by members of the Conference who do not wish to remain in a town for the Association Meetings after the Conference Meetings are over. On the other hand it was thought that the time and town of meeting of the British Association had come to be so generally understood as the town and time of meeting of the Conference that the whole organization of the latter would be much upset by a change. The simultaneous character of the gatherings was one of great convenience to many men, though it might be the opposite to others. It was not perhaps always easy to work up local pharmaceutical enthusiasm, but that was less difficult of accomplishment when a whole town had been fired with the idea of entertaining a large body like the British Association, than in the absence of such an impetus. Inquiries had been made on the subject, and correspondence had been carried on with former local secretaries and others, with a view to obtaining a general opinion on the point; many influential members preferred the existing practice with all its disadvantages; the meetings would probably suffer in point of number of members attending—both as regards local and visiting members—if the meetings were held at times other than those just preceding and overlapping the times fixed for the meetings of the British Association, as many members would not care to go to a town twice within a month or so. Local members, too, preferred to have the Conference at the least busy times of the year, which were just the times selected for the visit of the British Association. The Conference meetings might be held at the same time in some more or less distant town, but members wishing to economize time would object to such an arrangement. The teaching class contributed many men and papers to the Conference, and these would probably only attend during August or September. At whatever time during either of those months the meetings were held it would fit in with the holiday arrangements of some men and clash with those of others.

The following resolution was finally carried:—"The Committee having again had under consideration the desirability of holding the annual meetings of the Conference at times other than those just preceding and overlapping the times of the meetings of the British Association, or of holding them in towns other than those visited by the British Association, and having received opinions on the subject from local secretaries and other members of the Conference, conclude that any immediate alteration of the existing practice as regards times and places of meeting is undesirable."

Your Committee have had under consideration the advisability of publishing a general index of the ten 'Year-Books' issued since 1870, and six numbers of Proceedings' issued before 1870, and they have instructed the 'Year-Book' Committee to superintend the production and gratuitous distribution of such an index to members.

Since the last annual meeting eighty-six candidates have been elected to membership of the Conference.

Your Committee regret to have to report that only a single application has been made for a money grant in aid of research. It may not be amiss to remind members, especially those who have received some scientific training, that the Conference has funds at its disposal, and that there is no way in which they can be applied in more complete accordance with its avowed object than in the assistance of those who are able to undertake investigations in connection with the history of medicinal substances. The field is a wide one, as may be gathered from the list of subjects annually circulated by the Executive Committee, and it is earnestly hoped that our younger members may be induced to adopt original research as part of their duty to the profession to which they have devoted themselves.

It is the painful duty of your Committee to report, officially, the death of Mr. William Walter Stoddart. The constant devotion of Mr. Stoddart's life to the cause of science generally, and his great help to the highest interests of this Conference, not only during the year in which he occupied the post of its Presidency, but in the numerous papers he communicated to its 'Proceedings' from its first meeting in Bath to the last he was able to attend in Sheffield, render this special allusion to his loss by your Committee a simple though a sad duty.

They have also, with great regret, to announce that the Conference is about to lose the important services of Professor Attfield, as Senior General Secretary.

The distinguished position which the British Pharmaceutical Conference has achieved and has now for some time enjoyed as an organization for the development of scientific pharmacy has been so largely due to the ability and energy of Professor Attfield, that his retirement from the sphere of work in which he has so usefully laboured creates a void which your Committee feel it must be difficult to supply. They earnestly invite the co-operation of the members generally in the efforts they will be compelled to make to render this loss as little disastrous as possible.

Professor Attfield read the finanicial statement, which is printed on page 180.

Mr. Schacht explained that the financial statement would have been presented by the Treasurer, Mr. Ekin, but that gentleman was unable to be present, and had written desiring him to apologize to the Conference for his unavoidable absence.

The President then moved the adoption of the report and financial statement.

Mr. Savage (Brighton) seconded the motion, and it was at once carried unanimously.

THE LATE MR. STODDART.

Mr. Reynolds (Leeds) said there was one paragraph in the report which must have awakened deep feelings in the minds of all present, the one which referred to the great loss the Conference had sustained. Those who were not aware of Mr. Stoddart's illness must have felt a great shock, as he did, when they heard the news. He had ventured to put into the form of a resolution what he believed would represent the feelings of the members of the Conference on the subject, and would move—

"That the Conference records its deep regret at the removal by death of Mr. W. W. Stoddart of Bristol, who was one of its earliest supporters. Mr. Stoddart's sound and extensive knowledge of pharmacy, and his devotion to pharmaceutical research had long been highly valued by his professional brethren, and were formally recognized by his election to the post of President of the Conference during the years 1870 and 1871. Mr. Stoddart performed the duties of the office with great ability, and his genial and kindly disposition and readiness to give countenance and advice to younger inquirers secured for him the warm personal esteem of his fellow members."

He would also move—

"That the foregoing resolution be entered upon the minutes, and that a copy be forwarded to Mrs. Stoddart, with the assurance of the deep sympathy of the meeting with herself and family under their great bereavement."

Mr. Brady seconded the motion.

The President said all present would feel the propriety of the resolution, and he would simply put it without attempting to echo what had been so well said.

The motion was carried unanimously.

The President then delivered his opening address as follows:—

THE PRESIDENT'S ADDRESS.

When asked to accept the office of President of the Conference for the present year, I naturally hesitated, remembering the distinguished names and services to pharmacy of those who have hitherto occupied the chair.

I felt that it was a position that required qualifications I could hardly aspire to. I decided, however, that I ought not to refuse such an honourable office, and therefore appear before you this day to deliver the customary address.

In speaking of my predecessors, my first thought is of the loss the Conference has met with since our last meeting in the removal by death of our excellent friend, Mr. Stoddart, who filled the chair in the years 1870 and 1871. We shall sadly miss the genial presence and bright intellectual powers of one who for so many years took an active part in our deliberations and to whom no small portion of the success of our meetings is due.

My next thought has reference to the place of our meeting, and I have the pleasure for the first time of giving the right hand of fellowship to our brethren of the Principality on their own soil. There is no political boundary between England and Wales, simply one of race, therefore any emulation between us can only be the highly honourable one of progress, and that the Cymry are well represented in the practice of pharmacy, both in their own land and in English pharmacies, is an indisputable fact.

In making the very difficult choice of a subject upon which to address you, I had to choose between the abundant past and the limitless present, between the technical portion of our profession and the results of science which bear upon or are connected with it. The subjective view of pharmacy has recently been most ably laid before us. Pharmaceutical education is very much to the front just now, but I leave its elucidation in the very competent hands that are identified with it. Practical pharmacy and the materia medica of the present are dealt with in the 'Year-Book.' I therefore came to the conclusion that the past of pharmacy would still afford abundant material to work upon, and that I might present to you a few phases of its history that would still possess something of novelty and interest.

The first phase in the history of pharmacy that I wish to bring before you is that which existed in Italy about the time of the Christian era, and a description of it is to be found in the works of Roman authors.

This was a period of high intellectual cultivation, and amongst the literature of the Augustan age that has descended to us are the works, not only of poets, orators and historians, but also of physicians and naturalists.

Anterior to this time Greece had led the van in medicine as in science and philosophy, and the names amongst physicians of the somewhat mythical Æsculapius and his descendants the Asclepiads, amongst whom was Hippocrates of Cos, will occur to us as having with others laid the foundations of medical science. Medicine then formed a part of philosophy. Pythagoras, for example, wrote upon it, and to attempt a history of its rise and progress would of course be out of place here. Anatomy and physiology had made considerable progress. Aristotle had written his History of Animals, materials for which were provided at an enormous cost by the orders of Alexander the Great, and the great School of Alexandria was founded, where anatomy was studied, illustrated by dissection of the human body. At Alexandria laboured Theophrastus, pupil of Aristotle, who founded the science of botany and also wrote on materia medica. Aristotle himself also wrote on plants and on pharmacy. With the decay of the School of Alexandria learning began to shift westward. Asclepiades of Bithynia, a noted physician, whose works have perished, appears to have migrated to Rome about 90 B.C. About one hundred years after him flourished three men who have left their mark upon medical science: Celsus, a physician of Rome; Pliny, whose great work on Natural History was a collection of things credible and incredible, but was stored with information respecting materia medica and on medical subjects in general; and Dioscorides, whose renowned work on Materia Medica and Botany held its position in the first rank of authority for sixteen hundred years. Dioscorides is said to have been physician to Antony and Cleopatra, but it does not appear to be quite certain when he lived. Pliny quoted from him largely, but he does not give his name, as he does those of a multitude of authors whose works he quotes. Galen, whose name will be afterwards referred to, and who was a brilliant Greek physician, died some two hundred years later.

The name of Celsus is one we all know by sight very well, but it is specially familiar to the medical profession. Speaking as a pharmacist, pharmacists in general are, I believe, not much acquainted with his writings. Celsus wrote "Eight Books on Medicine," and his works are translated into English, and there are at least two translations of the first four books, one of them by Dr. Steggall, a name familiar to the earlier students at Bloomsbury Square. From this I judge that our medical friends devote their energies mainly to these four books, possibly to the neglect of the others, and as the book relating to pharmacy is the fifth I feel less compunction in taking it as the text of the first part of my observations.

In the time of Celsus, who was a friend of Horace and of Ovid and who is alluded to by both writers, luxury prevailed at Rome to a great extent. Horace makes some one say:—

> "By Jove, I wonder not that folks should eat
> At one delicious meal a whole estate."*

Civilization or what not produced luxury, luxury disease, disease required physicians, and physicians needed drugs. Some of the moralists of the present day tell us that our civilization approaches very near to the gilded heathenism of the Romans, by which a progression backwards is evidently indicated; but however this may be it is quite certain that many things were done at Rome that have also become the custom of these highly civilized and modern times. For instance:—

> "By my physician's learned advice I fly
> From Baiæ's waters."*

But where?

Sometimes the physician sent his patients to undergo hydropathic and bracing treatment:—

> "While the sick folk in Clusium's fountain dare
> Plunge the cold head or seek a colder air."*

But at others it was a sheltered nook they must have needed, for although the climate of Italy—the land of the olive and myrtle—is deemed to be the abode of zephyrs, the reverse is often found out to be the case, and Celsus himself gives a thoroughly British description of the North East Wind:—*Aquilo tussim movet, fauces exasperat, ventrem adstringit, urinam supprimit, horrores excitat, item dolores lateris et pectoris.* If Celsus sent his patients to the sea side it seems that sometimes they required a compensation which is not unknown at the present day:—

> "At the sea coast I shall expect to find
> My wines of genuine and of smoother kind."

There is nothing new under the sun. Luxurious extravagance and want usually run side by side. We know the Roman rulers had to provide bread for the poor—*panem et circenses*—but the latter our poor laws do not supply. Luxury and penury alike lead to disease; the happy medium between the two to health; and I am rather under the impression that through the influence of hard times the pharmacist of the present day is suffering from a turn in the tide tending towards moderation.

The first book of Celsus treats of general regimen for healthy people, with special instructions for the treatment of small ailments. Some of these directions were rendered necessary by the luxury just spoken of; for instance, the custom of vomiting after meals. Celsus tells us that the Greeks divided medicine into three branches: the first, dietetic; the second, pharmaceutical; the third, chirurgical. The next book treats of the prognostics of disease and its treatment by the dietetic method, with copious information respecting the various foods and their proper use. Celsus also makes a variety of observations respecting seasons, winds, age, temperament and other conditions of health. One passage struck me as of interest to middle-aged philosophers like ourselves, *At ætas media tutissima est, quæ neque juventæ calore, neque senectutis frigore infestatur.* There is much discretion and sound sense in the description of the various foods, both animal and vegetable. Generally speaking, foods may be said to have not more than a personal interest for pharmacists; but special aids for the digestion are attracting present notice, and with respect to farinaceous foods it is probable that more may yet be discovered as to suitable dietetic mixtures of these aliments. The Romans used a variety of cereals, as foreign wheat, winter wheat, siligo, a second kind of wheat, rye, barley, oats, rice, panick and millet; and of legumes beans, peas, lentils and lupins. Some of these were of good juice (*boni succi*), some of evil. Of flours, may be mentioned siligo and pollen, varieties of fine flour, amylum, whole meal, bran and fur, which was perhaps a kind of groats. Alica, a preparation of much repute, was made of rounded grains deprived of husk and whitened with chalk for use, sometimes ordered washed. It was said by Pliny to be obtained from a plant called zea, and is translated maize; but this cannot be correct, as maize is a native of South America. I would refer those who desire more information to the book itself, but they must remember that lentils and whole meal have been appropriated, the former at least to somebody's advantage. *Sorbitio*, slops or gruel, and *ptisan* (barley water, etc.), were favourite remedies. The latter name has been preserved by the French in their tisanes, but has been abandoned on this side of the channel. In dealing with *farinacea* we arrive at the directions for the cataplasm or poultice, of which there is more variety than now employed. *Cataplasmata* are directed to be made with flour, fine or coarse; and with barley, vetch, darnel, millet, panick, lentil, bean, lupin, linseed or fenugreek meal, boiled and applied hot; besides which a variety of drugs are employed to render them emollient, rubefacient, or stimulant. *Gestation*, that is exercise of divers kinds, friction, fomentation, baths, etc., are hardly pharmaceutical remedies, but clysters were administered, some of which were the same as are now used.

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* Francis's Horace.

The fourth book is more purely medical, and treats of diseases of certain parts of the body; and catarrh being considered a local disease, we light upon the word *destillatio*, which suggests an interesting comparison between the use of words adopted in modern times from the Latin, and the original meaning of the same words in the Augustan age. I may remark that this work of Celsus was the mine from which the medical writers, on the revival of learning, drew their medical Latin. In the word *destillatio* the allusion is to the humour which distils into the nostrils, distillation being synonymous with catarrh. The word *destillatio* is several times used, *mutatis mutandis*, with a like meaning, and in no other sense. *Pulvis*, as might be expected, is used with its proper and present meaning, but *tinctus* (the word *tinctura* does not occur) is used only in the sense of dipped, as in the case of water into which a smith's hot iron has been frequently dipped, which is said powerfully to affect the spleen. *Decoctum* continues as of old, *decocta* being numerous, but all extempore preparations. *Infusum*, however, is only used with its original meaning of pouring upon, as cold water poured upon the head. Neither *liquor* nor *solutio* are used in our technical sense, or in any way approaching to it; the term liquid as distinguished from solid is of course frequently to be met with. Probably at a much later period solution of any principle in water was, as we shall presently see, but little understood. In like manner *essentia* is something new altogether. The word *extractum* occurs a few times, and in the preparation of *Arteriace* I thought I had met with its use in the modern sense. Certain preparations are directed to be boiled "*donec extracta inde gutta indurescat.*" But I was too hasty, it was not the pharmacist's technical meaning. *Spiritus* is used only in the sense of breath or breathing, wind and air; what may be termed the spirituous application of the word did not then exist; it evidently grew out of the sense of something purified, refined, or ethereal. I may remark in this connection that the name *fermentum* was given to yeast. The word *pilula* is not to be met with, though we may find pills under another name; it is used by Pliny and is the diminutive of *pila*, a ball; singularly enough *pila* is a mortar. The word *linimentum* did not yet exist; but there are liquids "*quæ illinuntur*," a direction still given by physicians. These liquids, Celsus tells us, were called *enchrista* by the Greeks, a word still surviving in christen, which means to anoint rather than to sprinkle. The word *linamentum* signified lint or linen, *linteum* being a word also used. *Collyrium* was used in a somewhat more extended sense than that of "eye lotion," as will be presently explained. *Gargarisma* is not used, but the verb from which it was derived is to be frequently met with.

Referring to the general subject of the book, we find that for the diseases described special medicines and treatment are directed. Amongst the medicines occur the standing formulæ, and also a variety of extempore preparations; amongst these may be mentioned some to be taken internally, as decoctions and the juice of fresh plants. One preparation is still known and has not altogether lost its popularity, that is acetum scillæ; this, however, was no baby in the time of Celsus, as it was said to have been used by Pythagoras five hundred years before.

We now arrive at the fifth book where, having left the region of dietetic treatment, which, however, includes, as we have seen, the use of a number of medicines, Celsus enters upon the consideration of diseases more usually combated with the aid of drugs. Erasistratus, he says, and others who styled themselves empirics, put great confidence in medicines, but Asclepiades, for whose opinions Celsus seems to have had the greatest respect, pretty much laid aside the use of them—"with some reason, as most medicines offend the stomach, affording bad juices," —and turned his attention to the food (*victus*). Celsus, however, judiciously advises either class to look to both means of cure, and as medicines have peculiar powers he commences by reciting their names and virtues. This sketch being specially intended to bear upon the history of pharmacy, and not upon that of materia medica—a wider and most interesting subject—I will merely allude in general terms to the substances mentioned in the text.

In the first place drugs are classed under their respective properties and uses, and it is rather a surprise to find that these generally have reference to their external action upon the body, but we may remember that the very earliest allusions we have respecting pharmacy are to ointments. For instance, in Exodus xxx. myrrh, cinnamon, calamus and cassia with olive oil are to be obtained, "and thou shalt make it an oil of holy ointment, an ointment compound after the art of the apothecary." That enterprising lady, Medea, also compounded an ointment to render Jason invulnerable. Other instances might be given. So Celsus introduces styptics, vulneraries, digestives, cleansers, rodents, caustics, resolvents, and so forth.

Aperientia open mouths in bodies, which the Greeks call *stomata*. *Purgantia* purge wounds and not bowels. Let me give one short section by way of example of the drugs used, that of evacuants and drawing remedies, viz., ladanum (*Cistus creticus*), round alum, omphacium (verjuice), gall, chalcitis (copperas), bdellium, turpentine, and pine resin, propolis (bee glue), dry figs boiled, dove's dung, pumice, meal of darnel, green figs boiled in water, elaterium, bay berries, nitre (soda?) and salt. Although in this synopsis of the materia medica allusion is made almost exclusively to the external application of drugs, it must not be supposed that such is their only use; for instance in the previous book a long list is given of diuretics to be taken internally, and we shall find similar examples in the list of preparations. Celsus mentions from first to last perhaps four hundred drugs. Many of these have continued in use to the present day and the list contains some of our most valuable drugs, as scammony, aloes, opium, hyoscyamus, cantharides, ammoniacum, etc. It will be remembered that the Mediterranean coasts produced many species of drugs, and that the east, with its aromatics, its gums and balsams was open to the trade of Europe through Antioch and Alexandria. Amongst the minerals mentioned are metallic earths and oxides, mostly native, but some produced, and which include in some shape or other arsenic, copper, lead, iron, zinc and antimony. Silver and gold were not officinal, but the latter was used for fastening loose teeth. Soda, potash, and lime were the alkalies, acetic the only acid. Wine is freely used both on its own account and as a vehicle. *Passum* (a kind of raisin wine) and *mulsum* (hydromel) were also freely used. Most of the articles are well known and identified, others doubtful, whilst of others, as Targa, one of the editors of Celsus said: "*Qui monstrabit quid sit erit mihi magnus Apollo*;" pondering on which passage led me to think of the honours bestowed on pharmacists—one may by chance get a degree *honoris causâ*, or a phenomenal F.R.S. Something between a profession and a trade, there is not even a doctorate of pharmacy.

Pharmaceutical preparations are naturally introduced by a summary of the weights and measures used in compounding them. The ounce is divided into seven denarii of about 62 grains each, and the denarius into six sextantes, a sextans being equivalent to the Greek obolus, or a little more than ½ a scruple.

Simplicia, simples, is the name given by Celsus to uncompounded drugs, a designation that lasted longer than the day when Shakspere wrote of one "culling of simples," but now seems to have disappeared. Celsus says, "*sæpe simplicia opitulentur, sæpe mixta*," and in this last word, compounding of simples, lies the chief of the pharmaceutic art, the culling being left to others. Perhaps it is vanity to magnify our office; this designation of its duties reads simply enough, the words run smoothly; but he that has practised pharmacy alone knows its sinuosities and responsibilities. I say sinuosities, which may seem an odd word to use, but pharmacy, more than most professions, requires of its follower knowledge both in the highways and byeways of learning, and he often has to deplore, to himself at least, his ignorance, whilst he may apply to his profession the well-worn quotation—for did not Hippocrates the father of medicine originate it?—*Vita brevis, longa ars.*"

To recur to the text. External applications, as may be expected, are most prominent. *Malagmata* have the first place. A malagma was a plastic application; something between a plaster and a poultice. There are thirty-six formulæ given, some of them being named according to their properties, as malagma for pleurisy, for the gout, the liver, the spleen, etc., whilst others bear the name of their inventor, as Moschus, Chrysippus, Ctesiphon. Next come plasters, "*emplastra*," twenty nine kinds. Some of these have for their basis litharge (*spuma argenti*) and olive oil; and it is directed that when these are ordered they are to be boiled together, so that we follow in making our plasters the method employed at Rome eighteen hundred years ago. Special qualities are given by the addition of verdigris, minium, galbanum, cerussa alba, etc. Basilicon is older than the image of the Royal Stuart, with which I had associated it; its formula is panax—perhaps opoponax—galbanum, pitch, resin, and oil. Then come pastils (*pastilli*), which the Greeks called *trochiskous*, in which we follow the Greeks, cutting off the tail of the word for the sake of euphony. Pastils or troches are made of dry medicaments, mixed up with a liquid not greasy, as wine or vinegar, and afterwards dried. When used they are to be moistened with the same liquid. There are seven kinds, six of which are to be applied externally; but the seventh is to undergo what we consider to be the legitimate disposition of such named remedies. This kind is for the stone, and as the formula and directions for use are given after the manner of a modern prescription, I will quote in full the classic Latin of Celsus:—"*Cassiæ, croci, myrrhæ, costi, nardi, cinnamomi, dulcis radicis, balsami, hyperici, pares portiones conterentur; deinde vinum lene instillatur, et pastilli fiunt, qui singuli habeant P.* ⋇ =(*sextantem*) *hique singuli quotidie mane jejuno dantur.*"

Next come pessaries (*pessi*). These remedies have of late had considerable popularity; but the pessaries of Celsus had soft wool as a foundation, which was saturated with some oleaginous or other preparation, of which there are nine kinds; the last, if effective, though costly, might be worth notice, "*si non comprehendit, adeps leonina ex rosa* (*ol.*) *mollienda est.*" These are followed by compound powders, all for application, except a sternutatory, of which white hellebore is the basis. Gargles are described, and the formulæ of antidotes are given. Of these the most celebrated is Mithridates, by taking which daily the monarch of that name secured himself against the danger of poisoning. This medicine survives to our day; but its glory has departed. *Acopa* are a species of liniment. *Catapotia* are the predecessors of our modern pills. No directions are given for dividing the mass when made, the only instructions being that the size of a vetch seed, a pea, a bean, an Egyptian bean, or a lupin, as the case may be, is to be gulped down (*devorasse*). One formula is anodyne, in which *papaveris lacrimæ* is directed to be used, and in a second for a cough—*Athenionis*—the same drug is directed to be used, and two *catapotia* the size of our bean (*fabæ nostræ*) are to be taken morning and night. This dose would be equivalent to 20 grains or 2½ grains of opium, which indicates some discrepancy of weights. The same discrepancy is shown in the dose of elaterium as given by Dioscorides, viz., an obolus, which, if the strength were the same as at present used, would probably be an obolus for Charon. A few miscellaneous preparations conclude the list of regulation formulæ. In the next book is a long list of *collyria*, of which many are solids, to be dissolved or used as a *penicillium*, as the case may be. I have now brought to an end my brief sketch of the Pharmacopœia of Celsus. If I have made mistakes in rendering it, I trust I may be forgiven. I have met with some myself. For instance Celsus tells us that if a *sanguisuga* be swallowed salt and vinegar should be given. One editor says, *apropos* of this, that in every other place Celsus calls the leech *hirudo*. I take another edition with a good index and find six references to *hirudines*, but as they all prove to be *hirundines*, much more agreeable animals, I am still in doubt as to whether Celsus "ordered leeches." I could mention other discrepancies; but, as I say, I ask easy measure for myself.

There is yet a practical phase that neither physician, pharmacist nor the public would let pass in those days any more than in these present, namely the pecuniary, and we find it treated of in Horace:—

> "'Take the ptisan! What will it cost?' 'Nay, hold,
> A very trifle.' 'Sir, I will be told.'
> 'Threepence.' 'Alas, what does it signify,
> Whether by doctors or by thieves I die?'"*

The ptisan of the text was rice water; but advice might have been included. It is the old story, he spends fortune over a dish, but grudges eight asses, say sixpence for being cured of the effects of it.

Let us again take up the history of pharmacy. After a lapse of one thousand six hundred years great and mighty changes had come over the world. Pharmacy had also experienced its vicissitudes. Many searching spirits had arisen, and a new science was being unfolded to the world by a name unknown to Celsus. Alchemy and chemistry were born and grew together. With their history are associated the names of Basil Valentine with his "*currus triumphalis antimonii*" and his discovery of sulphuric acid, Raymond Lully, Roger Bacon, Albertus Magnus, and that prominent and burly figure Paracelsus—

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* Francis's Horace.

> "The wonderous Paracelsus, the dispenser
> Of life; the commissary of fate, the idol
> Of princes,——"

the destroyer of Galenism and a man of great genius, but a most egregious quack; author of a new medicine and a new theology; commonly believed to possess the double tincture, namely, the power of transmuting metals, and of curing diseases. Not much of his own survives, but appropriators have made good use of his ideas. Henceforward we have chemical as well as galenical remedies. The times had been strange, wild and irregular. Magic, superstition and astrology had a hold upon physic, as upon most things spiritual and temporal. Things medical, as things in general, were, however, now gradually improving in most countries of Europe, and in 1618 was issued the London Pharmacopœia, henceforth to be the law of the pharmacist. In early times it had a hard struggle to hold its own; the old views of things survived, new heresies arose; it followed but did not lead, but in following began the ascent to the proud position the British Pharmacopœia now occupies. It is not, however, to the Pharmacopœia Londinensis, but to the pharmacy of the times, irregular perhaps, that I wish to call your attention for a few minutes, and this is to be found in the dispensatories.

A famous dispensatory of the seventeenth century was that of Dr. William Salmon, Professor of Physick, who lived "at the Blew Ball by the ditch side nigh Holborn Bridge," which went through many editions. It is professedly a translation of the Pharmacopœia with explanations and commentaries, and a dictionary of the materia medica. The doctor is not afraid to make animadversions upon the work of the august fellows of "the Colledge," which it appears was lately reformed. For instance there follows the directions for melilot plaster:—"A learned but long discourse, the Colledge here talks almost like an apothecary as the vulgar phrase is; but not half so well." An interesting phrase this, and by the way, the apothecaries must have taken the ability to talk with them when they went over in 1815. Men were outspoken and hard hitters in those days, the amenities of life were less understood than at present. This may be termed the redundant age of pharmacy. The revival of learning had brought forward all the old knowledge stored up in the pages of Pliny, Galen and Dioscorides, and other ancient writers. In England, Gerard, Parkinson and the herbalists were opening these stores to the public view; as Salmon says, "In the very best authors extant a great part are collections," a fact probably true of many authors of the present day. Chemistry had begun to contribute its share. Superstition had not died out, cures being still performed "astrologically, galenically and chymically." Not long before this, Jerome Cardan, the first physician of his time in Europe, professor of mathematics and a philosopher, was accustomed to draw the horoscopes of his patients, and himself believed in them. The conflict between the old and the new, between rationalism and dogmatism, had commenced even in pharmacy, but as yet that science was blessed with a superabundance of material.

Salmon himself was a bit of a quack, even as the times went. I will give a slight sketch of his book. The first book treats of simples—the vegetable materia medica; the second of animals, including man, birds, beasts, serpents, insects and fishes. Many of the substances mentioned are preparations, not simples. Man's body, living or dead, affords thirty-nine medicaments, so it may readily be imagined that hardly a bone or tissue, a secretion or excretion but plays its useful part. A list merely would be amusing reading, but hardly fitted to the proprieties of the present day. So through the whole zoologia, the obscene preparations, of which we find a few even in Celsus and many in Dioscorides, were in full force; and it is odd to figure to oneself the disgusting compounds that may have been swallowed by the good people whose lives we read the story of, as well as by the wicked and the great unwashed. *Tempora mutantur et nos mutamur in illis*; the fastidious tastes of those days were probably very different from the fastidious tastes of the present day. Custom reconciles men to strange performances. Francis Rabelais was a physician, and there was a good deal of the grotesque spirit of pantagruelism about middle age medicine.

Next follows the mineralogia, and then the preparations of the Pharmacopœia, translated and copied with considerable comments and additions. These are divided into compounds internal and compounds external, and we now meet with the names that are still in use in the present day. A few have fallen out of use, as magisteries—precipitates both mineral and vegetable—except that perhaps now and then the magistery of bismuth is heard of. Quiddonies, kinds of rob or syrup, apparently pleasant preparations, have disappeared altogether, and lohochs survive only in the lohoch sanum, a name which in my district is curiously modified so as to have caused a totally different preparation to be substituted. But I would here remark that the fine old remedies and recipes that people used formerly for their minor complaints have very much succumbed before those all-promising but mostly delusive shams called patent medicines.

The next book treats of the 'Practice of Chymistry,' and has chapters on principles, instruments, dissolution, sublimation, etc.; that on fermentation is as follows:—"Fermentation is a certain manifestation of life fitting it for a resuscitation, and without which it would remain captivated within the bonds or chains of death; or, it is the breaking of the bond of corruption and putrefaction by the power of life assisted by a homogene matter or principle already freed." Quincy, who wrote perhaps fifty years afterwards by the light of his modern days—Quincy, whom in my junior days I always considered to be the grandfather and general ancestor of pharmacology, because his was the oldest book upon our shelves—remarks, quoting the passage: "And what confused stuff is this from Salmon!" But is there so much fault to be found with it? The modern problems of biology were very far beyond Quincy's ken, who proves fermentation to arise from unequal specific gravities—a sort of "here we go up, up, up—there we go down, down, down" process; but Salmon seems to have had a glimpse, if but a hazy one, of the truth, and if he wrote most delicious nonsense upon many subjects it may at least be said for him that on this he wrote what may well pass muster with much that is termed speculative philosophy in the present very modern times.

I shall not trace my way to the pharmacy of the present day by the direct path, but will just touch upon a work or two that indicate the way in which the old follow-my-leader style of writing gave place to that which culminated in 'Pharmacographia.' Remedies from newly discovered lands must necessarily be treated *de novo*. As early as 1661, a beautiful little book was published at Venice, written by Gandentius Brunacius, 'De Cina Cina seu Pulvere ad Febres.' I said newly imported drugs required new treatment; this is true to a certain extent, but yet this author is soaked through and through with the old ideas. He tells how the bark was introduced, and then he discusses its nature, and through the book as far as I have read it dwells at intervals upon this one theme, which evidently embarrasses him, viz., its quality of heat and dryness. Galen gives every plant its four degrees of heat or cold, dryness or moisture, and almost every writer down to a later period than this follows him. How they found them out would take a *magnus Apollo* to tell. What is cold and dryness? Is it a positive quality, as Galen has it, says Brunacius, or is it, as Cardan, in his book 'De Subtilitate' (on final causes, etc.), says, a mere absence of heat? Author after author amongst the ancients is quoted, and logical proofs are given, illustration after illustration, but still he is not satisfied. How heat can exist in wood is a problem in physics he cannot clearly comprehend, though he calls to his aid the case of the burning mirror, by which the vestal virgins rekindled the sacred fire, the case of the Apulian rustics who produced fire by the friction of dry sticks, and that of the hair-cutters, who say their instruments draw sparks from the heads of their clients. Then further how the heat or the cold of the bark acts upon the heat or cold of the fever, though puzzling, is a question that it becomes a 'Syntagma Physiologicum' to answer, and it is done accordingly. After this, we have the pharmacy of the drug, and the ninth chapter treats and proves very satisfactorily to our author "why cina cina should be given infused in wine;" on the other hand the next chapter answers the question whether cina cina should be exhibited in water in the form of infusion or decoction, and the answer given in the first line reminds me of *Punch's* advice to people about to marry, *Respondeo neutro modo esse præbendum*, and the reason follows, that decoction in water takes away the strength of medicines so prepared. This book must be one of the earliest extant specially treating upon cinchona, and it fixes the date at which it was brought to Rome to Cardinal Lugo by the Jesuits as the year of jubilee, 1650.

In 1681 was issued 'A New Mystery in Physick discovered by Curing of Fevers and Agues by Quinquina or Jesuites Powder.' This is a little book translated from the French of Dr. Belon, preceded by an introduction by an English author which contains a great deal of very curious chemistry. Although but a few years had elapsed since the former work, either the time or the place of writing has caused a wonderful difference in the treatment of the subject. The ancients are altogether left out of consideration, and a much more rational view is taken. The pharmacy is extended, wine is still the favourite vehicle, but there are also tincture, extract, infusion, pills; altogether the book reads much more pleasantly than the stilted English works of the same period. One step more and in 1769 we are landed in the gentle and respectable sobriety that characterized the pharmacy and materia medica of this present age until brightened by the influence of Dr. Pereira, and this step we take in the company of Dr. Canvane of Bath, whose dissertation on the Oleum Palmæ Christi reached a second edition in 1769. There is a little bit of history in the announcement that "the oil since my first publication of this pamphlet is now become officinal, it being sold at the Apothecaries' Hall and several other shops in London and Bath," but it may be added that this was rather a late introduction as the seeds were used by Hippocrates 1200 B.C. Dr. Canvane deals most fully with the therapeutical value of the oil, but he does not forget the pharmaceutical, and he introduces us to "the uncomparable Dr. Huxham of Plymouth," whose name is, I fear, gradually being forgotten by pharmacists. Not so that of Mr. Goulard, who flourished the triumphant motto "*Redeunt Saturnia Regna*;" the extract of Saturn is forgotten, but as Mr. Goulard's extract it survives, and if his name is "written in water" it is also written in lead. Mr. Goulard's work is well known; but the three others I have alluded to, especially the first, are, I believe, f considerable rarity.

I have now brought to a close my sketch of a few aspects of the history of pharmacy. My original intention was also to have said something of the pharmacy of the present; but I have already had to cut my story short. Whether many pharmacists can find time to trouble much about the pharmacy of the past when that of the present gives them so much to think of is perhaps rather doubtful, but there is at least considerable interest of a quaint sort to be gathered from it, and I cannot but think that if the history of pharmacy, which has not yet been written, were well put together it would be worthy of the doing.

If pharmacy advanced slowly, the same may be said of medicine, which from the time of Galen to the sixteenth century gathered little or nothing but the dust and cobwebs of scholastic theories. Then the sap began to flow in the barren stems of many sciences. Pharmacy was benefited by the advance made in natural philosophy and chemistry, and chemists of repute were found in the ranks of its followers. It for long, however, occupied but a second place as a subsidiary branch of medicine, and it was only in the present century that it first stood alone. Since then its growth has been rapid, a constant process of evolution and survival of the fittest. Its scientific history is written in the Year-Books of this Conference, and in the Journals of the Pharmaceutical Society, and its commercial, for it is a commerce, in the painstaking and moderately rewarded lives of its numerous followers.

Mr. Grose, Swansea, moved—'That the best thanks of the members of the Conference be given to the President for his very valuable and instructive address.

Mr. Greenish, in seconding the motion, said he need only refer to the passage in which allusion was made to the late Mr. Stoddart; those who had been in the habit of attending these meetings, and were at all acquainted with Mr. Stoddart, must heartily sympathize with what had been said.

Mr. Hughes, Llandilos, having supported the motion, Mr. Brady, as Senior Vice President, put it to the meeting, when it was carried unanimously.

(*To be continued.*)

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

The meeting of the above Association commenced on Monday, August 23, at Swansea, under the Presidency of Andrew Crombie Ramsay, LL.D., F.R.S., V.P.G.S., Director General of the Geological Survey of the United Kingdom, and of the Museum of Practical Geology, who delivered the opening address:—

THE PRESIDENT'S ADDRESS.

ON THE RECURRENCE OF CERTAIN PHENOMENA IN GEOLOGICAL TIME.

In this address I propose to consider the recurrence of the same kind of incidents throughout all geological time, as exhibited in the various formations and groups of formations that now form the known parts of the external crust of the earth. This kind of investigation has for many years forced itself on my attention, and the method I adopt has not heretofore been attempted in all its branches. In older times, Hutton and Playfair, in a broad and general manner, clearly pointed the way to the doctrine of uniformity of action and results, throughout all known geological epochs down to the present day; but after a time, like the prophets of old, they obtained but slight attention, and were almost forgotten, and the wilder cosmical theories of Werner more generally ruled the opinions of the geologists of the time. Later still, Lyell followed in the steps of Playfair, with all the advantages that the discoveries of William Smith afforded, and aided by the labours of that band of distinguished geologists, Sedgwick, Buckland, Mantell, De la Beche, Murchison, and others, all of whom some of us knew. Notwithstanding this new light, even now there still linger the relics of the belief (which some of these geologists also maintained), that the physical phenomena which produced the older strata were not only different in kind, but also in degree from those which now rule the external world. Oceans, the waters of which attained a high temperature, attended the formation of the *primitive* crystalline rocks. Volcanic eruptions, with which those of modern times are comparatively insignificant, the sudden upheaval of great mountain chains, the far more rapid decomposition and degradation of rocks, and, as a consequence, the more rapid deposition of strata formed from their waste—all these were assumed as certainties, and still linger in some parts of the world among living geologists of deservedly high reputation. The chief object of this address is, therefore, to attempt to show, that whatever may have been the state of the world long before geological history began, as now written in the rocks, all known formations are comparatively so recent in geological time, that there is no reason to believe that they were produced under physical circumstances differing either in kind or degree from those with which we are now more or less familiar.

It is unnecessary for my present purpose to enter into details connected with the recurrence of marine formations, since all geologists know that the greater part of the stratified rocks were deposited in the sea, as proved by the molluscs and other fossils which they contain, and the order of their deposition and the occasional stratigraphical breaks in succession are also familiar subjects. What I have partly to deal with now, are exceptions to true marine stratified formations, and after some other important questions have been considered, I shall proceed to discuss the origin of various non-marine deposits from nearly the earliest known time down to what by comparison may almost be termed the present day.

Metamorphism.

All, or nearly all, stratified formations have been in a sense metamorphosed, since, excepting certain limestones, the fact of loose incoherent sediments having been by pressure and other agencies turned into solid rocks constitutes a kind of metamorphism. This, however, is only a first step toward the kind of metamorphism the frequent recurrence of which in geological time I have now to insist upon, and which implies that consolidated strata have undergone subsequent changes of a kind much more remarkable.

Common stratified rocks chiefly consist of marls, shales, slates, sandstones, conglomerates, and limestones, generally distinct and definite; but not infrequently a stratum, or strata, may partake of the characters in varied proportions of two or more of the above-named species. It is from such strata that metamorphic rocks have been produced, exclusive of the metamorphism of igneous rocks, on which I will not enter. These may be looked for in every manual of geology, and usually they may be found in them.

As a general rule, metamorphic rocks are apt to be much contorted, not only on a large scale, but also that the individual layers of mica quartz and felspar in gneiss are bent and folded in a great number of minute convolutions, so small that they may be counted by the hundred in a foot or two of rock. Such metamorphic rocks are often associated with masses of granite both in bosses and in interstratified beds or layers, and where the metamorphism becomes extreme it is often impossible to draw a boundary line between the gneiss and the granite; while, on the other hand, it is often impossible to draw any true boundary between gneiss (or other metamorphic rocks) and the ordinary strata that have undergone metamorphism. Under these circumstances, it is not surprising that when chemically analysed, there is often little difference in the constituents of the unmetamorphosed and the metamorphosed rock. This is a point of some importance in relation to the origin and non-primitive character of gneiss and other varieties of foliated strata, and also of some quartzites and crystalline limestones.

I am aware that in North America formations consisting of metamorphic rocks have been stated to exist of older date than the Laurentian gneiss, and under any circumstances it is obvious that vast tracts of pre-Laurentian land must have existed in all regions, by the degradation of which, sediments were derived wherewith to provide materials for the deposition of the originally unaltered Laurentian strata. In England, Wales and Scotland, attempts have also been made to prove the presence of more ancient formations, but I do not consider the data provided sufficient to warrant any such conclusion. In the Highlands of Scotland, and in some of the Western Isles, there are gneissic rocks of pre-Cambrian age, which, since they were first described by Sir Roderick Murchison in the north-west Highlands, have been, I think justly, considered to belong to the Laurentian series, unconformably underlying Cambrian and Lower Silurian rocks, and as yet there are no sufficient grounds for dissenting from his conclusion that they form the oldest known rocks in the British Islands.

It is unnecessary here to discuss the theory of the causes that produced the metamorphism of stratified rocks, and it may be sufficient to say, that under the influence of deep underground heat, aided by moisture, sandstones have been converted into quartzites, limestones have become crystalline, and in shaley, slaty, and schistose rocks, under like circumstances, there is little or no development of new material, but rather, in the main, a rearrangement of constituents according to their chemical affinities in rudely crystalline layers, which have very often been more or less developed in pre-existing planes of bedding. The materials of the whole are approximately the same as those of the unaltered rock, but have been rearranged in layers, for example, of quartz, felspar and mica, or of hornblende, etc., while other minerals, such as schorl and garnets, are of not infrequent occurrence.

It has for years been an established fact that nearly the whole of the mountain masses of the Highlands of Scotland (exclusive of the Laurentian, Cambrian and Old Red Sandstone formations) mostly consist of gneissic rocks of many varieties, and of quartzites and a few bands of crystalline limestone, which, from the north shore to the edge of the Old Red Sandstone, are repeated again and again in stratigraphical convolutions, great and small. Many large bosses, veins and dykes of granite are associated with these rocks, and, as already stated, it sometimes happens that it is hard to draw a geological line between granite and gneiss and *vice versâ*. These rocks, once called Primary or Primitive, were first proved by Sir Roderick Murchison to be of Lower Silurian age, thus revolutionizing the geology of nearly one-half of Scotland. To the same age belongs by far the greater part of the broad hilly region of the south of Scotland that lies between St. Abb's Head on the east and the coast of Ayrshire and Wigtonshire on the west. In the south-west part of this district, several great masses of granite rise amid the Lower Silurian rocks, which in their neighbourhood pass into mica-schist and even into fine-grained gneiss.

In Cornwall the occurrence of Silurian rocks is now well known. They are of metamorphic character, and partly associated with granite; and at Start Point, in South Devonshire, the Silurian strata have been metamorphosed into quartzites.

In parts of the Cambrian areas, Silurian rocks in contact with granite have been changed into crystalline hornblendic gneiss, and in Anglesey there are large tracts of presumed Cambrian strata, great part of which have been metamorphosed into chlorite and mica-schist and gneiss, and the same is partly the case with the Lower Silurian rocks of the centre of the island, where it is almost impossible to disentangle them from the associated granite.

In Ireland similar metamorphic rocks are common, and, on the authority of Professor Hull, who knows them well, the following statements are founded:—

"Metamorphism in Ireland has been geographical and not stratigraphical, and seems to have ceased before the Upper Silurian period.

"The epoch of greatest metamorphism appears to have been that which intervened between the close of the Lower Silurian period and the commencement of the Upper Silurian, taking the formations in ascending order.

"It is as yet undecided whether Laurentian rocks occur in Ireland. There are rocks in north-west Mayo very like those in Sutherlandshire, but if they are of Laurentian age they come directly under the metamorphosed Lower Silurian rocks, and it may be very difficult to separate them.

"Cambrian purple and green grits are not metamorphosed in the counties of Wicklow and Dublin, but the same beds at the southern extremity of County Wexford, near Carnsore Point, have been metamorphosed into mica schist and gneiss.

"In the east of Ireland the Lower Silurian grits and slates have not been metamorphosed, except where in proximity to granite, into which they insensibly pass in the counties of Wicklow, Dublin, Westmeath, Cavan, Longford and Down; but in the west and north-west of Ireland they have been metamorphosed into several varieties of schists, hornblende-rock, *and gneiss, or foliated granite*."

It would be easy to multiply cases of the metamorphism of Silurian rocks on the continent of Europe, as, for example, in Scandinavia, and in the Ural Mountains, where, according to Murchison, "by following its masses upon their strike, we are assured that the same zone which in one tract has a mechanical aspect and is fossiliferous, graduates in another parallel of latitude into a metamorphic crystalline condition, whereby not only the organic remains, but even the original impress of sedimentary origin are to a great degree obliterated." The same kind of phenomena are common in Canada and the United States; and Medlicott and Blanford, in 'The Geology of India,' have described the thorough metamorphism of Lower Silurian strata into gneiss and syenitic and hornblende schists.

In Britain, none of the Upper Silurian rocks have undergone any serious change beyond that of ordinary consolidation, but in the Eastern Alps at Gratz, Sir Roderick Murchison has described both Upper Silurian and Devonian strata interstratified with separate courses of metamorphic chloritic schist.

Enough has now been said to prove the frequent occurrence of metamorphic action among Cambrian and and Lower and Upper Silurian strata.

If we now turn to the Devonian and Old Red Sandstone strata of England and Scotland, we find that metamorphic action has also been at work, but in a much smaller degree. In Cornwall and Devon, five great bosses of granite stand out amid the stratified Silurian, Devonian, and Carboniferous formations. Adjoining or near these bosses the late Sir Henry De la Beche remarks, that "in numerous localities we find the coarser slates converted into rocks resembling mica-slate and gneiss, a fact particularly well exhibited in the neighbourhood of Meavy, on the south-east of Tavistock," and "near Camelford we observed a fine arenaceous and micaceous grauwacke turned into a rock resembling mica-slate near the granite." Other cases are given by the same author, of slaty strata turned into mica-schist and gneiss in rocks now generally considered to be of Devonian age.

The Devonian rocks and Old Red Sandstone are of the same geological age, though they were deposited under different conditions, the first being of marine, and the latter of fresh-water, origin. The Old Red Sandstone of Wales, England, and Scotland, has not, as far as I know, suffered any metamorphism, excepting in one case in the north-east of Ayrshire, near the sources of the Avon Water, where a large boss of granite rises through the sandstone, which all round has been rendered crystalline with well-developed crystals of felspar.

On the continent of Europe, a broad area of Devonian strata lies on both banks of the Rhine and the Moselle. Forty years ago, Sedgwick and Murchison described the crystalline quartzites, chlorite, and micaceous slates of the Hundsruck and the Taunus and, from personal observation I know that the rocks in the country on either side of the Moselle are, in places, of a foliated or semi-foliated metamorphic character. In the Alps also, as already noticed, metamorphic Devonian strata occur interstratified with beds of metamorphic schists, and, Sir Roderick adds, "we have ample data to affirm, that large portions of the Eastern Alps . . . are occupied by rocks of true Palæozoic age, which in many parts have passed into a crystalline state."

I know of no case in Britain where the Carboniferous strata have been thoroughly metamorphosed, excepting that in South Wales, beds of coal, in the west of Carmarthenshire and in South Pembrokeshire, gradually pass from so-called bituminous coal into anthracite. The same is the case in the United States, in both instances the Carboniferous strata being exceedingly disturbed and contorted. In the Alps, however, Sir Roderick Murchison seems to have believed that Carboniferous rocks may have been metamorphosed: a circumstance since undoubtedly proved by the occurrence of a coal-measure calamite, well preserved, but otherwise partaking of the thoroughly crystalline character of the gneiss in which it is imbedded, and which was shown to me by the late Professor Gastaldi, at Turin.

I am well acquainted with all the Permian strata of the British Islands and of various parts of continental Europe, and nowhere, that I have seen, have they suffered from metamorphic action, and strata of this age are, I believe, as yet unknown in the Alps. This closes the list of metamorphism of palæozoic strata.

I will not attempt (they are so numerous) to mention all the regions of the world in which Mesozoic or Secondary formations have undergone metamorphic action. In Britain and the non-mountainous parts of France, they are generally quite unaltered, but in the Alps it is different. There as everyone knows who is familiar with that region, the crystalline rocks in the middle of the chain have the same general strike as the various flanking stratified formations. As expressed by Murchison, "as we follow the chain from N.E. to S.W. we pass from the clearest types of sedimentary rocks, and, at length, in the Savoy Alps, are immersed in the highly altered mountains of Secondary limestone," while, "the metamorphism of the rocks is greatest as we approach the centre of the chain," and indeed, anyone familiar with the Alps of Switzerland and Savoy knows that a process of metamorphism has been undergone *by all the Jurassic rocks* (Lias and Oolites) of the great mountain chain. Whether or not any strata of Neocomian and Cretaceous age have been well metamorphosed in this region I am unable to say; but it seems to be certain that the Eocene or Lower Tertiary Alpine formation, known as the Flysch, contains beds of black schists which pass into Lydian stone, and also that in the Grisons it has been converted into gneiss and mica-schist, a fact mentioned by Studer and Murchison. I also have seen in the country north of the Oldenhorn, nummulitic rocks so far foliated that they formed an imperfect gneiss.

In Tierra del Fuego, as described by Darwin, clay slates of early Cretaceous date pass into gneiss and mica-slate with garnets, and in Chonos Islands, and all along the great Cordillera of the Andes of Chili, rocks of Cretaceous or Cretaceo-oolitic age have been metamorphosed into foliated mica-slate and gneiss, accompanied by the presence of granite, syenite, and greenstone.

This ends my list, for I have never seen or heard of metamorphic rocks of later date than those that belong to the Eocene series. Enough, however, has been said to prove, that from the Laurentian epoch onward, the phenomenon of extreme metamorphism of strata has been of frequent recurrence all through Palæozoic and Mesozoic times, and extends even to a part of the Eocene series equivalent to the soft unaltered strata of the formations of the London and Paris basins, which excepting for their fossil contents, and sometimes highly inclined positions, look as if they had only been recently deposited.

(*To be continued.*)

Communications, Letters, etc. have been received from Messrs. Brady, Boutell, Wilford, Miller, Clark, Matthias, Alcock, Beaven, Battie, Hanbury, 374, H. O. I., T. C. A., S. H. P., J. O., Sheffield, Civis, Anteros, Eblana, Saxon.

ASHY INGREDIENTS IN LIGHT COLOURED COD LIVER OIL.

BY PROFESSOR E. A. VAN DER BURG.

In the first part of the 'Scheikunolige Onderzuckingen,' by G. J. Mulder, Dr. L. J. de Jongh says, on page 479 of his 'Chemical Investigation of the Composition of Cod Liver Oil':—"No less differ the series of inorganic ingredients which we have discovered in cod liver oil from those mentioned by others." Further on, on page 480, line 10:—"The reason why Marder, who, to our knowledge, has been up to the present time the only one that makes special mention of the inorganic ingredients of the cod liver oil, has found no phosphoric acid, is that he has not tried to find it. In declaring this, viz., the reasons why the results of our investigations on this point differ from those of others, we believe we have done no more than our duty. If we now look on the different results of our own investigations of the three sorts of cod liver oil we may state that the light-coloured oils contain more inorganic ingredients than the dark coloured."

Dr. de Jongh also tells us that his investigations led him to the discovery that in the former the quantity of phosphoric acid is nearly double and that of lime more than double what is found in the latter.

Considering that hardly any incombustible matter is found in the light-coloured oil, it may be of importance to know now Dr. de Jongh got those figures.

To determine the phosphoric acid and the sulphuric acid a certain quantity of the oil was saponified by the admixture of potassa caustica. The soap which was obtained in this way was decomposed with hydrochloric acid. After the removal of the fatty acids the phosphoric acid in the filtered liquor was determined as phosphas ferricus, and the sulphuric acid as sulphas barycus.

In order to see how much calcium, magnesia and soda the mixture contained a certain quantity of it was carbonized, the carbon digested with hydrochloric acid, and the phosphoric acid removed from the acid liquor as phosphas ferri. After filtration the calcium was determined as oxalas calcis, and after this had been removed the magnesia was precipitated as phosphas ammonico-magnesicus. The filtrate was now mixed with sulphuric acid, evaporated in a platinum cup, incinerated and weighed, and as no potash was found the weight was taken account of as sulphas sodæ.

In this manner the author found in light-coloured cod liver oil the follow percentages.

0·09135	Phosphoric acid
0·07100	Sulphuric acid
0·15150	Lime
0·00880	Magnesia
0·05540	Soda

Total 0·37805 per cent. inorganic matter or
0·32265 per cent. incombustible ingredients, if the soda, which may be volatilized as chloric natrium, is not counted.

What was, however, the result of a direct experiment, the burning in a platinum cup? Nothing more or less than this:—a quantity of no less than 35 grams of light-coloured cod liver oil left no weighable quantity of ash.

These experiments have often been made with the light coloured Lofodin cod liver oil of Draisma Van Valkenburg, and generally crowned with the same success.

Likewise other sorts of cod liver oil produced the same results. For instance, 23·867 grams of an English oil, that was very pure, left 0·0005 gram of a light brown ash, in which iron, but hardly any calcium, could be distinguished; accordingly 0·002 per cent.

22·408 grams of Dr. de Jongh's oil, which is darker than the two sorts mentioned above, left 0·002 gram of ash, in which iron and calcium were distinguishable; accordingly 0·009 per cent.

Hence it may be safely stated that light coloured cod liver oil contains hardly any or no incombustible matter.

How then are the results of Dr. de Jongh's experiments to be accounted for? Inasmuch as this phosphoric acid, calcium, etc., have really been found in an analysis, they can only have originated from the vessels or the reagents that were used, a warning example, no doubt, that one cannot be too scrupulously accurate in ascertaining the rectitude of the results that one has acquired through analysis.

ANALYSIS OF IODINE-IRON COD LIVER OIL.[*]

BY PROFESSOR E. A. VAN DER BURG.

From the above it is evident that the light coloured cod liver oil after combustion leaves no weighable quantity of ash. The quantity of iron may be found by burning at least 20 grams in a small porcelain or platinum cup, and weighing the iron oxide that is in that way produced. This weight multiplied by 0·7 gives the quantity of iron in the oil. If the oil is of the right kind there should be 0·27 per cent. of iron. One has to be very careful in burning the oil, as it is very combustible, and the experiment consequently liable to fail.

The vessel—I always use one of platinum—should be filled for no more than one-sixth. It should be heated by a gas flame under the chimney. The oil will be observed to lose the violet colour and become brownish-red. As soon as the colour of the oil has changed in this way, there will be a sufficient quantity of combustible vapour, that may be ignited by a flame, and will keep burning for some time. At that moment the gas flame should be removed, and the combustion, that heretofore took place in a very great flame, will keep on quietly. As soon as the flame is extinguished, the vessel should be heated anew, and again some inflammable vapours will appear. When the oil is completely carbonized, a beginning should be made with a total combustion of the carbon. This last process may be quickened a good deal, if every now and then a drop of water is poured on the cooled carbon, and after a slow and careful evaporation of the water the carbon is ignited afresh. The red ash may be determined as pure iron oxide. Should further proof be wanted, the ash may be dissolved in hydrochloric acid, reduced by zinc, after which the iron may be easily determined by the ordinary titrated solution of potassium permanganate.

To find out the iodine 5 grams of the oil is sufficient. This should be saponified with an alcoholic solution of potash (which must contain no iodine, of course), by heating it for an hour or two, in a porcelain cup, on a water-bath. After this the soap must be completely carbonized in the same cup by careful heating, and the carbon treated with water, until it ceases to have an alkaline reaction. As a test that the combustion has taken place in the right manner the solution must be totally colourless. The clear liquid must be rendered a little acid by admixture of hydrochloric acid and precipitated by a solution of palladium. The precipitate may be weighed now, or as palladium metal, after heating. If the preparation has been of the right composition, 5 grams will produce about 0·087 gram of iodetum palladiosum, or about 0·025 of palladium.

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[*] The method of making this preparation will be described in the next number of this Journal.

DETECTION AND DETERMINATION OF HEAVY MINERAL OILS, OF RESIN OILS, OF THE FATTY OILS, AND OF RESIN IN THE OILS OF COMMERCE.*

BY M. A. RÉMONT.

The qualitative analysis ought to be preceded by an examination of the organoleptic properties of the oil, the manner in which it behaves under the influence of heat, and of its specific gravity, which often gives useful indications. Thus, if the specific gravity of the sample is below 0·900 it certainly contains a mineral oil; if from 0·900 to 0·975, we may be in presence of the most complex mixtures; but if it is above 0·975 we have certainly an oil of resin.

We begin by treating the sample with carbon disulphide, freshly prepared, which gives a clear solution with all the oils. If oleic acid or a fatty oil has been mixed with alkali to raise its specific gravity by the formation of a portion of soap, there will appear a precipitate. In this case the liquid is filtered, and the residue is washed with carbon disulphide. It may be proved to be soap by its solubility in water, its alkalinity, and the turbidity, more or less marked, which is caused by an acid poured into the solution.

The filtrate is freed from the carbon disulphide by distillation: 1 c.c. of the residue is taken and mixed with 4 c.c. of alcohol at 85°. If solution takes place fatty acids are present, pure or mixed, and an excess of alcohol is gradually added. If after having poured in 50 c.c. the liquid is limpid, or there is produced a very slight cloud, which disappears on adding a drop of hydrochloric acid, the sample consists of oleic acid, pure or mixed with resin. If the specific gravity does not exceed 0·905 at 15° the sample consists entirely of oleic acid. If the specific gravity is higher the oleic acid contains resin. By way of confirmation the substance is examined with the polarimeter, either directly or dissolved in carbon disulphide, and if there is a deviation we may be certain of the presence of a resinous mixture.

If we find a persistent cloudiness in the alcoholic solution it is because the fatty acids contain an oil sparingly soluble in this solvent, and in so much the greater quantity as the cloud appears earlier. This very sensitive process renders it possible to detect 2 or 3 per cent. of heavy mineral oil, or of resin, or fatty oil in the oleic acid known in commerce as oleine. The turbidity produced in the alcoholic liquid resolves itself in some time into little oily drops, which line the sides of the vessel, and which can be made by a shock to fall to the bottom of the tube. The volume of this residue shows approximately the proportion of insoluble matter.

The most common case is when 4 parts of alcohol do not completely dissolve 1 part of oil. A larger quantity of the latter is then taken, and agitated with an equal volume of alcohol. After settling for a time the alcoholic solution is decanted and evaporated in a capsule. The nature and the quantity of the residue serve as a clue to the nature of the mixture.

I submit the oil to the action of caustic soda, employing the method indicated by M. Dalican for the analysis of tallows. In a capsule of porcelain, or preferably of enamelled cast iron, there are weighed about 20 grms. of oil, and heated to 100° to 110°. There is then poured in a mixture of 15 c.c. soda-lye at 36° B. and 10 c.c. of alcohol: the mixture is stirred and heated until the alcohol and the chief part of the water have disappeared. Then 150 c.c. of distilled water are added, and the boiling is kept up for half an hour, when three cases may occur:—

1. The oil, under the influence of the alkali, is merely emulsified, and on the addition of water it separates distinctly: this indicates either a mineral oil, a resin oil, or a mixture of the two. The aqueous solution is decanted off, and it is mixed with sulphuric acid. If there is no precipitate, or if a mere slight cloudiness is produced, the sample is a pure mineral oil. If there is a considerable precipitate which collects in brown viscid drops giving off a strong odour of resin, and soluble in an excess of alcohol, we have a resin oil, pure or mixed. The oil is examined with the polarimeter, and if it acts upon polarized light this is a confirmation of the presence of resin oil. If the specific gravity is below 0·960 there is probably a mixture of mineral oil. Good indications may also be got by distilling if one of the oils is not in too trifling proportion. The distillation ought to be fractionated as far as possible and conducted slowly. As the resin oils boil, as a rule, at lower points than the mineral oils, it follows that in place of having specific gravities which increase with the boiling-points, as happens with the heavy mineral oils or pure resin oils, there are observed, with their mixtures, very abrupt transitions. The sample ought to be tested with stannic chloride, and if the violet coloration is not very distinct the same reagent should be applied to the first products of distillation, since the colourable product contained in the resin oils is there chiefly met with.

2. Or there is formed by the action of caustic soda a paste-like mass of soap, which on treatment with water and boiling for some time gives a clear liquid. It is diluted with cold water and then supersaturated with an acid. The fatty acids liberated collect on the surface after decantation of the water, and if exposed to cold they crystallize. A small portion is melted in a tube at a gentle temperature, and 4 parts of alcohol at 85° are added first and afterwards an excess. Here two cases are possible:—

A. If no precipitation takes place it is because the fatty acids are pure, which shows that the oil examined is a pure fatty oil, or, which rarely happens, mixed with resin. The specific gravity of the fatty acids may here give good indications, but it cannot be taken at common temperatures, at which fatty acids are solid. They must be melted, and the specific gravity taken at a known temperature. M. Baudouin, Chemist at the Arnavon Soap Works, at Marseilles, has drawn up a table of the specific gravities of the fatty acids of certain oils taken at 30°. Except those of linseed oil, which mark 0·910, those of the other fatty oils have specific gravaties ranging from 0·892 to 0·900. To reduce the specific gravities of the fatty oils examined to the temperature of 30°, deduct from the density found, calculated on a litre, as many times 0·64 grm. as there are degrees below, or, if the temperature is higher, add to the density found as many times as 0·64 grm. as there are degrees above. If the specific gravity indicates that the neutral oil contains resin an attempt may be made to separate it, in part at least, rapidly by agitating 5 or 6 c.c. of the original oil with an equal volume of alcohol, decanting after settling, and evaporating in a capsule. There is thus obtained a solid or semi-fluid residue in case of resin. Further examination is then made with the polarimeter.

B. The fatty acids derived from the decomposition of the soap give a precipitate if treated with an excess of alcohol. If it is not redissolved by 1 grm. of hydrochloric acid, and if after some time it is resolved into oily drops it is due to a mineral oil or a resin oil. A fatty oil containing 10 to 15 per cent of one these oils is completely saponified, and yields with boiling water not an emulsion, but a soap completely soluble. The turbidity should resolve itself into oily drops, for there are certain fatty acids—those, amongst others, of the oil of earth-nuts (*arachis*)—which are soluble in a small proportion of alcohol at 85°, but an excess of the alcohol precipitates a sparingly soluble portion, arachidic acid, in small flocks. These flocks may be collected on a filter, and examined as to their complete solubility in alkalies. If their melting-point is near 73° they may be attributed to the oil of earth-nuts.

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*Bulletin de la Société Chimique de Paris. Reprinted from the Chemical News, July 23, 1880.

3. Or, lastly, the oil, on treatment with soda, may give a paste more or less firm, which if placed in boiling water for half an hour allows oily drops to rise to the surface, which are due to a mineral oil or a resin oil. After settling for some minutes a part of the supernatant liquid is decanted and mixed with an excess of a saturated solution of common salt. There is produced a precipitate of soap, which is filtered off on cooling. The filtrate is supersaturated with an acid. If there is produced a slight turbidity, and if the liquid which was almost colourless when alkaline gives off an odour of fatty matters we have a neutral oil mixed with a non-saponifiable oil. If, on the contrary, the solution was highly coloured after filtration, and gives when acidified a flocculent precipitate of a resinous odour, the sample is a mixture containing resin. In these two cases, the components of the mixture may be recognized by means of the procedures indicated above.

Quantitative Analysis.—If it is desired to know the elements attacked by alkalies, and of those which are not, the following procedure is to be followed:—If the sample has yielded anything insoluble in carbon disulphide, it is separated as already said, and the operation is confined to the residue of the distillation. Let it be assumed that the composition of the residue is as complex as possible, containing fatty oils, mineral oils, resin oils, and solid resin.

The mixture is saponified. Into a flask closed by stopper, through which passes a long tube, are introduced 20 grms. of the oil, and a mixture of 15 c.c. of soda at 36° B., and 15 c.c. of 90 to 95 per cent. alcohol. The flask is then set upon the water-bath for half an hour and is often shaken. At the end of this time the whole is poured into a funnel fitted with a tap and previously warmed, which is left in a stove at 50° to 60° until a complete separation of the non-saponifiable oil from the alkaline liquid has taken place. The latter is then decanted into a porcelain capsule, and in its stead is poured 15 c.c. of boiling water which has served to rinse the flask. It is shaken well so as to wash the non-saponifiable matter, and decanted anew after settling. Finally, it is washed a third time with boiling water. The oil in the funnel is received into a tared capsule and weighed. As for what adheres to the sides, it is washed with a little ether, and the solution is received in another capsule, which is exposed to the air till the bulk of the ether has disappeared. It is then gently heated to expel the rest, and weighed.

The alkaline liquid is kept at a boil for some time to expel the alcohol, and after cooling it is mixed with an equal volume of a saturated solution of common salt, freed from magnesia by being boiled for a few moments with caustic soda and filtered. In this manner, the soap is precipitated in firm clots, carrying with it the last portion of non-saponifiable matter. The saline solution, after settling, is decanted by means of a pipette and neutralized with an acid. If a notable turbidity is produced, which collects in flocks, it is due to resin. The flocks are collected, dried, and weighed. The clots of soap are thrown upon a filter, washed twice with salt water, the last traces of which are removed by pressing the mass between blotting paper. The soap is then placed in a glass cylinder, moistened with about 100 c.c. of carbon disulphide recently rectified, stoppered, gently shaken at intervals three or four times, so as not to break the clots, and left to settle. After an hour or two the carbon sulphide which is coloured yellow by the dissolved oil, separates in the lower part of the cylinder. It is decanted by means of a pipette, and in its stead is added a fresh portion of the solvent. It is shaken, left to settle, decanted, and so on till the carbon sulphide runs off almost colourless. The whole is then thrown upon a filter and washed for the last time. A portion of this last washing, if evaporated upon a watch-glass, should leave an insignificant residue.

The soap on the filter is exposed to the air till the carbon disulphide with which it is saturated has escaped.

As for the carbon disulphide solution, it is distilled gently on the water-bath. The last portions of the solvent are expelled by blowing air into the flask while placed in boiling water. When cold it is weighed.

The last portion of the non-saponifiable matter thus obtained ought to have the same appearance as the first portion. If it is less fluid it still contains a portion of soap. In this case it is again taken up in carbon disulphide at a gentle heat in presence of a few drops of water to hydrate the soap which, without this addition, would again be partially dissolved. It is then filtered and the washed soap is added to the chief mass.

The non-saponifiable oil may consist of mineral oil, resin oil, or a mixture of both. The means of detection have been given above, and I have not yet come upon a process for their separation.

The soap insoluble in carbon sulphide which lies on the filter contains resin and fatty acids combined with soda.

The separation of these substances, so similar in their properties, presents many difficulties. Several methods have been published, but none of them gives satisfactory results. That of M. Jean, one of the most recent, consists in exhausting the barium soap with ether, which ought to dissolve the resinate and leave the soaps of the fatty acids untouched. On following exactly the author's instructions, I have never been able to avoid the partial solution of the barium oleate. I have modified the process by substituting for the ether boiling alcohol of 85 per cent, which certainly dissolves much less of the oleate, but still takes up enough to render the results inaccurate.

As far as possible the soap is separated from the filter and placed in a capsule. The filter is put back in the funnel and filled with boiling water. The solution is effected slowly and filters by degrees; it is received in the capsule where the detached portion has been already placed.

The solution of soap, after cooling, is mixed with caustic soda until precipitation no longer ensues, and left to settle. All the soap of the fatty acids is deposited, drawing down with it the chief portion of the resinate, a part of which, however, remains in solution and colours the liquid strongly. The whole is filtered, the filtrate accurately neutralized with sulphuric acid; the flocks of resin deposited are received upon a tared filter which is weighed anew after washing in water and drying at a low temperature. The soap is redissolved in a little luke-warm water and an excess of barium chloride is poured into the solution with agitation. The clots of barytic soap are drained in a filter-pump, replaced in the capsule in which the precipitation has been effected and thoroughly dried in the water-bath or the stove. The mass is then powdered, and treated with 50 or 60 c.c. of alcohol at 85 per cent, which is kept near the boiling point, working it up with a pestle. It is left to settle for a few moments and the supernatant alcoholic liquid is then decanted into a phial. 20 to 25 c.c. of alcohol are again poured upon the residue, let boil, decanted after settling, and so on till a portion of the alkali which has been used leaves, on evaporation, scarcely any residue, which happens generally after 120 c.c. of alcohol have been used.

The alcoholic liquids are mixed and distilled till there remains only about 50 c.c. Hydrochloric acid is added to decompose the resinate, and the resin set at liberty floats in the liquids. On cooling it collects in a solid mass at the bottom of the vessel. It is thrown into a capsule, melted under water, and weighed after desiccation on the water-bath.

The residue insoluble in alcohol is treated in a similar manner to obtain the fatty acids.

EUPATORIUM PERFOLIATUM.*

BY GEORGE LATIN, PH.G.

Eupatorium perfoliatum has been analysed by Peterson (1851) and Bickley (1854); but, as they found nothing but the usual constituents of herbs, the writer thought it would be of some importance to make still further investigations.

The leaves and tops of the plant, reduced to a moderately fine powder, and packed in a percolator, were treated with 95 per cent. alcohol until exhausted. The alcohol was distilled off and the residue evaporated to the consistence of an extract by a very gentle heat. This extract was then treated with ether, which dissolved out the bitter principle and colouring matter, leaving a greyish, gummy-like mass, entirely soluble in water, and proved, by Trommer's test, to be sugar.

The ethereal tincture was then placed in a flask, and the ether carefully distilled off by means of a water-bath, and evaporated to a semi-solid consistence, which was then treated with petroleum benzin, by means of which a large amount of colouring matter, fat, etc., was removed. The benzin solution, upon being permitted to evaporate spontaneously, yielded a number of small crystals in an impure condition, which adhered to the sides of the vessel. These were washed very rapidly with petroleum benzin and then with ether, which left them in the form of pure white, needle-shaped, tasteless crystals, and were insoluble in alcohol, ether, water and alkaline solutions. When treated with sulphuric and nitric acids separately no change was produced, but subjected first to the action of nitric and then of sulphuric acid, a beautiful carmine-red was produced, changing after a short time to an orange-yellow; with hydrochloric acid a beautiful emerald-green, and with potassium bichromate with sulphuric acid a greenish-violet was developed. Heated to redness on platinum foil, no residue is left and no odour given off. The crystals have a comparatively low fusing point; on placing a few of them on a piece of note-paper and holding them over the flame of a Bunsen burner, they melt, leaving a greasy stain, but not sufficiently strong to render the paper transparent.

This being, so far as the writer is aware, the first crystalline principle obtained from *Eupatorium perfoliatum*, it was a difficult matter to decide exactly what was the nature of the crystals, as the quantity was very small; but, so far as examination enabled me to form an opinion, I judged them to be either wax or resin.

The residue left after treating with benzin was then dissolved in alcohol and filtered. Upon the filter there was left a black powder, which was unaffected by alcohol, water, alkalies and concentrated acids, and when heated was consumed, leaving an ashy residue.

The filtrate was then treated with an alcoholic solution of acetate of lead, which caused a copious precipitate of colouring matter; this was separated by second filtration and the liquid treated with sulphuretted hydrogen (H_2S), by which the lead was eliminated. The liquid being boiled, was thus freed from sulphuretted hydrogen. After this, purified animal charcoal was left in contact with it for three days, the whole being shaken occasionally. By this means the solution was nearly deprived of colour; it was then concentrated and treated with boiling water until all bitterness was removed, and the residue was a resinous, tasteless mass.

The aqueous solution thus obtained was again evaporated and treated with chloroform, which dissolved out a bitter principle and left a tasteless, resin-like mass in the vessel.

The chloroformic solution, when evaporated, left the bitter principle in a pure condition, and this was named eupatorine. When tested by Trommer's test it gave no reaction, but when first boiled with sulphuric acid it gives a red-coloured precipitate, and by sulphuric acid alone a white precipitate was occasioned, showing it to be a glucoside.

Eupatorine has a little acid taste, and is soluble in alcohol, chloroform, ether, boiling water and concentrated acids; with sulphuric acid a dark reddish-brown colour is produced, and with hydrochloric and nitric acids a light yellow colour results.

Eupatorine, when pure, is wholly dissipated by heat, and when boiled with sulphuric acid and water the odour of raspberries is given off.

Aqueous Percolate.—After the herb was treated with alcohol it was exhausted with water and the solution evaporated to the consistence of an extract, having an astringent taste, and giving the following reactions:—With ferric chloride, a dark green colour was produced; with solution of gelatin, a light brown precipitate was formed, and by placing this in a filter and washing it with cold water several times ferric chloride gave a dark colour to that part of the filter that had been in contact with the precipitate, proving the presence of tannin; with tartar emetic, no precipitate. Alcohol gave a precipitate of gum from an aqueous solution. 5 grams of the herb, when exhausted with sulphuric ether, upon evaporating yielded an extract weighing 54 centigrams, having no bitter taste, and nearly all soluble in benzin, supposed to be colouring matter. A small quantity of volatile oil was obtained by distilling the herb with water, having the disagreeable odour of boiled cabbage. 5 grams of the herb lose 37 centigrams of moisture when heated to dryness.

The chemical constituents of the herb are as follows:—Eupatorine, (a glucoside), a crystallizable body, a volatile oil, gum, tannic acid, sugar.

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THE CONDITIONS NECESSARY TO SUCCESSFULLY CONDUCT PERCOLATION.*

BY J. U. LLOYD, CINCINNATI, OHIO.

A reply to this query may at first sight appear easy. On the contrary, the natural laws to be considered, and the various causes dependent upon manipulation that are continually influencing the process, render the subject complicated. Beyond doubt, however, all the discrepancies which manipulators meet in result of work from time to time, and the recorded variations of different operators, are due to causes that may be understood and overcome to a very great extent. Natural laws govern the process of percolation, and to carry on our work so as to make the most judicious application of these laws to the object in view should be the desire of the manipulator. Percolation, as connected with the work of the pharmacist, has of late years become very important. Few appreciate the very great amount of medicine prepared in this manner, and I think it may truly be said that this very interesting part of the business of the pharmacist is overlooked in many instances where money might be saved and leisure time employed.

It is not perhaps altogether the fault of our druggists that the subject is neglected, for to a degree the impression has gradually extended that such articles even as the simple fluid extracts of the Pharmacopœia may be prepared upon a large scale better than in the small amounts required by dispensing pharmacists. Be this latter point true or not, to a very great degree the "manufacture" of fluid extracts has passed into the hands of large houses. Another reason, perhaps, for neglect of this branch of the apothecary's business, is the fact that some doubt has arisen as to the comparative values of extracts made by the officinal process and such modifications as have been recommended. And yet I know that our pharmacists are hard workers, and judging from acquaintances little fear need be entertained that dread of trouble will make the pharmacists of our country shrink from the adoption by the revising committee of the United States Pharmacopœia of any practical process for the preparation of fluid extracts, however complicated such process may be. I believe if the apothecary purchases fluid extracts that may easily be made by himself it is in the majority of cases from the above-named considerations. Few that witness the constant application of our druggists to business, from early morning until late at night, will disagree upon this point.

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* Read before the American Pharmaceutical Association.

It is desired that the result of the investigations, tabulated in the paper to follow, may assist in throwing a little light upon some of the points we have mentioned, and others that are obscure. In many instances old ground is undoubtedly traversed, but it was deemed best to follow the chain of argument, regardless of former investigations. Let it be remembered that these arguments are brought forward and experiments instituted with the object of study in actual laboratory management, and not for the purpose of upholding preconceived opinions. It may be found that some of the points are poorly taken, and others are supported by experiments in which natural laws that exert a very great influence upon the result are overlooked. If such be the case corrections will be thankfully accepted. It is to be hoped that those who criticize will bring forward experiments that will enable comparisons to be made, or at least will designate the points that appear defective. It is also requested that criticisms be confined to the points mentioned in this paper under like conditions only, as no others can be of value. It will be noticed that the experiments brought forward are upon a scale that will enable repetition by every retail pharmacist of the country. Others could have been tabulated, perhaps to advantage, but it is thought a sufficient number are given, and it is hoped that those who think otherwise may be interested, and induced to go over portions of the work while preparing fluid extracts during the year to come.

The opportunity is embraced to especially thank Mr. Charles Mohr for his careful review of the manuscript, and to acknowledge the justice of the majority of his arguments where issue was taken, as that gentleman will notice when enabled to peruse the present paper; also to Professor John M. Crawford for a careful review of the mathematical expressions used in the first portions of the paper. Lastly, it is to be remembered that the writer is looking at this subject with his present light, and deems it a duty to reconsider any point when convinced of error, but claims the privilege to maintain his belief, unless so convinced, whoever may be the dissenter.

One of the most frequent operations to be performed by the pharmacist is to separate from the crude materials, offered principally by the vegetable kingdom, active principles from others inert or not desirable. This object is reached by bringing the same into the liquid state by solution, with the aid of a proper solvent (menstruum). Thus we have the process of maceration and percolation, the latter being a modification of the former, calling in the aid of gravitation. To arrive at a proper understanding of the laws which govern the solution of substances, that is the transfer of a solid into the liquid state through the aid of solvents, we should consider first the greatest agent in percolation,—the attraction of gravitation. This unknown force impels all terrestrial bodies toward a common centre, the centre of the earth.

If we arrest the fall of a solid and pour upon it a liquid, that liquid will flow over the solid, excepting a small amount held by adhesion, and will fall from the lower surface towards the earth. If that solid be impenetrable, and insoluble in the liquid, it will remain intact; if soluble, it will gradually assume the liquid state and disappear. If the solid be porous the liquid will enter. This is due to absorption—a molecular force, which is working independent of the attraction of gravitation, and overcoming it to a limited degree, thereby exercising a great influence over the process of solution, beneficial inasmuch as it insures a closer and more continued contact between the solvent and the solid. Thus, if a certain amount of liquid be slowly poured upon the porous body, we shall find that attraction of gravitation will fail to detach the liquid from the lower side; it does not flow over the outside but enters, is absorbed, and held within its substance. The attraction of gravitation still exerts itself, for the actual weight of the mass is the sum of the separate weights of the two bodies. Without further examination we might suppose the materials at rest; such, however, is not the case. There are disturbing elements which produce constant motion; thus, an alteration of temperature will excite a change in the relative position of the molecules of the liquid, and temperature constantly changes. But besides the motions of the molecules, caused by the constantly varying changes of temperature, there is osmosis, an attraction that induces currents of liquid through cellular tissue. Gravity, however, overcomes at first all of these various contrary influences—among which we may class diffusion—and is ever tending to draw the liquid most heavily charged with soluble matters downward through the lighter, and thus there seems to be no rest, but, on the contrary, continual change.

The influences mentioned exert themselves whether the solid be large or small, whether a single particle of dust in a quantity of liquid or an innumerable number placed in a mass and covered with liquid. Let us turn our attention to solution. Throwing aside all theories as to the why and wherefore of the change of state from solid to fluid, we must accept the fact, that below the melting temperature certain solids will, to a fixed extent, assume the form of liquids if in contact with particular fluids. The conditions necessary to effect and promote this change are: surface exposed to the dissolving medium, circulation of the liquid, temperature and time of contact between the surfaces of solid and the liquid. In regard to the first of these conditions, it is invariably found that the rapidity of solution increases with the area of the surface exposed; thus, for an example, if a cubic crystal of bromide of potassium, or any other substance, one inch in dimension, be surrounded with water, the surface in contact with the water will be 6 square inches. If the crystal be bisected by a plane parallel to any two of its sides, the amount of the material remains the same, but its surface has been increased 2 square inches. Let each half now be divided into four equal parts, and there will be a total of 12 square inches of surface, exactly twice the amount of the original cube. Division can be theoretically, and in the above instance according to mathematical laws, continued to the extent of our imagination, and each cube divided into eight will double the amount of the surface. But in practice we meet with obstacles of various nature which soon interpose insurmountable limits to accurate divisions, making our further efforts in that direction impracticable, and the desired increase of surface is most readily effected by pulverizing the solid, thus obtaining irregular surfaces.

In considering the rest of the conditions upon which solution depends we next observe the action of currents.

Thus immerse a cubical crystal of bromide of potassium 1 inch in dimension in water, and its 6 square inches of surface will be in contact with 6 square inches of water surface; immediately the two surfaces act together, resulting in the disintegration of the surface of the salt, which assumes the liquid form and blends with the surface of the water in the most intimate manner. This change takes place to a fixed extent, dependent upon the temperature and the saturation of the solvent. If the crystal be at the bottom of a vessel of water it commences most rapidly to diminish in size from the top until finally it disappears. In observing closely the process we notice streams of liquid circulating about the crystal. These currents, colourless and transparent like the surrounding medium, are clearly visible from the fact that they refract the rays of light differently, an optical result caused by the portions of liquids of different densities, for the particles which form the surfaces of the salt unite with those of the water surface, resulting in a compound that has a greater specific gravity than pure water, consequently, as soon as united, this fluid flows over the crystal and down its sides in obedience to the laws of gravitation. It strikes upon the bottom of the vessel and, in response to the law that fluids of different densities seek their own level, spreads out, and in doing so displaces its bulk of water, which rises and replaces the solution about the crystal, and thus continuous currents flow over and down the sides of the crystal, and fresher menstruum is constantly taking the place of that more saturated. We might liken the foregoing to a surface of liquid resolving against a solid, each movement of which wears away the solid and decreases the wearing force of the liquid. At last, if the amount of water be sufficient, the crystal will have disappeared, and at the bottom of the vessel will be found a dense solution at rest surmounted by a lighter one. Again cautiously introduce a crystal of the same salt and the afore-named phenomenon will take place, though in a less marked degree. The circulation of the medium becomes gradually less and less distinct, and finally, if the salt be in excess, disappears. There remains now a remnant of bromide of potassium surrounded by the dense solution, while overlying we find almost pure water. In obedience to what is generally considered another force, which, it is thought, produces the diffusion of liquids, the solution and overlaying water continually but slowly intermingle. At last they are homogeneous, preceding which, however, the remnant of crystal at the bottom of the vessel will have disappeared. The foregoing exemplifies the changes which take place, under like conditions, when the crystal is broken, excepting that the increased amount of surface contact, before considered, hastens the operation. Thus we find that nature's laws constantly produce circulation while solution is progressing. Arguing therefrom we should be able to hasten the operation at certain stages and assist nature by frequently stirring the entire liquid, thus mixing the solutions. Recognizing the theoretical value of circulation and extent of surface, when we wish to dissolve substances we should powder them, and stir the liquids at short intervals.

Temperature is most important. With a few exceptions substances dissolve to a greater extent in warm than in cold liquids, and even though the material be scarcely more soluble in the hot menstruum it dissolves more rapidly. This results from the fact that liquids while rapidly changing temperature are in a more rapid state of circulation, and heat also decreases the cohesive attraction of solids, their molecules being more easily detached from the mass, and therefore more readily unite with those of the liquid. Few operators have failed to notice the benefit of a warm room when dissolving substances. Careful manufacturers cannot allow the process of percolation to be conducted at winter temperature, even though so doing results in great saving of alcohol by lessening evaporation (see tables 1 and 2).* Time is a consideration of importance. An appreciable amount of contact must be allowed between solvent and solid. That solutions require time for action is a principle well recognized and scarcely necessary to mention.

Having now briefly noticed the influences which govern solution, let us consider the relation between maceration and percolation, as these processes are called, bearing in mind the fact that the direct object is the solution of certain substances. Place 2 ounces of powdered buchu in a vessel and saturate thoroughly with alcohol. Then fit closely on the powder a sheet of blotting paper, and add alcohol so that the entire amount used is 16 fluid ounces; then very carefully remove the paper so as not to disturb the powder. Now we shall have the principles of solution exemplified exactly as in the previous example, excepting instead of one crystal we have a number of very small fragments, and instead of a perfectly soluble material the substance is only partially soluble, and in addition to other forces we have capillary attraction.

Solutions of different densities quickly form throughout the interstices of the powder. These solutions are in constant motion. They are subject to the forces before mentioned, but by the predominating influence of gravitation the constant tendency of the heaviest solutions is downward, and the densest part of the solution constantly seeks the lowest point (see table 3). Thus we have new surfaces presented between solvent and material, attended in the first place with a handing downward of the dissolved matter. Apparently, the liquid and the powder are at rest; actually, there is constant motion, and so long as the act of solution progresses the circulation of the menstruum continues. However, these forces cannot extend their influence above the surface of the powder. It may be suggested here that diffusion can effect the mixture (see table 3). Consequently the liquid within the interstices of the powder may be strongly saturated with dissolved matters, while that just overlying is scarcely contaminated, and that near the surface of the vessel is for some time perfectly pure. Assuming now that we desire to transfer the dissolved matter equally to all portions of the liquid, we most easily accomplish the object by stirring the contents of the vessel until the menstruum above and the solution within are thoroughly incorporated. When allowed to rest solution as before proceeds, and when we again stir the contents of the vessel we transfer a certain proportion of dissolved matter to the overlying fluid. Each operation depletes the powder to an extent of soluble matters, and tends to produce an equilibrium between menstruum and material. The process of solution becomes gradually less active, and at last ceases to any perceptible degree, at which point we find the liquid above the powder and the liquid within identical. However long we may allow them to remain together, and however violently they may be agitated, we cannot further deplete the powder without increase of temperature. This is maceration, and thus it is we cannot by maceration represent the powder operated upon, for when the supernatant liquid is filtered from the powder soluble matters in proportion to the liquid within the powder must remain with it. As the liquid obtained is to the entire menstruum, so must the material in the liquid obtained be to the material dissolved by the entire menstruum.

Other inconveniences attend the practical application of this mode of extracting the soluble substances from our plants. A very serious objection is the time required—generally two weeks. This, perhaps, more than any other cause, interested pharmacists in a general endeavour to improve. Another desideratum was an increase of strength in the product. We will consider briefly a slight modification of this process of maceration. Let us carefully moisten 2 ounces of powdered buchu with alcohol, press firmly into a container, and cover with the same menstruum. The operation of solution will be repeated exactly as in the other example. At length the liquid within the powder, and that in the cavities between its particles will be identical. When this state arrives we remove the material to a press, and obtain all the liquid possible by pressure.

The residuum material is again finely comminuted, macerated with fresh alcohol, and again submitted to pressure; the operation being repeated as many times as is considered necessary. It at first strikes us with reference to this process, that as we constantly remove saturated liquid from the powder, and substitute perfectly pure in its place, we must soon perfectly deplete the powder. But by any ordinary means we cannot remove all the liquid, and certainly that held within the powder must contain its full proportion of dissolved matters. Therefore, assuming that it required 4 ounces of alcohol, and the liquid within the powder and that between the particles had become identical in composition, and 3 ounces of liquid were obtained (a liberal allowance), one-fourth of the strength must remain in the residuum; consequently the 3 fluid ounces obtained containing three-fourths of the extractive matter represent 1¼ ounce of buchu, or ¼ ounce of powder to each fluid ounce, and each of the following operations dilutes this. At each successive step the powder, preceding and following maceration and expression, contains the same amount of liquid, and for every 4 ounces of alcohol applied, 4 ounces of solution are obtained, excepting loss by evaporation, which will not be considered here. Decrease in quantity of powder by having a portion of its extractive matter removed by each maceration is also disregarded. The second expressed liquid we find represents but four-fifths of the extractive matters remaining in the powder, that is, four-fifths of one-fourth, which is one-fifth of the whole, or original quantity, which, added to the three-fourths obtained by the first operation, make the sum of nineteen-twentieths contained in 7 fluid ounces of solution, a little less than three-twentieths to the fluid ounce. The first operation produced five-twentieths to the fluid ounce, therefore there is a reduction of a little more than two-twentieths to the fluid ounce by the second maceration. Theoretically this procedure may be carried to infinity before entirely exhausting the material (see table 4). Practically the exhaustion will not be as thorough as our example represents. From considerations yet to be named, the writer believes it is impossible to obtain an expressed liquid containing substances of the plant capable of being dissolved by the menstruum, in the great proportion between successive percolates indicated by this ideal example. It is invariably found that a tenth maceration will produce an appreciable amount of extractive matter, and when we come to study the constituents of plants and their relations to menstruum, it will be doubtless accepted that such must be the case. As the matter stands, those that favour this process cannot well object to the argument and table, inasmuch as it admits of the greatest possible depletion of the powder. Others may, perhaps, with good cause, argue that theoretical proportion of soluble matter extracted will be less than the above upon the assumption that the menstruum and the inert portion of the powder are alike impregnated with soluble matter, and that the actual proportion should be between menstruum squeezed from the mixture and entire residuum. Table 5 will give this view of the case, using the same data for calculations employed for table 4. Another trouble attending this process in practice is the necessity of finely dividing or pulverizing each residue before remaceration, an operation tedious and difficult to accomplish in the majority of cases, especially when large amounts of material are worked. I have never succeeded to my satisfaction in a general way, without passing the residuum through a sieve after each expression, an operation not easily accomplished, especially with substances which agglutinate, although in certain instances the process is preferable to any other. Our aim we understand to be the transference of soluble matter from material to liquid, if possible representing a grain of the material with a minim of the solution. This latter result we have not yet accomplished, and cannot by either process of maceration examined. In the first case we operate directly against the laws of nature. We are continually transferring a dense solution upward. In the latter example we neglect to take advantage of nature's greatest force. We use manual labour to accomplish, in the way of separating the liquid, what gravitation will do for us to any extent, and better in every particular. Now let us modify the operation by repeating the experiment of maceration exactly as heretofore, but in a vessel with a layer of cotton at the bottom, and an exit below, care being taken to avoid stirring the powder. After the usual maceration, cautiously open the exit and allow the liquid to escape at the very bottom of the powder. As a consequence we obtain the densest liquid at first, and substitute in its stead at the surface perfectly fresh menstruum, with the advantage that the liquid extracted has always passed through the entire material. Thus we find the product is constantly decreasing in colour and flavour, and the powder is continually submitted to the action of a moving menstruum.

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* The tables will appear in a subsequent portion of the paper.

We use no manual labour after preparing the apparatus, and have no pressed residue to pulverize. We simply connect maceration as before examined to one of nature's most familiar laws, and in this latter experiment have an exemplification of the process which Professor Procter recommended for the preparation of fluid extracts and tinctures. It is only a modification of the processes previously examined, differing in the manner in which the liquid is separated from the powder. It is simple in operation, easy in manipulation, and productive of satisfactory results when properly applied. It is called percolation, under which name we shall perhaps be led to examine some points of interest connected therewith, and some modifications which have been suggested as improvements over Professor Procter's process, very properly denominated simple percolation.

Professor Procter, in bringing before pharmacists this process to deplete a powder of soluble matters laid no claim to originality, excepting in the application of the principle for the purpose of making tinctures and fluid extracts. He certainly was aware that the process had been in use, for a similar process was recommended by Count Rumford for preparing coffee; and in 1817 Mr. C. Johnson applied the principle to the extraction of cinchona bark, saying: "The machine I use is similar to one made several years ago by Edmund Loyd and Co., 178, Strand, and does not differ essentially from any of those described in Count Rumford's eighteenth essay, and in the *Repertory of Arts*, for April and May, 1813." Of the practical application of the process, Mr. Johnson remarks, "that in the Lancaster Public Dispensary this method is found to afford a better preparation than was formerly obtained from twice the quantity of cinchona." ('Annals of Phil.,' vol. ix., p. 451.)

I am informed by Mr. Charles Mohr that Mr. Pelouze, as early as 1834, introduced percolation into the laboratory of the chemist in his method of preparing tannic acid, calling it "extraction by the process of displacement." Virtually, percolation had been employed for ages before with civilized and even partly barbarous nations, as, for example, in making saltpetre and potash. Yet, while the idea was not new, its application to the preparation of tinctures and fluid extracts was original, as far as I can learn, and thus we are as much indebted to Professor Procter as though the principle for separating soluble from insoluble matters was new in the world's history.

Professor Procter, by bringing forward this simple process and simple form of apparatus for the preparation of tinctures and fluid extracts, decreased the labour, the time, and the expense. The memory of Professor Procter will ever be dear to American pharmacists, as well as to those across the great water. His field of labour was a wide one, and yet, perhaps, we are more indebted to him for adapting the process of simple percolation to pharmaceuticals than the majority of us are apt to imagine. We cannot value his gift too highly; beautiful as it is in its simplicity, it is not less valuable than simple.

In conducting percolation, the object being the preparation of fluid extracts, many points are essential other than the considerations mentioned heretofore. Of those the most essential to be considered are the vessel employed, the material operated upon, the menstruum used, and the manner of manipulation. Accepting the argument that percolation is for the economical extraction of soluble materials, it is of the utmost importance to study influence of contact between the menstruum and the material whose partial solution is to be effected, as we have already seen that contact, continued for a length of time, is of first necessity. Thus, if we place a pound of powdered sugar, or any other soluble substance, within a cylindrical percolator of such diameter that the space occupied is 1 inch in height, and cautiously add, evenly upon the upper surface, diluted alcohol, admitting for the sake of argument that the menstruum passes evenly and regularly through the powder, the diluted alcohol in the first of the percolate will have been in contact with 1 inch of material. That which follows will have successively less material to operate upon, for the first portions of percolate are partly made up of dissolved sugar or extracted matter. Thus each preceding portion of the percolate lessens the material in the percolator, and lessens the height, thus decreasing the contact of any that may succeed, until finally only a thin layer of sugar remains, between which and the passing menstruum the contact is very slight indeed. At last the sugar disappears. For this reason, even where the material is completely soluble, our percolate should theoretically become less and less charged with dissolved matters as percolation progresses (unless it be saturated to a certain point of the percolate), and at last a comparatively large amount of menstruum should contain but a small amount of dissolved material. In connection with the above argument tables 6 and 7 may be introduced.

Let us now imagine a like amount of powdered sugar in a percolate of less diameter. The height will be increased and the contact between the first part of percolate and powder will be greater in proportion to the increased height. Allowing, for argument, the material to occupy 8 inches in height, it will follow that the menstruum of the first portion of percolate will have passed through eight times the height of sugar that the corresponding portion did in the former experiment, although the real amount of sugar was the same. Now, again, we have the afore-mentioned rule regarding decrease of contact. Each successive part of the percolate lessens the sugar in the percolator, and decreases the possible contact (with sugar) of all the menstruum that may follow, and under like motion of liquid the sugar decreases in each succeeding part of the percolate. It will be seen that, theoretically, each portion of the menstruum in the smaller percolator must have greater contact with the material than the corresponding menstruum of the larger, if both percolate with the same rapidity, although in both examples we operate upon similar amounts of material. Arguing therefrom we are induced to anticipate that unless the percolate from the percolator of greater diameter is saturated with sugar, that which corresponds from the smaller will contain more dissolved matter, for after 1 inch—the depth of sugar in the percolator of greatest diameter—is passed there remains in the smaller 7 inches of contact during which solution may progress. Calculating accordingly we may expect that if we spread a pound of sugar so that it will occupy a depth of 1 inch in a percolator, and percolate through it diluted alcohol enough to produce 16 fluid ounces of percolate, we will fail to obtain as much sugar in solution as though the sugar had been placed in a vessel of less diameter, thereby increasing the contact between menstruum and sugar. Applying the same rule to larger and smaller amounts of other substances, we must conclude that unless there be counterbalancing influences the amount of dissolved matter in a percolate must increase and decrease with alteration in the height of powder, other conditions being identical, and amount of percolate passing from each in a given time. In connection with this portion of the argument I will invite attention to tables 6, 7, 8, 9, 10 and 11, in which temperature, rapidity of percolation, and menstruums of corresponding examples were identical.

Let us not infer, however, that the conditions cannot render the foregoing to an extent inaccurate. If our material be placed loosely in the percolator as a consequence the first portion of menstruum will pass rapidly. If after the first fraction of percolate is obtained the flow be retarded by means of a stopcock, that which follows may be held in contact with the material some time longer than the first; after the second fraction is reserved the flow may be again retarded, and thus more actual contact of time induced between menstruum and material than was obtained at first, although there is continually less material within the percolator. With some substances another benefit to be derived by the latter percolates arises from the fact that if the material be not finely divided or pressed firmly into the percolator the first portion of percolate flows over the particles and through the interstices between, thus preventing the menstruum flow coming into close contact with soluble materials. Gradually, however, the material may absorb menstruum, and expanding fill up those interstices, thus forcing the passing percolate to seek more and more the capillary passages through the material, and thus give a larger amount of dissolved material to a portion of percolate succeeding a certain amount of the first. To an extent this result may occur from a somewhat similar cause, even with materials perfectly soluble in the menstruum, as, for an example, sugar or salt. With small amounts of loosely packed granulated sugar the first part of a percolate of diluted alcohol or water quickly finds the exit of the percolator, but the surfaces of the particles are in the meantime softened and the mass contracts. The interstices become filled with thick syrup or solution, and thus the percolates that follow are for a time retarded (see tables 12 and 13). It will be noticed that the foregoing discrepancies result simply from imperfect contact, or, as we may say, imperfect maceration.

We will now consider another phase of the subject. Will a certain amount of material, occupying a height of 10 inches, yield to corresponding portions of percolate less dissolved matter than a smaller amount in a percolator of such size as to make the height 20 inches? If we accept the foregoing arguments we must conclude this will be the case to a certain point of the operation, unless the percolate from each percolator is saturated, as each drop of menstruum passing through the one will come into contact with a larger portion of material than that from the other, until a certain amount of soluble matter is carried from the smallest amount of material, when it will naturally follow that the percolate from the largest amount of material will contain more dissolved matter. In other words, the first portion of percolate from the material occupying the greatest height will excel the other, while afterwards the case will be reversed. Perpendicular height should govern to this extent the result from this standpoint regardless of quantity. For the greatest contact between powder and menstruums, moving with like rapidity, must be where there is greater height of powder regardless of breadth. Thus we are brought to tables 14 and 15 in which corresponding parts of percolates are tabulated.

In considering now that phase of contact between menstruum and solid, called maceration, in connection with percolation, one cannot find any influence at work arising from a force other than those simply due to a prolongation of contact before considered. The passing menstruum is retarded, thus permitting a longer time for the action of the solvent. In treating of this entire subject let us bear constantly in mind that our aim is to dissolve solid substances, and that the various modifications of the processes are simply influences affecting solution.

(*To be continued.*)

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 4, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE BRITISH ASSOCIATION.

The public proceedings of the Association having been, as stated last week, opened on Wednesday evening by the address of the President, Professor Ramsay, which was delivered before a moderate audience, the meetings of the various Sections have since been carried on with considerable vigour. The meetings have been wisely held principally in buildings situated towards the west end of Swansea, where, being separated a considerable distance from the smoke-belching chimneys of the Landore suburb, a nearer approach to a tolerable atmosphere exists than is to be found perhaps in any other part of the town.

The addresses of the Presidents of the Sections have as a whole been very interesting, an unusual proportion of them dealing with topics interesting to the readers of this Journal, and which it is therefore proposed to take an early opportunity of reproducing. Among them may be mentioned the Address of the President of the Mathematical and Physical Science Section, Professor W. Grylls Adams, who discoursed on the constitution of matter principally in the light thrown upon it by recent spectroscopic investigation. Dr. Joseph H. Gilbert addressed the Chemical Section upon a subject with which his name has long been closely associated, the application of chemistry to agriculture. In the Geology Section, the President, Dr. H. C. Sorby, took for his subject the comparative structure of artificial slags and erupted rocks. In the Biology Section, Dr. Gunther spoke with the authority belonging to him in virtue of his official position on the use and management of museums, incidentally describing the arrangement proposed to be adopted in the new natural history museum at South Kensington, whilst in the Anatomy and Physiology Department of the same Section Professor F. M. Balfour took for his text "the coming of age of the origin of species." These presidential addresses have been followed by the reading of a goodly number of papers in the different sections, besides which there has been a lecture on Primeval Man, by Professor W. Boyd Dawkins, and another on Mental Imagery, by Mr. Francis Galton. These, with the usual *soirées* and a large number of excursions, have constituted ample material for occupying the time of the scientific visitors to the Principality.

At a general meeting of the Committee on Monday last, the subject of the meetings in 1881 and 1882 came under discussion. It was decided at Sheffield that the jubilee meeting of the Association should be held in York, where its first meeting took place, and now it was unanimously resolved that Sir John Lubbock should be the President of that meeting. With respect to the meeting in 1882, invitations have been received from four towns, Southampton, Southport, Nottingham and Leicester. Leicester, however, withdraws for the present from the competition, and the result of the first vote was unfavourable to Nottingham. Eventually it was decided to accept the invitation from Southampton by 27 votes against 22 given for Southport.

The concluding meeting was held on Wednesday, when it was announced that only 914 tickets had been issued, being the smallest number issued in any year since 1852. The Association adjourned until the 31st of August, 1881.

THE MANUFACTURE OF BOGUS DIPLOMAS.

For several years past a considerable scandal has existed in consequence of the facility with which it has been possible to obtain diplomas purporting to be issued by more or less learned bodies, though the sole value of such diplomas consisted in their affecting to grant titles and degrees resembling those conferred by universities of repute as a testimony of the holders having satisfied the requirements of a university curriculum and examination. Certain universities on the Continent, from which better things might have been expected, have not been free from this taint, but the principal manufactories, like many other big things, have had their home across the Atlantic, and the name of Pennsylvania has long been malodorous in this respect.

Many attempts have been made to stop this traffic, and foreign governments have pressed their complaints concerning it upon the Washington authorities, but hitherto the evil has not been effectually grappled with by them, and apparently it has been left to the volunteer efforts of the Editor of the *Philadelphia Record* to break up some of the most notorious rings engaged in it. Stripped of the sensational paragraphing which seems to be inseparable from American journalism, there is enough in what may be deemed the sober facts to make one ponder upon the public estimation of the relative value of titles in this age of quackery.

The "American University of Philadelphia" seems to have been started by a man named Buchanan, formerly a porter, but who had in 1867 somehow obtained a charter from the State legislature "empowering him to confer all manner "of degrees upon those who had attended a course "of study." In so reckless a manner were diplomas distributed under this authority—some being said to have been distributed gratuitously among coloured voters to influence local elections—that at length a committee was appointed by the Senate to investigate the scandal, the result being a resolution to repeal the charter. But the power of the Senate to repeal it was disputed in the law courts by BUCHANAN, and eventually successfully, and in the meanwhile he fell back upon another charter that he had obtained for the "American University," which had been overlooked. This *contretemps* seems to have given an impetus and additional audacity to the movement, so that when recently the proprietors of the *Philadelphia Record* entered into a compact with the legal authorities to find the funds necessary for an attempt to break up the system, the agent employed, it is said, obtained for a sum equal to about £45 sterling, no less than eight diplomas from seven "universities" and "colleges," five being for the degree of M.D., and one each for those of D.D., LL.D, and D.C.L.

The story of the schemes by which several diplomas were obtained by the same person under different names is very amusing, but cannot be recapitulated here. One of the most expensive—having cost twenty-five hours in time and £26 in cash—was for the curious degree of "Master in Electro-Therapeutics," and was declared to be granted to one "qui bene curriculo studiorum "praescripto perfunctus est, et quem justo et "rigido examine prius habito, hoc gradu dignis-"simum censuimus." The result was that "Dr." BUCHANAN and some of his colleagues were arrested, he being charged with devising a scheme to defraud by means of the Post Office of the United States. A few days afterwards proceedings were commenced against the trustees and officers of the "Philadelphia University of Medicine and Surgery," concerning whom it is in evidence that in conferring degrees upon a person of whom they knew nothing except the name they had made an infant two years old an M.D. and LL.D.

Some idea may be formed of the extent to which this traffic extended from the statement that when BUCHANAN was arrested the officers discovered on the premises nearly half a ton weight of blank diplomas, some of them signed by the "faculty" and prepared for the insertion of the names of buyers. Receipts were also found showing that fully three thousand diplomas have been sold during the past six years, and it is estimated that during the last twenty-two years BUCHANAN has sold at least eleven thousand diplomas.

The *Philadelphia Record* is carrying on the work of exposure with great zeal and is evidently determined to spare no effort to tread the swindle out of existence. Column after column is filled with lists of persons who are alleged to have countenanced these "universities" and those who have obtained diplomas from them. It appears, however, that the charters of BUCHANAN's colleges are still valid, and therefore the diplomas issued from them, when regular, although they may have little or no intrinsic value, are possessed of some legal status. In the State of Pennsylvania which chartered these colleges the diplomas must be recognized in the courts unless shown to be irregular. Fortunately many of them are so, and it is so far satisfactory to learn that all their diplomas for the titles of Graduate in Pharmacy and Doctor of Dental Surgery are informal and worthless, as the colleges were not authorized to confer those degrees.

It is needless to say that our contemporary has our hearty sympathy in its labours, the difficulty of which is shown by the success with which all previous official attempts in the same direction had been baffled. We notice a statement in the *Medical Times and Gazette* that the chief culprit, BUCHANAN, who was admitted to bail, has disappeared, and it is conjectured that he has committed suicide. But there is little in the history of his previous career suggestive that he would adopt such a method of getting out of a difficulty.

EXPERIMENTAL CULTIVATION IN JAMAICA.

IN a series of papers relating to Her Majesty's colonial possessions, recently presented to Parliament, there is some interesting information as to the results attending some cultivation experiments that are being made in the island of Jamaica. Cinchona cultivation seems to promise well, the fact that bark of the best quality can be produced in the island being said to be demonstrated and the establishment of a remunerative plantation being considered to be only a matter of time. A quantity of seed of the carnauba palm (*Copernica cerifera*) has been introduced among other Brazilian plants, and hundreds of trees are reported to be growing. An experiment with the cocoa plant (*Theobroma Cacao*) does not seem to have been so successful. In the orange cultivation there has been a considerable development. In the Castleton Gardens the clove has borne fruit freely and trees have been raised from seed for distribution. The cinnamon (*Cinnamomum Zeylanicum*) has not thriven there, but the *Cinnamomum Cassia* grows luxuriantly, and plants of it are eagerly sought by the peasantry, who use the bark for flavouring tea and medicinal purposes.

The Liberian coffee plant has also been introduced and the trees first received have borne a small crop of fruit. Concerning this plant the Superintendent of the Castleton Gardens reports that taking equal numbers of average fruit of the two species (Arabian and Liberian), grown side by side on the same ground, the relative weight of the Liberian was as eight to three of the Arabian. The Liberian variety is slow in maturing, taking fully twelve months from the season of flowering, and it is thought probable that it will not be so easily pulped as the ordinary kind.

THE MEETING OF THE COUNCIL.

THE meeting of the Council, which should have taken place on Wednesday last, was postponed in consequence of a quorum not having been formed.

Proceedings of Scientific Societies.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THE PRESIDENT'S ADDRESS.

ON THE RECURRENCE OF CERTAIN PHENOMENA IN GEOLOGICAL TIME.

BY PROFESSOR RAMSAY.

(*Concluded from page* 188.)

Volcanoes.

The oldest volcanic products of which I have personal knowledge are of Lower Silurian age. These in Wales consist of two distinct series, the oldest of which, chiefly formed of felspathic lavas and volcanic ashes, lie in and near the base of the Llandeilo beds, and the second, after a long interval of repose, were ejected and intermingled with the strata forming the middle part of the Bala beds. The Lower Silurian rocks of Montgomeryshire, Shropshire, Radnorshire, Pembrokeshire, Cumberland and Westmoreland are to a great extent also the result of volcanic eruptions, and the same kind of volcanic rocks occur in the Lower Silurian strata of Ireland. I know of no true volcanic rocks in the Upper Silurian series.

In the Old Red Sandstone of Scotland lavas and volcanic ashes are of frequent occurrence, interstratified with the ordinary lacustrine sedimentary strata. Volcanic rocks are also intercalated among the Devonian strata of Devonshire. I know of none in America or on the continent of Europe.

In Scotland volcanic products are common throughout nearly the whole of the Carboniferous sub-formations, and they are found also associated with Permian strata.

I come now to Mesozoic or Secondary epochs. Of Jurassic age (Lias and Oolites), it is stated by Lyell with some doubt, that true volcanic products occur in the Morea and also in the Apennines, and it seems probable, as stated by Medlicott and Blanford, that the Rajmahal traps may also be of Jurassic age.

In the Cordillera of South America, Darwin has described a great series of volcanic rocks intercalated among the Cretaceo-oolitic strata that forms so much of the chain; and the same author in his 'Geological Observations in South America,' states that the Cordillera has been, probably with some quiescent periods, a source of volcanic matter from an epoch anterior to our Cretaceo-oolitic formation to the present day. In the Deccan volcanic traps rest on Cretaceous beds, and are overlaid by Nummulitic strata, and according to Medlicott and Blanford, these were poured out in the interval between Middle Cretaceous and Lower Eocene times.

In Europe the only instance I know of a volcano of Eocene age is that of Monte Bolca near Verona, where the volcanic products are associated with the fissile limestone of that area.

The well-preserved relics of Miocene volcanoes are prevalent over many parts of Europe such as Auvergne, and The Velay, where the volcanic action began in Lower Miocene times, and was continued into the Pliocene epoch. The volcanoes of the Eifel are also of the same general age, together with the ancient Miocene volcanoes of Hungary.

The volcanic rocks of the Azores, Canaries, and Madeira are of Miocene age, while in Tuscany there are extinct volcanoes that began in late Miocene, and lasted into times contemporaneous with the English Coralline Crag. In the north of Spain also, at Olot in Catalonia, there are perfect craters and cones remaining of volcanoes that began to act in newer Pliocene times and continued in action to a later geological date. To these I must add the great *coulées* of Miocene lava, so well known in the Inner Hebrides, on the mainland near Oban, etc., in Antrim in the north of Ireland, in the Faroe Islands, Greenland, and Franz-Joseph Land. It is needless, and would be tiresome, further to multiply instances, for enough has been said to show that in nearly all geological ages volcanoes have played an important part, now in one region, now in another, from very early Palæozoic times down to the present day; and, as far as my knowledge extends, at no period of geological history is there any sign of their having played a more important part than they do in the epoch in which we live.

Mountain Chains.

The mountain chains of the world are of different geological ages, some of them of great antiquity, and some of them comparatively modern.

It is well known that in North America the Lower Silurian rocks lie uncomformably on the Laurentian strata, and also that the latter had undergone a thorough metamorphism and been thrown into great anticlinal and synclinal folds, accompanied by intense minor convolutions, before the deposition of the oldest Silurian formation, that of the Potsdam Sandstone. Disturbances of the nature alluded to imply beyond a doubt that the Laurentian rocks formed a high mountain chain of pre-Silurian date, which has since constantly been borne away and degraded by subaerial denudation.

In Shropshire, and in parts of North Wales, and in Cumberland and Westmoreland, the Lower Silurian rocks by upheaval formed hilly land before the beginning of the Upper Silurian epoch, and it is probable that the Lower Silurian gneiss of Scotland formed mountains at the same time, probably very much higher than now. However that may be, it is certain that these mountains formed high land before and during the deposition of the Old Red Sandstone, and the upheaval of the great Scandinavian chain (of which the Highlands may be said to form an outlying portion) also preceded the deposition of the Old Red Strata. In both of these mountain regions the rocks have since undergone considerable movements, which in the main seem to have been movements of elevation, accompanied undoubtedly by that constant atmospheric degradation to which all high land is especially subject.

The next great European chain in point of age is that of the Ural, which, according to Murchison, is of pre-Permian age, a fact proved by the Permian conglomerates which were formed from the waste of the older strata. On these they lie quite unconformably and nearly undisturbed on the western flank of the mountains.

In North America the great chain of the Alleghany Mountains underwent several disturbances, the last (a great one) having taken place after the deposition of the Carboniferous rocks, and before that of the New Red Sandstone. The vast mountainous region included under the name of the Rocky Mountains, after several successive disturbances of upheaval, did not attain its present development till after the Miocene or Middle Tertiary epoch.

In South America, notwithstanding many oscillations of level recorded by Darwin, the main great disturbance of the strata that form the chain of the Andes took place apparently *in post-Cretaceous times.*

The Alps, the rudiments of which began in more ancient times, received their greatest disturbance and upheaval in post-Eocene days, and were again raised at least 5000 feet (I believe much more) at the close of the Miocene epoch. The Apennines, the Pyrenees, the Carpathians, and the great mountain region on the east of the Adriatic and southward into Greece, are of the same general age, and this is also the case in regard to the Atlas in North Africa and the Caucasus on the borders of Europe and Asia. In the north of India the history of the Great Himalayan range closely coincides with that of the Alps, for while the most powerful known disturbance and elevation of the range took place after the close of the Eocene epoch, a subsequent elevation occurred in post-Miocene times closely resembling and at least equal to that sustained by the Alps at the same period.

It would probably not be difficult by help of extra research to add other cases to this notice of recurrences of the upheaval and origin of special mountain chains, some of which I have spoken of from personal knowledge; but enough has been given to show the bearing of this question on the argument I have in view, namely, that of repetition of the same kind of events throughout all known geological time.

Salt and Salt Lakes.

I now come to the discussion of the circumstances that produced numerous recurrences of the development of beds of various salts (chiefly common rock-salt) in many formations, which it will be seen are to a great extent connected with continental or inland conditions. In comparatively rainless countries salts are often deposited on the surface of the ground by the effect of solar evaporation of moisture from the soil. Water dissolves certain salts in combination with the ingredients of the underlying rocks and soils, and brings it to the surface, and when solar evaporation ensues the salt or salts are deposited on the ground. This is well known to be the case in and near the region of the Great Salt Lake in North America, and in South America in some of the nearly rainless districts of the Cordillera extensive surface deposits of salts of various kinds are common. The surface of the ground around the Dead Sea is also in extra dry seasons covered with salt, the result of evaporation, and in the upper provinces of India (mentioned by Medlicott and Blanford) "many tracts of land in the Indo-Gangetic alluvial plain are rendered worthless for cultivation by an efflorescence of salt known in the North-West Provinces as *reh*," while every geographer knows that in Central Asia from the western shore of the Caspian Sea to the Kinshan Mountains of Mongolia, with rare exceptions nearly every lake is salt in an area at least 3500 miles in length. This circumstance is due to the fact that all so-called fresh-water springs, and therefore all rivers, contain small quantities of salts in solution only appreciable to the chemist, and by the constant evaporation of pure water from the lakes, in the course of time, it necessarily happens that these salts get concentrated in the water by the effect of solar heat, and, if not already begun, precipitation of solid salts must ensue.

The earliest deposits of rock-salt that I know about have been described by Mr. A. B. Wynne, of the Geological Survey of India, in his memoir 'On the Geology of the Salt Range in the Punjab.'* The beds of salt are of great thickness, and along with gypsum and dolomitic layers occur in marl of a *red colour* like our Keuper marl. This colour I have for many years considered to be, in certain cases, apt to indicate deposition of sediments in inland lakes, salt or fresh, as the case may be, and with respect to these strata in the Punjab Salt Range, authors seem to be in doubt whether they were formed in inland lakes or in lagoons near the seaboard, which at intervals were liable to be flooded by the sea, and in which in the hot seasons salts were deposited by evaporation caused by solar heat. For my argument it matters but little which of these was the true physical condition of the land of the time, though I incline to think the inland lake theory most probable. The age of the strata associated with this salt is not yet certainly ascertained. In 'The Geology of India,' Medlicott and Blanford incline to consider them of Lower Silurian age, and Mr. Wynne, in his 'Geology of the Salt Range,' places the salt and gypsum beds doubtfully on the same geological horizon.

The next salt-bearing formation that I shall notice is the Salina or Onondaga Salt Group of North America, which forms part of the Upper Silurian rocks, and lies immediately above the Niagara Limestone. It is rich in gypsum and in salt-brine, often of a very concentrated character, "which can only be derived from original depositions of salt," and it is also supposed by Dr. T. Sterry Hunt to contain solid rock-salt 115 feet in thickness at the depth of 2085 feet near Saginaw Bay, in Michigan.

In the Lower Devonian strata of Russia near Lake Ilmen, Sir R. Murchison describes salts springs at Starai Russa. Sinkings "made in the hope of penetrating to the source of these salt springs," reached a depth of 600 feet without the discovery of rock salt, "and we are left in doubt whether the real source of the salt is in the lowest beds of the Devonian rocks or even in the Silurian system."

In the United States brine springs also occur in Ohio, Pennsylvania and Virginia, in Devonian rocks.

In Michigan salts are found from the Carboniferous down to the Devonian series; and in other parts of the United States, Western Pennsylvania, Virginia, Ohio, Illinois and Kentucky, from the lower Coal-measures salts are derived which must have been deposited in inland areas, since even in the depths of inland seas that communicate with the great ocean, such as the Mediterranean and the Red Sea, no great beds of salt can be deposited. Before such strata of salt can be formed, supersaturation must have taken place.

In the North of England at and near Middlesbrough, two deep-bore holes were made some years ago in the hope of reaching the Coal-measures of the Durham coal-field. One of them at Salthome was sunk to a depth of 1355 feet. First they passed through 74 feet of superficial clay and gravel, next through about 1175 feet of red sandstones and marls, with beds of rock-salt and gypsum. The whole of these strata (excepting the clay and gravel) evidently belong to the Keuper marls and sandstones of the upper part of our New Red series. Beneath these they passed through 67 feet of dolomitic limestone, which in this neighbourhood forms the upper part of the Permian series, and beneath the limestone the strata consist of 27 feet of gypsum and rock-salt and marls, one of the beds of rock-salt having a thickness of 14 feet. This bed of Permian salt is of some importance, since I have been convinced for long that the British Permian strata were deposited, not in the sea, but in salt lakes comparable in some respects to the great salt lake of Utah, and in its restricted fauna to the far greater salt lake of the Caspian Sea. The gypsum, the dolomite or magnesian limestone, the red marls covered with rain-pittings, the sun-cracks, and the impressions of footprints of reptiles made in the soft sandy marls when the water was temporarily lowered by the solar evaporation of successive summers, all point to the fact that our Permian strata were not deposited in the sea, but in a salt lake or lakes once for a time connected with the sea. The same may be said of other Permian areas in the central parts of the Continent of Europe, such as Stassfurt and Anhalt, Halle and Altern in Thuringia, and Sperenberg, near Berlin, and also in India.*

Neither do I think that the Permian strata of Russia, as described by Sir Roderick Murchison, were necessarily, as he implies, deposited in a wide ocean. According to his view all marine life universally declined to a minimum after the close of the Carboniferous period, that decline beginning with the Permian and ending with the Triassic epoch. Those who believe in the doctrine of evolution will find it hard to accept the idea which this implies, namely, that all the prolific forms of the Jurassic series sprang from the scanty faunas of the Permian and Triassic epochs. On the contrary, it seems to me more rational to attribute the poverty of the faunas of these epochs to accidental abnormal conditions in certain areas, that for a time partially disappeared during the deposition of the continental Muschelkalk which is absent in the British Triassic series.

In the whole of the Russian Permian strata only fifty-three species were known at the time of the publication of 'Russia and the Ural Mountains,' and I have not heard that this scanty list has been subsequently increased. I am therefore inclined to believe that the red marls, grits, sandstones, conglomerates, and great masses of gypsum and rock-salt were all formed in a flat inland area which was occasionally liable to be invaded by the sea during intermittent intervals of minor depression, sometimes in one area, sometimes in another, and the fauna small in size and poor in numbers is one of the results, while the deposition of beds of salt and gypsum is another. If so, then in the area now called Russia, in sheets of inland Permian water, deposits were formed strictly analogous to those of Central Europe and of Britain, but on a larger scale.

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* Many earlier notices and descriptions of the Salt Range might be quoted, but Mr. Wynne's is enough for my purpose.

* See 'Physical Geology and Geography of Great Britain,' 5th edition, where the question is treated in more detail.

Other deposits of salt deep beneath overlying younger strata are stated to occur at Bromberg in Prussia, and many more might be named as lying in the same formation in northern Germany.

If we now turn to the Triassic series it is known that it consists of only two chief members in Britain, the Bunter sandstones and the Keuper or New Red marls, the Muschelkalk of the Continent being absent in our islands. No salt is found in the Bunter sandstones of England, but it occurs in these strata at Schöningen in Brunswick and also near Hanover. In the lower part of the Keuper series deposits of rock-salt are common in England and Ireland. At Almersleben, near Calbe, rock-salt is found in the Muschelkalk, and also at Erfurt and Slottenheim in Thuringia and at Wilhelmsglück in Wurtemburg. In other Triassic areas it is known at Honigsen, in Hanover, in middle Keuper beds. In the red shales at Sperenberg and Lieth on the Lower Elbe, salt was found at the depth of 3000 feet, and at Stassfurth the salt is said to be "several hundred yards thick."

In Central Spain rock-salt is known, and at Tarragona, Taen, and also at Santander in the north of Spain, all in Triassic strata. Other localities may be named in the Upper Trias, such as the Salzkammergut, Aussee, Hallstatt, Ischl, Hallein in Salzburg, Halle in the Tyrol, and Berchesgaden in Bavaria.

In the Salt Range of mountains in Northern India saliferous strata are referred with some doubt by Medlicott and Blanford to the Triassic strata.

In the Jurassic series (Lias and Oolites), salt and gypsum are not uncommon. One well-known instance occurs at Berg in the valley of the Rhone in Switzerland, where salt is derived from the Lias. Salt and gypsum are also found in Jurassic rocks at Burgos in Spain. At Gap in France there is gypsum, and salt is found in the Austrian Alps in Oolitic limestone.

In the Cretaceous rocks salt occurs, according to Lartet, at Jebel Usdom by the Dead Sea, and other authorities state that it occurs in the Pyrenees and at Biskra in Africa, where "mountains of salt" are mentioned as of Cretaceous age. The two last-named localities are possibly uncertain; but whether or not this is the case, it is not the less certain that salt has been deposited in Cretaceous rocks, and judging by analogy, probably in inland areas of that epoch.

In the Eocene or Older Tertiary formation, rock-salt is found at Cardona in Spain, and at Kohat in the Punjab it occurs at the base of Nummulitic beds. It is also known at Mandi in India in strata supposed to be of Nummulitic Eocene age.

The record does not end here, for a zone of rock-salt lies in Sicily at the top of the Salina clays in Lower Miocene beds, and in Miocene strata gypsum is found at several places in Spain, while salt also occurs in beds that are doubtfully of Miocene age (but may be later) at Wielitzka in Poland, Kalusz in Galicia, Bukowina, and also in Transylvania.

In Pliocene, or Later Tertiary formations, thick beds of gypsum are known in Zante, and strata of salt occur in Roumania and Galicia, while in Pliocene rocks, according to Dana, or in post-Tertiary beds, according to others, a thick bed of pure salt was penetrated to a depth of 38 feet at Petet Anse in Louisiana. This ends my list, though I have no doubt that, by further research, many more localities might be given. Enough, however, has been done to show that rock-salt (and other salts) are of frequent *recurrence* throughout all geological time, and as in my opinion it is impossible that common salt can be deposited in the open ocean, it follows that this and other salts must have been precipitated from solutions, which by the effect of solar evaporation became at length supersaturated, like those of the Dead Sea, the great salt lake of Utah, and in other places which it is superfluous to name.

Fresh-water. Lakes and Estuaries.

I now come to the subject of recurrences of fresh-water conditions both in lakes and estuaries. In the introduction to the 'Geology of India,' by Messrs. Medlicott and Blanford, mention is made of the Blaini and Krol rocks as probably occupying "hollows formed by denudation in the old gneissic rocks," and the inference is drawn that "if this be a correct view, it is probable that the cis-Himalayan Palæozoic rocks are in great part of fresh-water origin, and that the present crystalline axis of the Western Himalayas approximately coincides with the shore of the ancient Palæozoic continent, of which the Indian peninsula formed a portion." The Krol rocks are classed broadly with "Permian and Carboniferous" deposits, but the Blaini beds are doubtfully considered to belong to Upper Silurian strata. If this point be by-and-by established, this is the earliest known occurrence of fresh-water strata in any of the more ancient Palæozoic formations.

It is a fact worthy of notice that the colour of the strata formed in old lakes (whether fresh or salt) of Palæozic and Mesozoic age is apt to be red: a circumstance due to the fact that each little grain of sand or mud is usually coated with a very thin pellicle of peroxide of iron. Whether or not the red and purple Cambrian rocks* may not be *partly* of fresh-water origin, is a question that I think no one but myself has raised.†

There is, however, in my opinion, no doubt with regard to the fresh-water origin of the Old Red Sandstone, as distinct from the contemporaneous marine deposits of the Devonian strata. This idea was first started by that distinguished geologist, Doctor Fleming, of Edinburgh, followed by Mr. Godwin-Austen, who, from the absence of marine shells and the nature of the fossil fishes in these strata, inferred that they were deposited, not in the sea, as had always been asserted, but in a great fresh-water lake or in a series of lakes. In this opinion I have for many years agreed, for the nearest analogies of the fish are, according to Huxley, the polypterus of African rivers, the ceratodus of Australia, and in less degree the lepidosteus of North America. The truth of the supposition that the Old Red Sandstone was deposited in fresh water is further borne out by the occurrence of a fresh-water shell, *Anodonta Jukesii*, and of ferns in the Upper Old Red Sandstone in Ireland; and the same shell is found at Dura Den in Scotland, while in Caithness, along with numerous fishes, there occurs the small bivalve crustacean Estheria Murchisoniæ.

I think it more than probable that the red series of rocks that form the Catskill Mountains of North America (and with which I am personally acquainted) were formed in the same manner as the Old Red Sandstones of Britain; for excepting in one or two minor interstratifications, they contain no relics of marine life, while "the fossil fishes of the Catskill beds, according to Dr. Newberry, appear to represent closely those of the British Old Red Sandstone." (Dana.)

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* By Cambrian I mean only the *red and purple* rocks of Wales, England, Scotland and Ireland, older than the Menevian beds, or any later division of the Silurian strata, that may chance to rest upon them.

† "On the Red Rocks of England of older date than the Trias." *Jour. Geol. Soc.*, 1871, vol. 28.

The Devonian rocks of Russia, according to the late Sir Roderick Murchison, consist of two distinct types, viz., Devonian strata identical in general character with those in Devonshire and in various parts of the continent of Europe. These are exclusively of a marine character, while the remainder corresponds to the Old Red Sandstone of Wales, England and Scotland.

At Tchudora, about 105 miles S.E. of St. Petersburg, the lowest members of the series consist of flag-like compact limestones accumulated in a tranquil sea and containing fucoids and encrinites, together with shells of Devonian age, such as Spirifers, Terebratulæ, Orthis, Leptænas, Avicula, Modiola, Natica, Bellerophon, etc., while the upper division graduates into the Carboniferous series as it often does in Britain, and, like the Old Red Sandstone of Scotland, contains only fish-remains, and in both countries they are of the same species. "Proceeding from the Valdai Hills on the north," the geologist "quits *a Devonian Zone with a true 'Old Red' type* dipping under the Carboniferous rocks of Moscow, and having passed through the latter, he finds himself suddenly in a yellow-coloured region, entirely dissimilar in structure to what he had seen in any of the northern governments, which, of a different type as regards fossils, is the true stratigraphical *equivalent of the Old Red system*." This seems to me, as regards the Russian strata, to mean, that just as the Devonian strata of Devonshire are the true equivalents of the Old Red Sandstone of Wales and Scotland, they were deposited under very different conditions, the first in the sea and the others in inland fresh-water lakes. At the time Sir Roderick Murchison's work was completed, the almost universal opinion was that the Old Red Sandstone was a marine formation. In the year 1830, the Rev. Dr. Fleming, of Edinburgh, read a paper before the Wernerian Society in which he boldly stated that the "*Old Red Sandstone* is a *fresh-water formation*" of older date than the Carboniferous Limestone. This statement, however, seems to have made no impression on geologists till it was revived by Godwin-Austen in a memoir "On the Extension of the Coal-measures," etc., in the *Journal of the Geological Society*, 1856. Even this made no converts to what was then considered a heretical opinion. I have long held Dr. Fleming's view and unfortunately published it in the third edition of 'The Physical Geology and Geography of Great Britain,' without at the time being aware that I had been forestalled by Dr. Fleming and Mr. Godwin-Austen.

To give anything like a detailed account of all the fresh-water formations deposited in estuaries and lakes from the close of the Old Red Sandstone times down to late Tertiary epochs, is only fitted for a manual of geology, and would too much expand this address; and I will therefore give little more than a catalogue of these deposits in ascending order.

In the Coal-measure parts of the Carboniferous series, a great proportion of the shales and sandstones are of fresh-water origin. This is proved all over the British Islands by the shells they contain, while here and there marine interstratifications occur, generally of no great thickness. There is no doubt among geologists that these Coal-measure strata were chiefly deposited under estuarine conditions, and sometimes in lagoons or in lakes; while numerous beds of coal formed by the life and death of land plants, each underlaid by the soil on which the plants grew, evince the constant recurrence of terrestrial conditions. The same kind of phenomena are characteristic of the Coal-measures all through North America, and in every country on the continent of Europe, from France and Spain on the west, to Russia in the east, and the same is the case in China and in other areas.

In Scotland, according to Professor Judd, fresh-water conditions occur more or less all through the Jurassic series, from the Lias to the Upper Oolites. In England, fresh-water strata, with thin beds of coal, are found in the Inferior Oolite of Yorkshire, and in the middle of England and elsewhere in the Great Oolite. The Purbeck and Wealden strata, which, in a sense, fill the interval between the Jurassic and Cretaceous series, are almost entirely formed of fresh-water strata, with occasional thin marine interstratifications. By some the Wealden beds are considered to have been formed in and near the estuary of a great river, while others, with as good a show of reason, believe them to have been deposited in a large lake subject to the occasional influx of the sea.

In the eastern part of South Russia the Lias consists chiefly of fresh-water strata, as stated by Neumayr.

The Godwana rocks of Central India range from Upper Palæozoic times well into the Jurassic strata, and there all these formations are of fresh-water origin. Fresh-water beds with shells are also interstratified with the Deccan traps of Cretaceous and Tertiary (Eocene) age, while 2000 feet of fresh-water sands overlie them.

In south-western Sweden, as stated by Mr. Bauerman, "the three coalfields of Hoganas, Stabbarp, and Rodingé, lie in the uppermost Triassic or Rhætic series." In Africa, the Karoo beds, which it is surmised may be of the age of the New Red Sandstone, contain beds of coal. In North America, certain fresh-water strata, with beds of lignite, apparently belong to the Cretaceous and Eocene epochs, and in the north of Spain and south of France, there are fresh-water lacustrine formations in the highest Cretaceous strata.

In England the lower and upper Eocene strata are chiefly of fresh-water origin, and the same is the case in France and other parts of the Continent. Certain fresh-water formations in Central Spain extend from the Eocene to the upper Miocene strata.

There is only one small patch of Miocene beds in England, at Bovey Tracey, near Dartmoor, formed of fresh-water deposits with interstratified beds of lignite or Miocene coal. On the continent of Europe, Miocene strata occupy immense independent areas, extending from France and Spain to the Black Sea. In places too numerous to name, they contain beds of "brown coal," as lignite is sometimes called. These coal beds are often of great thickness and solidity. In one of the pits which I descended near Teplitz, in Bohemia, the coal, which lies in a true basin, is 40 feet thick, and underneath it there is a bed of clay, with rootlets, quite comparable to the underclay which is found beneath almost every bed of coal in the British and other coal-fields of the Carboniferous epoch. The Miocene rocks of Switzerland are familiar to all geologists who have traversed the country between the Jura and the Alps. Sometimes they are soft and incoherent, sometimes formed of sandstones, and sometimes of conglomerates, as on the Righi. They chiefly consist of fresh-water lacustrine strata, with some minor marine interstratifications which mark the influx of the sea during occasional partial submergences of portions of the area. These fresh-water strata, of great extent and thickness, contain beds of lignite, and are remarkable for the relics of numerous trees and other plants which have been described by Professor Heer of Zurich, with his accustomed skill. The Miocene fresh-water strata, of the Sewalik Hills in India are well known to most students of geology, and I have already stated that they bear the same relation to the more ancient Himalayan Mountains that the Miocene strata of Switzerland and the North of Italy do to the pre-existing range of the Alps. In fact, it may be safely inferred that something far more than the rudiments of our present continents existed long before Miocene times, and this accounts for the large areas on those continents which are frequently occupied by Miocene fresh-water strata. With the marine formations of Miocene age this address is in no way concerned, nor is it essential to my argument to deal with those later Tertiary phenomena, which in their upper stages so easily merge into the existing state of the world.

Glacial Phenomena.

I now come to the last special subject for discussion in this address, viz., the recurrence of glacial epochs, a subject still considered by many to be heretical, and which was generally looked upon as an absurd crotchet when, in 1855, I first described to the Geological Society, boulder-beds, containing ice-scratched stones, and erratic blocks in the Permian strata of England. The same idea I afterwards applied to some of the Old Red Sandstone conglomerates, and of late years it has become so familiar, that the effects of glaciers have at length been noted by geologists from older Palæozoic epochs down to the present day.

In the middle of last July I received a letter from Professor Geikie, in which he informed me that he had discovered mammilated *moutonnée* surfaces of Laurentian rocks, passing underneath the Cambrian sandstones of the north-west of Scotland at intervals, all the way from Cape Wrath to Loch Torridon, for a distance of about ninety miles. The mammilated rocks are, says Professor Geikie, "*as well rounded off as any recent roche moutonnée*," and "in one place these bosses are covered by a huge angular breccia of this old gneiss (Laurentian) with blocks sometimes five or six feet long." This breccia, where it occurs, forms the base of the Cambrian strata of Sutherland, Ross and Cromarty, and while the higher strata are always well stratified, where they approach the underlying Laurentian gneiss, "they become pebbly, passing into coarse unstratified agglomerates or boulder-beds." In the Gairloch district, "it is utterly unstratified, the angular fragments standing on end and at all angles," just as they do in many modern moraine mounds wherever large glaciers are found. The general subject of Palæozoic glaciers has long been familiar to me, and this account of more ancient glaciers of Cambrian age is peculiarly acceptable.

The next sign of ice in Britain is found in the Lower Silurian rocks of Wigtonshire and Ayrshire. In the year 1865, Mr. John Carrick Moore took me to see the Lower Silurian graptolitic rocks at Corswall Point, in Wigtonshire, in which great blocks of gneiss, granite, etc., are imbedded, and in the same year many similar erratic blocks were pointed out to me by Mr. James Geikie in the Silurian strata of Carrick, in Ayrshire. One of the blocks at Corswall, as measured by myself, is nine feet in length, and the rest are of all sizes, from an inch or two up to several feet in diameter. There is no gneiss or granite in this region nearer than those of Kirkcudbrightshire and Arran, *and these are of later geological date than the strata amid which the erratic blocks are imbedded.* It is therefore not improbable that they may have been derived from some high land formed of Laurentian rocks of which the outer Hebrides and parts of the mainland of Scotland form surviving portions. If so, then I can conceive of no agent capable of transporting large boulders and dropping them into the Lower Silurian mud of the seas of the time save that of icebergs or other floating ice, and the same view with regard to the neighbouring boulder-beds of Ayrshire is held by Mr. James Geikie. If, however, any one will point out any other natural cause still in action by which such results are at present brought about, I should be very glad to hear of it.

I must now turn to India for further evidence of the action of palæozoic ice. In the Himalayas of Pangi, S.E. of Kashmir, according to Medlicott and Blanford, "old slates, supposed to be Silurian, contain boulders in great numbers," which they believe to be of glacial origin. Another case is mentioned as occurring in "transition beds of unknown relations," but in another passage they are stated to be "very ancient, but no idea can be formed of their geological position." The *underlying rocks are marked by distinct glacial striations.*

The next case of glacial boulder-beds with which I am acquainted is found in Scotland, and in some places in the north of England, where they contain what seem to be indistinctly ice-scratched stones. I first observed these rocks on the Lammermuir Hills, south of Dunbar, lying unconformably on Lower Silurian strata, and soon inferred them to be of glacial origin, a circumstance that was subsequently confirmed by my colleagues, Professor and Mr. James Geikie, and is now familiar to other officers of the Geological Survey of Scotland.

I know of no boulder formations in the Carboniferous series, but they are well known as occurring on a large scale in the Permian brecciated conglomerates, where they consist "of pebbles and large blocks of stone, generally angular, imbedded in a marly paste. . . . . the fragments have mostly travelled from a distance, apparently from the borders of Wales, and some of them are 3 feet in diameter." Some of the stones are as well scratched as those found in modern moraines or in the ordinary boulder-clay of what is commonly called the glacial epoch. In 1855 the old idea was still not unprevalent that during the Permian epoch, and for long after, the globe had not yet cooled sufficiently to allow of the climates of the external world being universally affected by the constant radiation of heat from its interior. For a long time, however, this idea has almost entirely vanished, and now, in Britain at all events, it is little if at all attended to, and other glacial episodes in the history of the world have continued to be brought forward and are no longer looked upon as mere ill-judged conjectures.

The same kind of brecciated boulder-beds that are found in our Permian strata occur in the Rotheliegende of Germany, which I have visited in several places, and believe them to have had a like glacial origin.

Mr. G. W. Stow, of the Orange Free State, has of late years given most elaborate accounts of similar Permian boulder-beds in South Africa. There, great masses of moraine matter not only contain ice-scratched stones, but on the banks of rivers where the Permian rock has been removed by aqueous denudation, the underlying rocks, well rounded and mammilated, *are covered by deeply incised glacier grooves* pointing in a direction which at length leads the observer to the pre-Permian mountains from whence the stones were derived that formed these ancient moraines.*

Messrs. Blanford and Medlicott have also given in 'The Geology of India' an account of boulder-beds in what they believe to be Permian strata, and which they compare with those described by me in England many years before. There the Godwana group of the Talchir strata contain numerous boulders, many of them six feet in diameter, and "in one instance *some of the blocks were found to be polished and striated, and the underlying Vindhyan rocks were similarly marked.* The authors also correlate these glacial phenomena with those found in similar deposits in South Africa, discovered and described by Mr. Stow.

In the Olive group of the Salt range, described by the same authors, there is a curious resemblance between a certain conglomerate "and that of the Talchir group of the Godwana system." This "Olive conglomerate" belongs to the Cretaceous series, and contains ice-transported erratic boulders derived from unknown rocks, one of which of red granite "is polished and striated on three faces in so characteristic a manner that very little doubt can exist of its having been transported by ice." One block of red granite at the Mayo Salt Mines of Khewra "is 7 feet high and 19 feet in circumference." In the "Transition beds" of the same authors, which are supposed to be of Upper Cretaceous age, there also are boulder beds with erratic blocks of great size.

I know of no evidence of glacial phenomena in Eocene strata excepting the occurrence of huge masses of included gneiss in the strata known as Flysch in Switzerland. On this question, however, Swiss geologists are by no means agreed, and I attach little or no importance to it as affording evidence of glacier ice.

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* Mr. Stow's last memoir on this subject is still in manuscript. It is so exceedingly long, and the sections that accompany it are of such unusual size, that the Geological Society could not afford their publication. It was thought that the Government of the Orange Free State might undertake this duty, but the late troubles in South Africa have probably hindered this work—it is to be hoped only for a time.

Neither do I know of any Miocene glacier-deposits excepting those in the north of Italy near Turin, described by the late eminent geologist, Gastaldi, and which I saw under his guidance. These contain many large erratic boulders derived from the distant Alps, which, in my opinion, were then at least as lofty or even higher than they are now, especially if we consider the immense amount of denudation which they underwent during Miocene, later Tertiary, and post-Tertiary times.

At a still later date there took place in the north of Europe and America what is usually misnamed "*The* Glacial Epoch," when a vast glacial mass covered all Scandinavia, and distributed its boulders across the north of Germany, as far south as the country around Leipzig, when Ireland also was shrouded in glacier ice, and when a great glacier covered the larger part of Britain, and stretched southward, perhaps nearly as far as the Thames on the one side, and certainly covered the whole of Anglesey, and probably the whole, or nearly the whole, of South Wales. This was after the advent of man.

Lastly, there is still a minor glacial epoch in progress on the large and almost unknown Antarctic continent, from the high land of which in latitudes which partly lie as far north as 60° and 62°, a vast sheet of glacier-ice of great thickness extends far out to sea and sends fleets of icebergs to the north, there to melt in warmer latitudes. If in accordance with the theory of Mr. Croll, founded on astronomical data, a similar climate were transferred to the northern hemisphere, the whole of Scandinavia and the Baltic would apparently be covered with glacier-ice, and the same would probably be the case with the Faroe Islands and great part of Siberia, while even the mountain tracts of Britain might again maintain their minor systems of glaciers.

Conclusions.

In opening this address, I began with the subject of the oldest metamorphic rocks that I have seen—the Laurentian strata. It is evident to every person who thinks on the subject that their deposition took place *far from the beginning of recognized geological time.* For there must have been older rocks by the degradation of which they were formed. And if, as some American geologists affirm, there are on that continent metamorphic rocks of more ancient dates than the Laurentian strata, there must have been rocks more ancient still to afford materials for the deposition of these pre-Laurentian strata.

Starting with the Laurentian rocks, I have shown that the phenomena of *metamorphism* of strata have been continued from that date all through the later formations or groups of formations down to and including partof the Eocene strata in some parts of the world.

In like manner I have shown that ordinary volcanic rocks have been ejected in Silurian, Devonian, Carboniferous, Jurassic, Cretaceo-oolitic, Cretaceous, Eocene, Miocene, and Pliocene times, and from all that I have seen or read of these ancient volcanoes, I have no reason to believe that volcanic forces played a more important part in any period of geological time than they do in this our modern epoch.

So, also, mountain chains existed before the deposition of the Silurian rocks, others of later date before the Old Red Sandstone strata were formed, and the chain of the Ural before the deposition of the Permian beds. The last great upheaval of the Alleghany Mountains took place between the close of the formation of the Carboniferous strata of that region and the deposition of the New Red Sandstone.

According to Darwin, after various oscillations of level, the Cordillera underwent its chief upheaval after the Cretaceous epoch, and all geologists know that the Alps the Pyrenees, the Carpathians, the Himalayas, and other mountain chains (which I have named) underwent what seems to have been their chief great upheaval after the deposition of the Eocene strata, while some of them were again lifted up several thousands of feet after the close of the Miocene epoch.

The deposition of salts from aqueous solutions in inland lakes and lagoons appears to have taken place through all time—through Silurian, Devonian, Carboniferous, Permian, Triassic, Jurassic, Cretaceous, Eocene, Miocene, and Pliocene epochs—and it is going on now.

In like manner fresh-water and estuarine conditions are found now in one region, now in another, throughout all the formations or groups of formations possibly from Silurian times onward; and glacial phenomena, so far from being confined to what was and is generally still termed *the* glacial epoch, are now boldly declared, by independent witnesses of known high reputation, to begin with the Cambrian epoch, and to have occurred somewhere, at intervals, in various formations, from almost the earliest Palæozoic times down to our last post-Pliocene "glacial epoch."

If the nebular hypothesis of astronomers be true (and I know of no reason why it should be doubted), the earth was at one time in a purely gaseous state, and afterwards in a fluid condition, attended by intense heat. By-and-by consolidation, due to partial cooling, took place on the surface, and as radiation of heat went on, the outer shell thickened. Radiation still going on, the interior fluid matter decreased in bulk, and, by force of gravitation the outer shell being drawn towards the interior, gave way, and, in parts, got crinkled up, and this, according to cosmogonists, was the origin of the earliest mountain chains. I make no objection to the hypothesis, which, to say the least, seems to be the best that can be offered and looks highly probable. But, assuming that it is true, these hypothetical events took place so long before authentic geological history began, as written in the rocks, that the earliest of the physical events to which I have drawn your attention in this address was, to all human apprehension of time, so enormously removed from these early assumed cosmical phenomena, *that they appear to me to have been of comparatively quite modern occurrence, and to indicate that from the Laurentian epoch down to the present day, all the physical events in the history of the earth have varied neither in kind nor in intensity from those of which we now have experience.* Perhaps many of our British geologists hold similar opinions, but if it be so, it may not be altogether useless to have considered the various subjects separately on which I depend to prove the point I had in view.

SOCIETY OF ARTS.

The Chemistry of Bread-Making.*

BY PROFESSOR GRAHAM, D.SC.

(*Concluded from page* 164.)

Lecture V.

I pass on now to a very interesting matter, and that is the value of bread as food, or its value as a source of power. I have here a table which we owe to the researches of Messrs. Lawes and Gilbert, showing the composition of the ordinary articles of food—meat, bacon, butter, milk, cheese, flour, bread, maize, oatmeal, rice, potatoes, vegetables, peas, and sugar.

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* Cantor Lectures: Delivered November and December, 1879. Reprinted from the *Journal of the Society of Arts.*

Average Composition of Articles of Food.
(Lawes and Gilbert.)

	Parts per 100.			
	Dry Substance.	Carbon.	Nitrogen.	Nitrogen to 100 Carbon.
Meat	45	30	2·0	6·6
Bacon	80	57	1·1	2·0
Butter	85	68	...	...
Milk	10	5·4	0·5	9·3
Cheese	60	36	4·5	12·5
Flour	85	38	1·7	4·5
Bread	64	28·5	1·3	4·5
Maize	87	40	1·7	4·4
Oatmeal	85	40	2·0	5·0
Rice	87	39	1·0	2·5
Potatoes	25	11	0·3	3·5
Vegetables	15	6	0·2	3·3
Peas	85	39	3·6	9·4
Sugar	95	40	...	...

I will not, of course, detain you by reading all these numbers, but I wish to point out to you some very interesting results obtained from a consideration of these researches. We find in the fourth column a series of numbers headed, "Ratio of nitrogen to 100 parts of carbon." In the case of wheat, it is 6·6; bacon, 2; of course in butter none; milk, 9·3; cheese, 12½; flour, 4½; of course, bread is the same; rice, 2½; ordinary vegetables, 3·3; and so on. In sugar there is no nitrogen. In looking at this table, you will see that flour and bread stand tolerably high in the ratio of nitrogen to carbon, viz., 4½ to the 100. This leads me back again to a matter I spoke of before, viz., the question of what one should do with the bran of the wheat. Supposing a hard-working labourer, say a ditcher or a navvy, were supplied with white bread almost in sufficiency but yet not quite, what would he crave for? We all know, as a matter of fact and experience, and those of you who have seen men undergoing hard mechanical work will agree with me, his first craving is not for a lump of brown bread, but for a piece of fat, butter, or bacon; but in any case the craving is not for more nitrogen, but for more carbon, and especially if that carbon be derived, not from carbo hydrates in which, as I pointed out to you, the hydrogen and oxygen are in the ratio in which they form water, but bodies such as fat, in which there is a very small proportion of oxygen, and therefore a considerable excess of hydrogen; in other words, bodies which contain, not merely respirable carbon, but also respirable hydrogen, that is hydrogen over and above that which is required to form water with the oxygen in the compound. That is what a man craves for. If the labourer were to select cheese instead of fat, even then, in cheese, there is a considerable quantity of fat, and from the fat of the cheese he would obtain a considerable amount of heat force, vastly more than he would from the caseine of the cheese. But, probably what the great mass of working men undergoing hard work would desire most to have would be very fat meat. Those of you who may have seen navvies consuming large quantities of excessively fat bacon, so fat that one can see no lean in it, will readily understand what I am pointing out. And yet there is a very current notion that it is the lean of the meat that gives us the greatest amount of motive force—the greatest amount of mechanical power; whereas, not only will a labourer in our own country, but the Chinese coolie, who lives upon rice, when he has to do a large amount of work, such as loading a ship (and it is astonishing the enormous quantity of work they can do under pressure) does not look to albuminoids in order to give him that extra power; on the contrary, he uses butter or fat with his rice. He uses those fatty compounds that contain carbon, and contain what chemists would call potential force in the hydrogen, over and above what is required to form water with the oxygen in the compound.

Let us see if science cannot explain this difference of opinion. We have the instinctive craving of the labouring classes throughout the world; and we have certain views, which have been accepted, that lean meat, or albuminoids, are the best sources of motive power. Before coming to the table, which I have here, on the mechanical equivalent of food, I think it will be convenient if I explain to you a few numbers that are necessary to be understood before we can consider these sources of power. According to the definition used by physicists, we say that a unit of heat is the amount of heat required to raise a gramme (= 15·432 grains) of water 1° C.

If you take one gramme of pure carbon—say, the very finest charcoal—and thoroughly burn it to carbonic acid gas, the amount of heat given out by that oxidation of one gramme of carbon would be sufficient to raise 8080 grammes of water 1° C. I must apologize for using French weights and measures, but I am very much more conversant with these data in the French than in English weights and measures; but I will afterwards put the statements in a plainer form, so that you will be better able to follow me. Now, hydrogen gives out rather more than four times as much heat as carbon. One gramme will give out as much heat, when converted into water by burning, as to raise 34,462 grammes of water 1° C.; that is, merely considering the amount of heat-force obtained from the oxidation of carbon and hydrogen, and looking at it solely from the point of view of how much water that oxidation will warm. In order to convert this into the mechanical motion of lifting a weight against gravity, all we have to do is to make use of the data obtained by the most invaluable researches of Dr. Joule, of Manchester, published some years ago, by which he determined what is called the mechanical equivalent of heat. He found, when a gramme weight was allowed to fall through 424 mètres, the force thus generated being made—by proper mechanical contrivance—to agitate water, that an amount of heat was produced equal to raising the temperature of the same weight of water—that is 1 gramme—1° C. The force obtained from a falling weight can be converted into heat-force, and, conversely, the heat of combustion can be converted into raising a weight against gravity. Thus, a gramme of carbon, when burnt to carbonic acid gas, produces 8080 units of heat, and is, therefore, equivalent to 8080 × 424 = 3392 mètre kilogrammes of work, or rather more than the force produced by three tons falling through one mètre. The same weight of hydrogen, when burnt, produces more than four times as much force as carbon, and is equivalent to 14½ tons falling through one mètre.

Mechanical Equivalent of Food. (In natural state as consumed.)

Weight of substance One gramme (=15·432 grains).	Complete oxidation.		As burnt in body.
	Units of Heat.	Mètre kilogrammes of Forces.	Mètre kilogrammes of Forces.
Potatoes . . .	1·013	429	422
Flour	3·936	1669	1627
Oatmeal	4·000	1696	1665
Rice	3·813	1615	1591
Lean Beef . . .	1·567	664	604
Beef Fat	9·069	3841	3841
Cheshire Cheese .	4·647	1969	1846

Now, these data being explained, I will proceed to consider the motive force obtained from the various sources of food we make use of, and, thanks to the researches of Voit, Pettenkoffer, Bischoff, and others abroad, and Playfair, Edward Smith, Frankland, and others in our own country, this matter has been made very clear. In the experiments of Frankland, by which he determined, by very well-known methods, the heat of combustion, not merely of carbon and hydrogen—that had been done before—but the heat of combustion of lean meat—that is, to say, meat deprived of fat by digestion in ether—fat meat, rice, potatoes, starch, and so on, he found that the heat of combustion of fat was rather more than six times that obtained from the same weight of lean. I am not using the word "lean" in the sense that you and I do, where we speak of a lean beefsteak as having no fat in it—a lean beef steak contains a good deal of fat—but the lean meat deprived of fat by proper chemical means. He found that fat can develop more than six times as much heat as the same weight of lean. Now, Dr. Frankland, in carrying out these researches, determined not merely the absolute amount of heat-force obtained, but the amount of force obtained by carbo-hydrate, from fat, and from albuminoid matters, when used by man. Albuminoids are not burnt up to carbonic acid and ammonia; they are eliminated chiefly as urea, slightly as uric acid, and, in birds and reptiles particularly, a considerable quantity is eliminated in the less oxidized form of uric acid. By making a deduction from these determinations of the eliminated urea, the result of his researches was that the fats yielded a very large amount of force compared with the albuminoids—as I said before, about six times as much. Two German chemists—Messrs. Fick and Wislécenus—experimented upon this matter. They carefully and most accurately weighed everything they ate, and accurately determined the excrete products, the carbonic acid, and so on. They found that, in going up the Faulhorn, which is 10,000 feet high, they burnt 37 grammes of their muscles. Now, according to the researches of Frankland, this 37 grammes of muscle was only equivalent to 68,000 mètre kilogrammes of force; whereas, the total amount of force expended in going up a mountain of that height was 319,000 mètre kilogrammes—leaving a deficiency, therefore, 251,000 metre kilogrammes. This was entirely due to the fat and the carbo-hydrates they consumed, and not due to the oxidation of their own muscles. From the researches of these gentlemen, and those of Playfair, upon labourers, and of Haughton, who experimented upon soldiers undergoing shot drill, and Dr. Edward Smith, who experimented not only upon individuals undergoing the treadmill, but who also worked the treadmill himself, and also from the work of Dr. Frankland, we now know that the heat of combustion we obtain, and the amount of force we generate, is due chiefly, not to the nitrogenous, but to the non-nitrogenous parts of our food.

This is not all. As the work done increases in severity, it is not the nitrogenous compound urea that increases, but it is the carbonic acid gas which increases in the eliminated products of combustion. The greater amount of work done in a given unit of time, the greater is the amount of carbonic acid produced. Dr. Smith, in experimenting upon himself, found that, when he was sleeping, he eliminated 19 grammes of carbonic acid gas per hour from his lungs. It was carefully quantified and weighed. When sitting, 29 grammes were eliminated; when walking 2 miles an hour, 70 grammes; 3 miles an hour, 100 grammes; when ascending the treadmill, at the rate of 28½ feet per second, it amounted to 190 grammes per hour. Then, you may say, granting that the carbonic acid increases the more work is done, whereas the urea increases but little, what function does the muscle perform in the system? The function that the muscle performs is precisely the same as the piston-rod, together with the machinery, play in the ordinary locomotive. You know that the function of the piston-rod of a locomotive is to convert heat from the oxidation of the coke or coal—which, of course, operates in changing water into steam—into a motion of the mass; so that, in that way, by burning fuel, you can drive a train at 50 or 60 miles an hour. Precisely similar is the function of the muscle in the human system; it is the apparatus by which the heat produced from the oxidation of the carbo hydrates and of the fat is converted into mechanical motion—into the motion, not merely of the pulsation of the heart and other internal mechanical work, but the motion of the body in walking, or running, or climbing hills, and other mechanical work. There is this difference, however, between the muscle and the piston-rod; not merely the piston-rod, but all parts of the engine are carefully constructed by the engineer, so as to avoid what is technically termed "hot bearings"; in other words, there must be no local production of heat by friction in any part of the engine. There is this difference, then, that the muscle is partly oxidized and broken up, but the amount of heat obtained from the oxidation of the muscle is only converted into mechanical motion in about the ratio of one third of the total heat produced, two thirds going to heat the body, and only one third going to produce mechanical motion. We are indebted for these researches to Heidenheim and others.

To take a more practical view of this question, one that will be more readily understood by most of you, I will take some of Dr. Frankland's results upon the heat of combustion produced by oxidizing various articles of food. Supposing we were to take the average of all persons present in this room, and assume we are all 10 stone weight (140 lbs.), and if we wished to go up 10,000 feet against gravity, what amount of force should we require? I could have given you the quantity in mètre kilogrammes of force, as I have already done, but let us see what amount of money it would cost in the form of different kinds of food, in order to do that amount of mechanical work.

Weight and Cost of Food required to raise 140 *lbs.* 10,000 *feet high.*

	Weight in lbs. required.	Cost per lb. in pence.	Total cost in pence.
Potatoes	5	1	5
Flour	1⅓	3	4
Bread	2⅜	2	4¾
Oatmeal	1¼	2¾	3¾
Rice	1⅓	4	5⅓
Lean of Beef	3½	12	42
Beef Fat	½	10	5
Cheshire Cheese	1⅕	10	12

On this table we have the number of lbs. required, of different kinds of ordinary food, to produce this amount of mechanical work. If we take potatoes; we find 5 lbs. of potatoes would be required, and if we consider them as costing 1*d.* per lb., it will cost 5*d.* You will readily understand that the last column, which gives the value of the articles, will vary from time to time. Of flour we should only require 1⅓ lb., which is taken at about 3*d.* per lb., and this would, therefore, only cost 4*d.* Bread would cost 4¾*d.*; the difference is due, doubtless, to the expense of the process of making bread. In the case of lean beef, deprived of fat, 3½ lbs. are required, and as the cost of very lean beef is taken at 1*s.* per lb., that would cost 3*s.* 6*d.*, whereas the fat would only cost 5*d.*, because so small a quantity as ½ lb. would do the work which 3½ lbs. of lean beef would do; 1⅕ lb. of Cheshire cheese would be required, which, assuming the price to be 10*d.* per lb., would cost 1*s.* to do that amount of mechanical work. Of course, this table is merely suggestive, but you see perfectly well that man does not require a large quantity of albuminoids in doing heavy work.

I told you that bread contains a very fair ratio of nitrogen to carbon, and that, when considered from another point of view—the mechanical work capable of being done by the use of such food materials—that, really, the money spent upon flour is not at all badly laid out; whereas, on the other hand, if you wish to have a large quantity of work done in a short time, then, in addition to bread, we require, not to use much nitrogenous matter, but rather to use fat, and, therefore, the peasants, not merely of England, but of all countries have been right, in spite of many scientific assertions that they were wrong, in their instinctive habit of adding fat, rather than nitrogenous food, to their diet when undergoing hard work.

At a former meeting, I said I would again revert to the subject of bran; in doing so now, I wish it to be distinctly understood that, in my criticism against the admixture of bran with flour, I have been anxious to defend the miller from the charges of being ignorant of true scientific principles. I hold that the miller who so well mills his flour as to eliminate all bran is the man who is working on true scientific principles. His object is to enable the baker to produce a fine, well-piled loaf, not a sodden, heavy one. I think it is right I should suggest a method by which wheaten flour may be used, and yet not produce the injurious effects which I told you finely-ground bran, with its cerealin, produces in the panification process. This is to do what I suggested at the last meeting should be done with inferior flours, namely, to make the ferment and the sponge of really good, strong flour, and then, in the dough process, when it is so much stiffer, and where the whole operation only lasts one hour, to use the wheaten flour. Of course, you are perfectly well aware that hydrochloric acid and bicarbonate of soda are sometimes used for raising wheaten bread, but I am suggesting this other plan for those who prefer a fermented loaf, and yet wish to avoid the high-coloured products and sodden bread, formed by the action of the finely-ground bran on this flour during the many hours of the ferment and sponge stages, and who desire that the fermented loaf of whole meal shall be light and porous.

I have, at last, come to the conclusion, and I will briefly recapitulate what, it seems to me, have been the prominent features of our study together. In the first place, you will remember, we studied in some detail the properties of the different constituents of the cereals, giving, of course, more especial weight to wheat. Secondly, we found that climatic conditions have a most important bearing upon the nature of those constituents, and then, thirdly, we considered together the right mode of treating such wheats by the miller, and, subsequently, by the baker. Lastly, we saw the necessity of microscopic examination of the yeast, in order to be sure that we were not introducing into our fermenting process organisms of disease producing acetic acid, lactic acid, butyric acid, and other injurious products. These, perhaps, have been the chief points, though, at the same time, there have been several others which have occupied our attention for some time.

I have now only to say that, if I have succeeded in awakening an interest in the wonderful phenomena connected with the art of bread-making, and have raised in your minds a true conception of the high importance and dignity of the art—based, as we have seen it to be, on some of the most interesting departments of physical, chemical and biological science—and if I have stimulated any of you to resolve on the further study of these sciences, whereby greater and more rapid progress may be made, I shall rejoice that my efforts have not altogether failed.

Parliamentary and Law Proceedings.

Poisoning by Prussic Acid.

We regret to notice the sudden death, on Wednesday last week, of Mr. H. J. Heywood, a medical practitioner of Pendleton, where he had a large practice. It appears that the deceased had for years suffered much from indigestion, and had been in the habit of taking laudanum to relieve pain and induce sleep. Early on Wednesday morning his wife was awakened by hearing a fall, and found her husband on the floor, unconscious, with a prussic acid bottle in his hand; and he died shortly afterwards, an attempt to administer an emetic having proved unsuccessful. Evidence given at the inquest showed that he kept a bottle of laudanum and one of prussic acid side by side on the same shelf, and that he had inadvertently taken the prussic acid instead of the laudanum. If a medical man can act in such a way, who can wonder if non-professional persons, nurses or patients, are now and then wanting in due carefulness?—*Medical Times and Gazette*, August 28.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[442]. Hydrarg. iodid. is a preparation of the London Pharmacopœia; its synonym in the British Pharmacopœia is hyd. iodid. viride. The ointment should be as follows:—

℞ Hyd. Iodid.	1 part.
Ceræ Alb.	2 parts.
Adipis Præp.	6 parts.

To the wax and lard melted together add the iodide and mix well.

"374."

Notes and Queries.

[672]. STORM AND WEATHER GLASS.—Take a clean salad oil flask, half fill it with water, invert it in a wide-mouthed bottle full of water, taking care that the water does not escape from the flask. The water will rise for fine weather and sink for wet. A little permanganate of potash dissolved in the water will look very effective.

"374."

[673]. PASTILLE.—Can any of your readers inform me what is mixed with conf. rosæ, to form the pastille, now unobtainable, formerly used in Turkey for lighting the chibouque?

A. G. Beaven.

[674]. IVORY STAINING.—Can any of your readers inform me of the best process for permanently staining ordinary white ivory, to the natural yellowish brown colour of African ivory, having what is called the bark on?

Sheffield.

[675]. INJECTIO MORPHIÆ TARTRATIS.—I want to prepare a solution of above, containing one grain in twelve minims. By precipitating the alkaloid from a solution of its salt, well washing, and dissolving by means of a solution of tartaric acid I get a solution from which very insoluble crystals are eventually thrown down. The solution I get from the London houses never deposits in any way. Can any one explain this and give

a form for working by? Any person doing so will very greatly oblige S. H. P.

[676]. PREVENTIVE OF SEA-SICKNESS.—I should feel obliged if you will ask, through the Journal, if any member will oblige with a formula for "a sea-sickness preventive." J. J. MATTHIAS.

COLOURS FOR SHOP WINDOWS.—A very beautiful amethystine colour can be produced by dissolving 5 grains of salicylic acid in a little solution of ammonia, mixing this with two gallons or enough water to fill the show bottle. To this is added a few drops of solution of chloride of iron, and afterwards a few drops of muriatic acid.

Emerald-green colour, of great beauty, can readily be produced by dissolving a few five cent nickel pieces in equal parts of nitric acid and water, then diluting with sufficient water.

A GOOD FILLING FOR TEETH.—A filling that has been used very successfully for teeth, and which is next to gold leaf in permanency, is made of the following ingredients:—

℞ Oxide of Zinc (recently made by burning)	200 parts.
Powdered Silica	8 „
„ Borate of Soda . . .	4 „
„ Glass	5 „

Mix and pass through a very fine sieve. To be kept in a well stoppered bottle.

When required for use, a little of the powder is mixed quickly with a concentrated solution of chloride of zinc, so as to make a thick paste, which is pressed into the cavity of the tooth, and will harden in less than ten minutes. It forms a hard white cement, which will last for years.

COSMETIC POMADE can be made by the following formula:—

White Wax	4½ ozs. avoir.
Lard	4¾ „ „
Balsam of Peru	1 drachm.
Oil of Orange Flowers	30 drops.
„ Lavender	5 „
„ Cloves.	6 „
„ Rosemary	5 „

Melt the lard, wax and balsam, and stir them constantly until they thicken, when the oils are added. This is then poured into moulds; when cold, wrap up each stick in wax paper and tinfoil.

Black stick pomade is made by mixing 40 grains of best lampblack, carefully rubbed up with a portion of the lard.

Brown, by using burnt sienna in same way, and various shades of brown, by mixing burnt sienna with lampblack.

CAMPHORATE OF AMMONIA.—This salt is easily produced by neutralizing camphoric acid with liq. ammonia fortior, evaporating by a very moderate heat until reduced to a syrupy liquid, and a pellicle begins to form, when it is set aside in a cool place to crystallize. It is a beautifully crystalline salt, consisting of masses of crystals, radiating from central points, arranged in the most symmetrical manner.

It is a salt that has sedative properties resembling the monobromide of camphor, but, unlike that compound, it is freely soluble in water. The dose is from 5 to 10 grains.

Erratum.—Page 166, second column, line 31. *For* "Then pour off the clear liquor, and a little creasote to prevent mouldiness," *read* "Then pour off the clear liquor and *add* a little creasote to prevent mouldiness.

"374."

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

ASSISTANTS IN THE SOUTH OF FRANCE.

Sir,—If Mr Weddell bases his protest against my letter on personal experience, I must remind him that in one short season he can hardly have had the opportunities that nearly six years have afforded me of knowing the treatment assistants sometimes meet with. I can easily understand that being still under the charm of his first season spent in a good southern pharmacy he sees "tout en rose" and resents the idea that gloomy colours can possibly exist in so charming a climate; but let him only take the trouble of inquiring of those who have lived in the several places referred to, and he will find that what I advance is perfectly correct.

My object was not to create a prejudice against employers in the south generally, far from it, but simply to state facts and offer a word of advice to those whom it might serve; had Mr. Weddell had more experience of the littoral he would certainly corroborate, instead of disputing my statements.

Paris. H. BOUTTELL.

Sir,—I trust that having perused Mr. Weddell's letter in your last issue no assistant will be led to think too lightly of home situations and comforts and be eager to relinquish them for the doubtful advantages offered by a few months' sojourn in the "sunny south."

Taking into consideration the fact that these engagements extend only over a season of from five to eight months, the extra expense incurred by an imperfect knowledge of the language and customs of the country, and the probable loss of time and expenditure at the close of the season—it is unquestionable that a good average permanency in England is better in a pecuniary sense.

It is not necessary to seek in France the "gentlemanly respect" or "liberty of action and judgment" which your correspondent appears to think is not prevalent in English pharmacies. Reasonable assistants can always find the former and capable men the latter quality among English employers, and probably with the accompaniment of a greater amount of genuineness.

The experience gained by a few months in a foreign pharmacy is often of great use in the future, but it is the unanimous opinion of those who have "gone south" for successive seasons that "it does not pay."

Mr. Weddell concludes his letter by saying, "So attached does he (the English assistant) frequently become to the business, to the proprietor, to the customers, and to the gentle clime, that he can hardly bring himself afterwards to settle again in England." This I take to be as undesireable a thing as could happen to assistants who have prospects of establishing themselves in business in their own country.

FRED. J. BATHE.

COUMARIN IN SPECIES OF ORCHIS.

Sir,—In reply to Mr. Druce's inquiry as to whether *Orchis fusca* contains coumarin, I have found that in drying this species in quantity it gives off an almost unbearably strong smell of this substance, far more than *Anthoxanthum odoratum* or any other plant with which I am acquainted. I may also mention that *Orchis uslulata* develops the same smell, though in a somewhat less degree.

FREDERICK J. HANBURY.

F. H. Alcock is thanked for his communication.

C. W. Nighton.—*Spergula arvensis.*

M. I.—*Parnassia palustris.*

H. J. H.—We are not aware of the existence of such a work.

T. C. A.—A recipe for inseparable lime juice and glycerine was repeated in vol. ix., p. 1032.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Wills and Wootton, Oswald, Wighton, W. J Smith, Suburban Chemist, G. W.

PREPARATION OF IODINE-IRON COD LIVER OIL.

BY S. DRAISMA VON VALAENBURG.

Being invited by the Rotterdam Department of the Dutch Pharmaceutical Society to make the manner in which I prepare my iodine-iron cod liver oil public, a thing which I had often thought of, but different circumstances had up till now prevented me from carrying out, I herewith present to the public the following prescription:—

℞ Iodii.	part	1·25
Ferri pulverati	„	2·50
Ol. jecor. aselli.	„	98·50

The iodine is thrown into a vessel filled with cod liver oil, and by constant stirring or shaking for some days made entirely to dissolve into it, so that the liquid when left for some time to itself has a specific weight of 0·932—0·937 at 13·5°—21° C.

The solution is now poured in a vessel which is hermetically shut, and brought into contact with iron by shaking or stirring it with this ingredient for some four hours, until it gets a purple-violet colour, and after a due shaking with solution of iodetum kalicum and diluted starch has lost the power to produce a reaction on free iodine.

The liquid must now stand quietly for twenty-four hours (the vessel must be carefully shut, and nearly full), then shaken again for an hour at least, till it has been proved, after again shaking with a little iodetum kalicum amylum solution (also after twenty-four hours) that the preparation is wholly exempt from free iodium, may easily be made an emulsion, and consequently remain constant. The mixture must now stand till it appears clear, and one must make sure by specific weight and analysis that the desired combination has taken place.

The oil should be conserved in well corked bottles, filled to the top and of yellow-coloured glass, which must have as little surface exposed to the air as is possible.

The bottles are supposed to be emptied in five days; scrupulous investigations have brought to light, that in this space the air can produce but a very trifling change in the oil.

The mixture must be of a purple-violet colour, and should have a specific weight of 0·937—0·940 at 8°—13°.

It should contain 1·23 per cent. of iodine and about 0·27 per cent. of iron, both in a chemically combined condition. The mixture will become of a darker colour and the quantity of iron greater as the air has had more time to form iron oxy-iodide.

Nothing of an iodine reaction must be observed when the mixture is shaken with diluted starch, not even if to the latter should be added a solution of kalium iodide. The addition of kalium iodide, which seizes the free iodine that might be in the oil greatly enhances the sensibility of the amylum reaction.

I prepare my cod liver oil in quantities of 800 to 1000 litres in a vessel that is provided with a stirring apparatus, and several cocks placed in gradual elevations. The vessel must be of iron, and capable of being shut hermetically. During the preparation, samples of the oil, of the iodine solution, and of the iodine-iron solution are sent to Professor Van der Burg, and not before he has tested them, is the operation proceeded with.

In large quantities French iodine is, in my opinion, to be preferred above English iodine. The latter is finer and consequently mixed itself easily with the oil to a tough mass, which cannot be resolved again but with great difficulty. In small quantities the solution of the iodine may be considerably quickened by pulverizing the iodine in a mortar.

A long shaking with iron ought not to be omitted in this case. Though apparently all the iodine is dissolved to a clear liquid, close investigations have shown that, especially with large quantities, small parts of a dark coloured matter will adhere to the bottom of the vessel, from which no shaking or stirring can remove them. This matter is insoluble in ether. It may be nearly completely burnt. The eye, with the aid of a microscope, can detect no crystallization. This circumstance probably explains why the iodine-iron cod liver oil is of a finer taste and odour than the original oil.

That the mixture after its purity has been tested, shows a free iodine reaction when it has stood for twenty-four hours, finds its explanation in the fact that a small quantity of ferrid-iodide seems to have been produced which soon decomposes itself into ferro-iodide and iodine.

The violet colour owes its origin to the small particles of ferrid-oxyiodide, which can hardly be avoided but by a very careful removal of the air during the shaking with iron.

A preparation that should be *totally* free of ferrid-oxyiodide is not the thing that is desired. Then, being a little darker coloured than the oil which was used, it obtains immediately after it has been brought into contact with the air the peculiar dark violet colour, and may be used as a sensible characteristic reagent for oxygen.

Without taking this precaution, the quantity of the oxyiodide combination will amount to very little (though sufficient for the colour), if the preparation has been gone through with due care. Analysis will sufficiently show this.

The oxidizable properties of the mixture will become evident if a drop is exposed to the air on the lid of a cup. At once the colour will change, while, at last, the liquid will have a colour little darker than the original oil.

If the drop is made to spread by strongly blowing upon it, the above reaction will appear much more quickly, on account of the higher temperature as well as the vapour of water of the breath.

It is very remarkable that water will spoil the mixture. We once had to ascribe the loss of about 10 tuns to this cause.

This influence of water may be easily shown. If 1 drop of water is shaken up with about 10 grams of the oil in a well corked bottle, great changes will soon be observed in the colour.

The water seems to rob the oil of the ferro-iodide for some part, and for the other to decompose it by mutual influence.

It is still noteworthy that the quantity of iron was larger than was absolutely necessary, because this quickens the combination.

Exact investigations, made expressly for this purpose, have clearly shown that the cod liver oil which is prepared with the due observances remains constant.

ARALIA SPINOSA, OR FALSE PRICKLY ASH BARK.*

BY LOUIS H. HOLDEN.

The striking difference of the physical characteristics between the barks of false and true prickly ash (*Xanthoxylum*) lies in the appearance of the spines and the fracture of the bark.

The former presents spines which are quite numerous compared with the latter; they are about one-fourth inch in length, are smooth, slender and tapering to a fine point; their base is round or oval, and arranged in transverse rows.

The latter bark has few spines, scattered irregularly; they are straight and of the same length, but two-edged, with narrow linear base of about three-fourths inch in length.

The false bark breaks with a rather tough but nearly smooth fracture.

The true is brittle, and breaks with a short, non-fibrous fracture.

In examining the bark the following is the result of my analysis:—

Having reduced the drug to a coarse powder, it was moistened with alcohol and packed in a percolator, exhausted with alcohol, the alcohol was removed by distillation, and the residue evaporated to a solid extract. The extract was mixed with alcohol to the consistency of syrup, then treated with benzin, which removed the fatty matter; this fat is of a dark green colour, which is probably due to chlorophyll. The residue was then treated with ether repeatedly, until the portion insoluble in ether, after being dissolved in water, would not answer the tests for tannin.

On examination, I find ether has removed from the extract all of the tannin and resin. Upon evaporating the ethereal solution to dryness and washing the residue with water, the tannin becomes separated from the resin.

The tannin is precipitated from aqueous solution by acetate of lead; it gives an emerald-green colour with salts of iron; with caustic potash it turns ruby-red; the latter colour, when acted upon by oxalic acid, is destroyed. The tannin coagulates albumen; it is an astringent, soluble in ether, alcohol and water. The alcoholic extract cannot be detannated with oxide of lead, which the following process will prove. The alcoholic extract was mixed with water; on adding to this oxide of lead, heating, allowing to stand for several days, then evaporating slowly to dryness, mixing again with water and filtering, then adding fresh oxide of lead and allowing to stand for two months, it still answered to tests for tannin.

The residue from the ethereal solution, after washing with water, was found to be resin. It is a brown opaque mass; powdered, it is of a light brown colour, solid, brittle, fusible, and volatilized by a high heat; it is slightly acrid, soluble in alcohol and ether, insoluble in water, benzin and chloroform.

The residue from the alcoholic extract, after being treated with benzin and ether, is entirely soluble in water, from which it is precipitated by acetate of lead in the form of a heavy yellow adherent mass, which carries down mechanically the bitter principle; this can be separated by washing with alcohol. Upon evaporation, a lightish yellow substance, in scale, is obtained, which from the following experiments was proved to be a glucoside; to this the name of araliin is given. Its solution has no effect on litmus. It is soluble in alcohol and dilute acetic acid, very soluble in water, foaming excessively upon agitation, and the froth being quite persistent; not soluble in benzin, chloroform or ether. Acetate lead has no effect upon its solution; no precipitate is produced by platinic chloride or bichloride of mercury; no action by nitric acid and chromate potash, nor does it answer to any of the tests for alkaloids. Hydrochloric acid bleaches the araliin and develops the peculiar odour of the plant; the effect of sulphuric acid is similar. Potassium hydrate and ammonia have no effect.

Upon dissolving araliin in water acidulated with hydrochloric acid, and upon boiling, a white, insoluble, tasteless and odourless precipitate is formed, for which I propose the name araliretin. After filtering, testing filtrate for glucose by cupric sulphate and excess of caustic potash, and boiling, a heavy precipitate of red oxide of copper is formed, showing the bitter principle to be a glucoside. Araliin boiled with potassio-cupric tartrate produced precipitate of red oxide of copper, confirming the preceding test. When araliin is boiled with hydrate potash an amber colour is produced.

Upon addition of tannic acid in cold solution no change takes place, but upon the application of heat a flocculent precipitate is formed.

THE CONDITIONS NECESSARY TO SUCCESSFULLY CONDUCT PERCOLATION.*

BY J. U. LLOYD, CINCINNATI, OHIO.

(*Concluded from page* 196.)

If we close the exit of our percolator at any time during the progress of percolation the menstruum within the percolator will necessarily cease to move bodily downward. The liquid will thus remain in direct contact with the material, and as a consequence the act of solution will progress in a manner similar to that exemplified by our example of the dissolving crystal of bromide of potassium. Hence, it is evident that no other advantage than those resulting from longer continued contact can arise. To guard against any disturbing influence affecting succeeding percolation, caused by an unequal contraction of the only partially saturated powder, it is to be observed that all particles of material are equally and permanently surrounded by menstruum. We must bear in mind that the action of the menstruum upon the powdered material in the percolator, which consists of a number of small fragments, and that upon the single crystal of bromide of potassium, in the example cited heretofore, differ only in degree; its solvent power affects alike all the molecules exposed to its influence, and the relative difference is dependent solely upon the difference of the areas of surface exposed to contact. In fact, the term molecule implies no definite idea of size, and is an expression applying to something beyond our senses; we cannot compare the molecules of a liquid to particles of matter of any conceivable size. We are forced to assume that a menstruum is made up of an inconceivably large number of infinitely small particles, which we consider capable of permeating the powder within the percolator, finding its way through the capillary channels which surround the particles of the solid, circulating around them in obedience to laws already considered, and according to influences yet to be mentioned. During the process of maceration in the percolator the capillary tubes, as well as the larger interstices, are supposed to be filled with liquid; if this liquid be capable of dissolving wholly or partially the solid solution must take place. Each successive movement of contact is found to decrease the quantity of matter held in solution until the liquid is saturated or the solid dissolved. Thus we find the effect of contact in percolation to be identical with that in simple maceration.

In percolation, from the instant the stratum of menstruum commences to penetrate the material until it escapes we have maceration connected with alteration of the position of the mass of the liquid. There are continually new surfaces of contact formed as the liquid passes downward towards the exit of the percolator, and in maceration this phenomenon is also presented. There is no rest within the vessel while solution progresses. Mediums of greater specific gravity than the original menstruum are constantly forming, which, obedient to gravity, seek the lowest portion of the vessel, in turn to be displaced by heavier liquids. In this way during maceration numbers of percolating currents are flowing throughout the capillaries, and between the interstices of the material, as in percolation, while fresh portions of liquid are continually coming into contact with new surfaces, and saturations are giving way with perfect regularity to those not saturated.

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* From the *American Journal of Pharmacy*, August, 1880.

* From the 'Proceedings of the American Pharmaceutical Association,' vol. xxvii., 1879.

Thus circulation of currents progress and will continue until an equilibrium is established, as long as there is soluble matter and unsaturated menstruum within the percolator, and afterwards whenever the temperature is permitted to change. Therefore maceration cannot be disconnected from percolation, and as we have seen percolation must include maceration. And thus I am led to understand that the contact of maceration and the contact of percolation are identical. Reasoning from the foregoing it may be argued that the expression, maceration in connection with percolation, is simply an expression to imply prolonged contact of liquid with material, by which means we may overcome a defective contact of height of material within the percolator. Upon the other hand, increase of height of powder may imply prolonged maceration of the material with successive portions of menstruum.

I think we may be justified in arguing that the influences which modify contact are of vital interest in the study of percolation; that the solvent action of a percolating menstruum may be facilitated by judicious maceration, or by increasing the perpendicular height of the powder.

Let us now consider the vessel which contains the material known as the percolator. This is of the utmost importance, as the increase and decrease of diameter governs capacity, subservient to mathematical laws, which it is necessary to examine.

The percolator controls the height of powder under like pressure. As the diameter of the percolator decreases it is responded to by greater, and as it increases by less height, both of powder and menstruum. Thus, if a cylindrical percolator be 6 inches in diameter, and a given amount of liquid or powder occupy a height of 6 inches, the same material will occupy—

13½ inches in height in a percolator 4 inches in diameter.
24 " " " 3 " "
54 " " " 2 " "

This is in conformity with the mathematical law that the height of both liquid and powder increase inversely as the square of the diameter of the percolator; a rule, however, which does not apply to the increase and decrease of the resultant contact between the material and passing liquid, as a more careful examination will illustrate.

Let us represent contact by numbers. If a cylindrical or prismatic percolator be used which has been filled 1 inch with a powder, overlying which is alcohol to the depth of an inch, it is evident that every particle of the powder which assists to form any perpendicular line or column of the powder an inch in height will be exposed to and come into contact with every collection of molecules in the line or column of alcohol perpendicular above, providing the alcohol passes directly through the powder from top to bottom. If we knew the number of particles of powder and the number of molecules of alcohol in their respective columns, by multiplying the numbers together the product would represent the individual contacts between particles and molecules. As before remarked we cannot calculate the number of molecules in a given bulk, therefore we will simply call the inch of alcohol and the inch of powder one, and thus by multiplying one by one we have the product one, which we will take as unity. If the powder be 2 inches in depth and the alcohol be 1, or if the alcohol be 2 inches in depth and the powder 1, the contact will be twice as great (2 × 1 = 2), and may be represented by two. If both are 2 inches in depth, the contact will be (2 × 2 = 4) twice as great as the last, or four times that of the first, and may be represented by four, and so on. Let us now take a percolator, and apply the foregoing law of increase of contact. For the sake of obtaining even numbers we will consider a square prism instead of a cylinder, as the principle applies alike to either, although in practice cylindrical percolators are employed.

The area of the base of a square prism 16 inches in diameter is 16 × 16 or 256 square inches. If a powder properly moistened for percolation be placed in it to the depth of 1 inch, above which rests an inch of alcohol, there will be 256 cubic inches of each layer, and yet being taken as unity when the alcohol has passed through the powder the contact will be 1 × 1 = 1, and thus the contact may only be represented by one. If a square prism 8 inches in diameter be considered, the area of the base will be 64 square inches. If filled with powder to the depth of 1 inch, over which rests an inch in depth of alcohol, each layer will contain 64 cubic inches of material, or one-fourth the amount required to fill the 16-inch percolator 1 inch in depth. The 8-inch percolator would therefore have to contain 4 inches in depth of each alcohol and powder before the amount (256 cubic inches) could be reached. Thus the contact will be 4 × 4 = 16.

A prism 4 inches in diameter must be filled 16 inches in depth with both alcohol and powder to contain 256 cubic inches of each material. The contact will consequently be 16 × 16 = 256. Thus continuing our calculations, we have the following table which expresses the contact between material and liquid, in each instance the percolator below being one-half the diameter of that above:—

Percolator 16 inches in diameter, alcohol and powder each 1 inch deep, contact, 1.

Percolator 8 inches in diameter, alcohol and powder each 4 inches deep, contact, 16.

Percolator 4 inches in diameter, alcohol and powder each 16 inches deep, contact, 256.

Percolator 2 inches in diameter, alcohol and powder each 64 inches deep, contact, 4096.

Percolator 1 inch in diameter, alcohol and powder each 256 inches deep, contact, 65,536.

It will be seen that with the percolator 1 inch in diameter there will be 65,536 times as much contact between alcohol and powder, inch for inch, as in the 16-inch percolator. Thus we find that whereas the height of both liquid and powder increases inversely as the square of the diameter of the percolator, the contact between liquid and powder increases inversely as the fourth power of the diameter of the percolator.

As we follow a line of experiments, the solution or partial solution of one problem brings us face to face with others. Thus we are led onward, and the more thorough our study of the present, the more important we find it to carefully note the future. The utmost caution is necessary in studying nature's laws, lest from insufficient data we hastily generalize. The foregoing argument regarding the laws of contact is undoubtedly as accurate, from a theoretical view, as those of the mathematical increase and decrease of the capacity of the percolator. In practice, however, the advantage derived from increased contact of height between liquid and powder, is not by any means as great as the foregoing calculations indicate, and as our tables have shown. Counteracting agencies overcome to a very great extent the theoretical advantages contact should afford. Some of these influences we have been led to consider, others have yet to be mentioned. Let us not forget that every effect has a cause, that variations in the result of percolations are due to the working of natural laws.

We shall now consider the material to be exhausted, of which the United States Pharmacopœia speaks as follows:—

"As different degrees of fineness are necessary in powders, according to their nature and mode of treatment, the special degree required is designated in the several formulas. For this purpose the terms very fine, fine, moderately fine, moderately coarse and coarse are used; the powder passed through a sieve of eighty or more meshes to the linear inch, being designated as very fine; through one of sixty meshes, fine; through one of fifty meshes, moderately fine; through one of forty meshes, moderately coarse; and through one of twenty meshes, coarse."

Seven articles, coarsely ground, moistened, and packed in two different sized percolators, during the month of January, and allowed to macerate forty-eight hours, then drawn in stream size of pin until liquid ceased to pass. Temperature averaged 38° F.

TABLE 1.

		Percolate.	Menstruum.	Height of material.	Amnt. used to moisten material.	Menstruum added.	Amount of percolate obtained.		Absorbed by the material and lost by evaporation.		Dry extractive matter contained in 1 c.c.	Amount of extractive matter contained in 1 fl. oz.	Amount of extrective matter contained in 16 fl. oz.
Coarse Ground.	lb.	No.		In.	Pts.	Pts.	Pts.	fl. oz.	Pts.	fl. oz.	Gr.	Gr.	Gr.
Mayapple root . . .	12	10	Alcohol.	10	3	12	11	8	3	8	·41	12·095	193·52
Leptandra	12	9	Alcohol.	13½	3	12	9	14	5	2	1·00	29·5	472·16
Hydrastis	8	8	Alcohol.	12½	2	12	9	11	4	5	·41	12 095	193·52
Hamamelis leaves . .	5	7	Alcohol 3. Water 2.	16½	4	19	14	13	8	3	1'22	35·99	575·84
Mayapple root . . .	5	3	Alcohol 3. Water 2.	23½	1	9	5	14	4	2	1·75	51·625	826·00
Hydrastis	5	4	Alcohol 3. Water 2.	21	2	8	5	8	4	8	1·84	54·28	868·48
Aletris	4	5	Alcohol.	18½	2	8	6	9	3	7	·70	20·65	330·40

Like amounts of material were at the same time, from the same source, nicely wrapped and placed in a dry situation until August, then percolated, each article being worked in the percolator used in January for the corresponding part. The same amount of menstruum was used for moistening each individual article, and in every way precautions were taken to render the two lines of experiments as nearly as possible alike. The result is tabulated under:—

TABLE 2.

	Amount of dry extractive matter contained in 1 c.c. of tincture, obtained from the reserved part of materials percolated in August.	Amount of dry extractive matter contained in 1 fl. oz. of tincture, obtained from the reserved part of materials percolated in August.	Amount of dry extractive matter contained in 16 fl. oz. of tincture, obtained from the reserved part of materials percolated in August.
Coarse Ground.	Gr.	Gr.	Gr.
Mayapple root . . .	·87	25·665	410·64
Leptandra	1·94	57·23	915·68
Hydrastis	·84	24·78	396·48
Hamamelis leaves . .	1·24	36·58	585·28
Mayapple root . . .	2·11	62·245	995·92
Hydrastis	2·63	77·585	1241·36
Aletris	·94	27·73	443·68

TABLE 3.

Eight glass tubes, ½ inch diameter, and 10 inches long, were carefully sunk into alcohol until a little more than half filled, then the lower orifice was corked. A plug of cotton was now thrust from the top until an inch below the alcohol. Different powders were then poured into the tubes until even with the surface of the alcohol. Each powder was then covered with a plug of cotton, the tubes filled with alcohol, corked, and placed in a quiet position. In six months the liquids below and above were identical in appearance. In every case the lower liquid was first coloured. Experiments with larger amounts were much more striking.

Aconite.—Yellowish stratum appears at bottom of tube in two and a half hours. Entire lower liquid yellowish in twenty hours. Upper transparent.

Helonias dioica.—Lower liquid tinged in twenty hours, increasing to yellow in thirty-four days. Upper transparent.

Blue Flag.—Lower liquid yellow in thirty hours, increasing to dark yellow in thirty-two days. Upper transparent.

Tamarac Cones.—Lower liquid reddish in four hours, blood-red in twenty hours. Upper slightly pink in thirty days.

Mayapple.—Lower liquid yellow in twenty hours. Upper slightly tinged in thirty-four days.

Bloodroot.—Lower liquid tinged in four and a half hours at bottom, reddish-yellow throughout in twenty hours, increasing in colour for thirty-two days, when it is a dark yellowish-red, and upper liquid is yellowish.

Black Cohosh.—Lower liquid yellowish in twenty hours. Upper transparent.

Lobelia Herb.—Lower liquid contains greenish-yellow stratum at bottom in two hours; greenish-yellow throughout in twenty hours. Upper liquid slightly tinged in forty hours. Lower liquid brownish-yellow in thirty-four days. Upper yellowish.

TABLE 4.

No. of maceration.	Fl. oz. of liquid obtained by each maceration.	The part of the entire extractive matter contained in the powder, obtained by each maceration.	The part of the entire extractive matter of the powder contained in each fl. oz. of the liquid.	Total fl. oz. of liquid obtained.	Total part obtained of the entire extractive matter contained in the powder.	The part of the entire extractive matter of the powder contained in each fl. oz. of the entire liquid.	Decrease of extractive matter in each fl. oz. of the liquid, occasioned by the addition of the liquid obtained by the last maceration.	The part of the entire extractive matter remaining after each maceration.
1st	3	·75	·25	3	·75	·25		·25
2nd	4	·20	·05	7	·95	·1357	·1143	·05
3rd	4	·04	·01	11	·99	·09	·0457	·01
4th	4	·008	·002	15	·998	·06653	·02347	·002
5th	4	·0016	·0005	19	·9996	·05261	·01392	·0005
6th	4	·00032	·00008	23	·99992	·04347	·00914	·00008
7th	4	·00006	·00002	27	·99998	·03703	·00644	·00002

TABLE 5.

No. of macerations.	Fl. oz. of liquid obtained by each maceration.	The part of the entire extractive matter contained in the powder obtained by each maceration.	The part of the entire extractive matter of the powder contained in each fl. oz. of the liquid.	Total fl oz. of liquid obtained.	Total part obtained of the entire extractive matter contained in the powder.	The part of the entire extractive matter of the powder contained in each fl. oz. of the entire liquid.	Decrease of the extractive matter, in each fl. oz. of the liquid, occasioned by the addition of the liquid obtained by the last maceration.	The part of the entire extractive matter remaining after each maceration.
1st	3	·6	·2	3	·6	·2		·4
2nd	4	·26666	·06666	7	·86666	·12381	·07619	·13333
3rd	4	·08889	·02222	11	·95555	·08686	·02695	·04444
4th	4	·02963	·00741	15	·98518	·06568	·02118	·01482
5th	4	·00988	·00247	19	·99506	·05237	·01331	·00494
6th	4	·00329	·00082	23	·99835	·04341	·00896	·00165
7th	4	·0011	·00028	27	·99945	·03702	·00639	·00055

Each experiment consisted of 24 troy ounces of granulated sugar, packed with like pressure into cylindrical percolators. Height occupied by experiment No. 7, 5 inches. Height occupied by experiment No. 6, 1 inch. Menstruum, diluted alcohol. Rapidity of percolation uniform with both experiments, both being conducted simultaneously.

TABLE 6.

Percolate.	Grains of sugar obtained from 1 c.c. of percolate.	Grains of sugar contained in each percolate of 8 fl. oz.
1st	8·87	2093·32
2nd	8·74	2062·64
3rd	8·67	2046·12
4th	5·99	1413·64
5th	3·58	844·88
6th	·04	9·44

TABLE 7.

Percolate.	Grains of sugar obtained from 1 c.c. of percolate.	Grains of sugar contained in each percolate of 8 fl. oz.
1st	5·38	1269·68
2nd	4·48	1077·28
3rd	3·31	781·16
4th	2·46	580·56
5th	1·93	455·48
6th	1·73	403·56

Each experiment consisted of 16 troy ounces of powdered (dusted) *Leptandra Virginica*, moistened with alcohol, and packed in different sized cylindrical percolators with like pressure, the percolation being afterward conducted with the same menstruum. Height of powder experiment No. 8 was 5¼ inches. Height of powder experiment No. 9 was 1¼ inch. The percolations were conducted simultaneously. Percolates were passed as nearly as possible with uniform rapidity, and every precaution was taken to secure identical conditions of both.

TABLE 8.

Percolates.	Grains of dry extractive matter obtained from 1 c.c. of percolate.	Grains of dry extractive matter contained in each percolate of 2 fl. ozs.
1st	3·92	231·28
2nd	3·20	198·80
3rd	2·37	139·83
4th	1·80	106·20
5th	1·29	76·11
6th	·93	44·87
7th	·63	37·17
8th	·40	23·60
9th	·34	20·06
10th	·25	14·75
11th	·25	14·75
12th	·23	13·57

TABLE 9.

Percolates.	Grains of dry extractive matter obtained from 1 c.c. of percolate.	Grains of dry extractive matter contained in each percolate of 2 fl. ozs.
1st	2·18	128·62
2nd	2·04	120·36
3rd	1·76	103·84
4th	1·49	87·91
5th	1·20	70·80
6th	·98	57·82
7th	·94	55·46
8th	·72	42·48
9th	·61	35·99
10th	·40	23·60
11th	·47	27·73
12th	·43	25·37

Each experiment consisted of 8 troy ounces of *Alstonia constricta* in fine (dusted) powder, moistened with alcohol, and packed in different sized cylindrical percolators with like pressure, the percolation being afterward conducted with alcohol. Height of powder of experiment No. 10 was 5 inches. Height of powder of experiment No. 11 was 1¼ inch. The experiments were conducted simultaneously. Percolates were passed with uniform rapidity as nearly as possible.

TABLE 10.

Percolates.	Grains of dry extractive matter obtained from 1 c.c. of percolate.	Grains of dry extractive matter contained in each percolate of 2 fl. ozs.
1st	1·76	103 84
2nd	·93	54·87
3rd	·49	28·91
4th	·24	14·16
5th	·22	12·98
6th	·14	8·26
7th	·16	9·44
8th	·13	7·67
9th	·16	9·44
10th	·12	7·08
11th	·13	7·67
12th	·12	7·08
13th	·10	5·90
14th	·10	5·90
15th	·07	4·13
16th	·11	6·49

TABLE 11.

Percolates.	Grains of dry extractive matter obtained from 1 c.c. of percolate.	Grains of dry extractive matter contained in each percolate of 2 fl. ozs.
1st	·73	43·07
2nd	·68	40·12
3rd	·47	27·73
4th	·36	21·24
5th	·28	16·52
6th	·24	14·16
7th	·17	10·03
8th	·15	8·85
9th	·16	9·44
10th	·17	10·03
11th	·13	7·67
12th	·14	8·26
13th	·12	7·08
14th	·09	5·31
15th	·11	6·49
16th	·11	6·49

Each experiment consisted of 16 troy ounces of chloride of sodium, in coarse powder, packed with like pressure, in different sized cylindrical percolators. No. 12 occupied three and a half inches in height. No. 13 occupied seven-eighths of an inch in height. Water was the menstruum. The percolates were reserved in fractions of 8 fluid ounces. The experiments were conducted simultaneously, and every precaution taken to secure uniformity, but the percolates were permitted to pass naturally and freely.

TABLE 12.

Percolates.	Grains of salt obtained from 1 c.c. of percolate.	Grains of salt contained in each percolate of 8 fl. ozs.
1st	4·89	1154·04
2nd	4·91	1158·76
3rd	4·97	1172·92
4th	4·43	1045·48
5th	3·05	719·80

TABLE 13.

Percolates.	Grains of salt obtained from 1 c.c. of percolate.	Grains of salt contained in each percolate of 8 fl. ozs.
1st	4·89	1154·04
2nd	4·90	1156·40
3rd	4·91	1158·76
4th	4·00	944·00
5th	2 76	651·36

TABLE 14.

8 troy ounces of coarse-ground ergot. Height of powder, 4¼ inches. Menstruum: alcohol, 1; water, 3.	1 c.c. contains dry extractive matter.	Total percolate contains dry extractive matter.
1st percolate, 1 fl. oz. . .	4·76	140·42
2nd " " " . .	3·59	105·905
3rd " " " . .	2·91	85·845
4th " " " . .	2·26	66·67
5th " " " . .	1·76	51·92
6th " " " . .	1·47	43·365

TABLE 15.

16 troy ounces of coarse-ground ergot. Height of powder 1¾ inches. Menstruum: alcohol, 1; water, 4.	1 c.c. contains dry extractive matter.	Total percolate contains dry extractive matter.
1st percolate, 1 fl. oz. . .	2·85	84·075
2nd " " " . .	2·76	81·42
3rd " " " . .	2·66	77·97
4th " " " . .	2·64	77·88
5th " " " . .	2·59	76·405
6th " " " . .	1·58	46·61

The Pharmaceutical Journal.

SATURDAY, SEPTEMBER 11, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE FUTURE OF THE DRUG TRADE.

MUCH of the correspondence that reaches us in reference to the present condition and future prospects of the drug trade furnishes evidence of the precarious and unsatisfactory state of affairs that prevails at the present time, and various as are the suggestions offered with the object of effecting some improvement, we cannot say that any one has yet come under our notice which can be trusted to as promising immediate relief from the evils which chemists and druggists have to contend with. In fact the very diversity of opinion on this subject is in itself a reason by no means inconsiderable for apprehending that the prospect of amelioration is somewhat remote.

As regards the competition which is now brought to bear upon chemists and druggists by co-operative stores, grocers and others who have entered upon the trade in articles which were formerly sold only by chemists and druggists, it must be acknowledged that this is, on the whole, perhaps the most serious disadvantage to which they are exposed. In so many instances the trade in patent medicines and other kinds of proprietary articles constitutes so large a part of the business of a chemist and druggist, that when he is called upon to face competition in this trade upon terms that are inconsistent with the nature of his business the prospect presented to him is necessarily most discouraging. Whatever alternative he adopts there is but little reason for expecting a satisfactory result. That he can consistently, with due regard to his obligations and responsibility to the public, and with proper consideration for the legitimate dignity of his calling, carry on business upon the principle of small profits and quick returns is, in our opinion, utterly impossible. Whether or not the consumption of quack medicines can be promoted by selling them on this principle is, for our present purpose, not a question worth considering, inasmuch as that is outside the scope of legitimate pharmaceutical business, in the conduct of which it would be unreasonable to suppose increased consumption of medicine would be a result of the reduction of its cost, as might be the case with any ordinary commodity of daily use. The grocer who sells patent medicines very nearly at cost price does not trust to this trade for his living: it is only an accessory that can be carried on without involving much, if any, addition to his general expenses, and if it only gives him an infinitesimal profit in return for such slight trouble as it entails, he at least secures by it the advantage of attracting custom for his other goods, which is of much more importance to him. This is the true explanation of the fact that some proprietary articles are sold retail by grocers and at the stores at prices even below the advertised wholesale prices. In one instance that lately came under our notice, such an article in great demand was being sold retail at five shillings, although the wholesale dealer's price for it was six shillings.

We are therefore thoroughly in accord with those of our correspondents who deprecate a reduction of prices so as to compete with the stores. Among others, Mr. CHAPMAN put this view very sensibly in the Journal of the 21st ult. No doubt the recent decision in favour of co-operative trading has inclined some chemists and druggists to make greater efforts to compete by reducing their prices. We quite agree with Mr. CHAPMAN in thinking this to be inadvisable for, of course, a half measure would have no effect in bringing trade to the chemist and druggist, people would still go to the cheaper market, and a reduction of prices to the level of the stores or the pushing grocer could only give the chemist and druggist trade without its corresponding advantage. Mr. CHAPMAN illustrates the impracticability of competition by various examples, the force of which will be apparent to every one who has to do with trade in the articles mentioned.

But what is the natural result to be foreseen from adopting the alternative course, recommended by Mr. CHAPMAN, of refusing to compete with the low priced sellers? Naturally the loss of the trade in the articles referred to, and that undoubtedly means ruin for many of those engaged in the drug trade as it is now generally carried on. This is the rut into which the wheel of the chemist and druggist's waggon has sunk and stuck fast. But while deploring his condition, we confess we cannot sympathize with the cry that he addresses to the Council of the Pharmaceutical Society to obtain for him protection in the sale of patent medicines and proprietary articles. We doubt whether protective measures, even if there were any chance of their being obtainable, would do much good, and we would rather advise recourse to the old medical principle of endeavouring to remove the cause of the disastrous influences which now press so hardly upon chemists and druggists as to imperil, in many cases, their very existence.

With such an object, let us consider what are the circumstances that have brought about the present state of affairs. In the first place it must be remembered that while the business of the chemist and druggist has developed into a distinct form, it has never yet been possible to secure such a thorough transfer of dispensing from the hands of medical men to chemists and druggists as would admit of their business being generally kept within its legitimate bounds. The necessity of the chemist and druggist as a means of conveniently supplying the wants of the public has operated largely as an inducement to enter upon his business while, at the same time, the idea of its being less laborious, more profitable and generally of a higher character than other kinds of retail trade has probably had a strong influence in the same direction. Chemists and druggists having thus become too numerous in proportion to the demands upon them for carrying out strictly pharmaceutical business have gradually taken up other branches of trade. In this way there was added on to the business of pharmacy properly so called a kind of spurious business that might have been carried on by a grocer's boy as well as by the most accomplished pharmacist, and as the worst feature of this course chemists and druggists have been the chief agents in the introduction of patent medicines, etc., to the public notice. But now that the profitable result of this trade is being torn from them by the competition of stores and grocery shops there seems to be strong reason for seeking protection to their interests by a closer adherence to legitimate pharmaceutical business and by a jealous determination to limit, in the most rigorous manner, the admission to the right of carrying on that kind of business, which differs so entirely from all other branches of trade as to demand in the public interest proof of competent skill and experience on the part of those allowed to carry it on.

It is by such protection alone that we have any hope to see the true interests of pharmacy conserved in this country and it is only by such means that we think it possible to attain the result pointed to by Lord Justice Bramwell when he observed that the days of protection being past the only interests worth consideration were those which could protect themselves. If on this higher platform chemists and druggists resolve to abandon the idea of underselling as a policy at once short-sighted, erroneous and derogatory, and to adhere to a more dignified and consistent course of securing business in virtue of their superior qualification and by the exercise of attention, civility, neatness and dispatch, while maintaining from their customers a just appreciation of their technical knowledge and responsibility, more may, we believe, be done for the drug trade than can be expected by making demands upon Parliament for legislation inconsistent with all the tendencies of the age.

Of course we do not overlook the fact that the adoption of such a course involves great difficulties, and many great hardships, but when it is considered what mischief has been brought about by reliance upon the patent medicine trade as a main feature of the chemists and druggists' business, and how thoroughly it has been the means of upsetting the efforts of local associations to ensure harmony and mutual co-operation for the advancement of pharmacy; when it is remembered that so much of the present distress is due to the cultivation of this spurious trade, we think that many will deem it wiser even to risk the loss of this trade than reduce themselves to the level upon which it must obviously be carried on for the most part in future.

PROPOSED ADULTERATION BILL FOR THE UNITED STATES.

Her Majesty's Secretary of Legation at Washington, U.S., reports that considerable attention is being just now paid to the subject of adulteration, and that an attempt is being made to secure the passage of a Bill by Congress to "regulate commerce between "the States and to protect the citizens of each State "against the frauds and abuses of an untrammelled "interchange of manufactures and commodities." From some of the reports that have been drawn up, it would appear that if wooden nutmegs are played out the genus is still fairly represented across the Atlantic. One report states that six packages of coffee berries, purchased in Baltimore, being tested by simply washing them to remove the dressing, lost weight respectively 68, 64, 63, 58, 19 and 8 per cent. The washings being evaporated gave residues containing in each case chromate of lead, phosphate of lime (from bone black) and sulphate of barium. In another report inferior molasses is said to be mixed gallon for gallon with the liquid glucose now used largely for flavouring syrups, whilst glucose in the solid form is in its turn freely mixed with low class sugars to lighten their colour. The draft Bill put forward to remedy the evil appears to be a very crude production, and in providing sweeping penalties upon undefined adulteration promises a crop of troubles similar to those borne by early legislation on this subject in our own country.

UTILIZATION OF WASTE.

A notable instance of the utilization of waste is to be found in the smelting works of the Greek Laurium Company at Ergasteria, where the material operated upon for several years past has been the slag (*scoriæ*) of the ancient lead mines of Laurium. This slag, however, is now nearly exhausted, and the company is now operating chiefly upon the *ekbolades* or rejected materials of the ancient mines. These still exist in enormous quantities and although the yield of lead from them is considerably smaller, twenty tons daily instead of thirty, the yield of silver is larger. It is computed that the materials rejected by the old miners contain in their natural state 5 to 6 per cent. of lead and 1250 grams of silver per ton, whilst the slag yielded only about 700 grams of silver to each ton of lead produced. Upwards of three thousand hands are employed in this utilization of the waste of former generations, and amongst the staff are to be found a medical man and a pharmacist.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 186.)

The reading of papers was then proceeded with.

The first paper read was a—

REPORT ON THE ACONITE ALKALOIDS.

BY C. R. ALDER WRIGHT, D.SC. (LOND.),

Lecturer on Chemistry, in St. Mary's Hospital Medical School,

AND E. H. RENNIE, M.A. (SYDNEY), D.SC. (LOND.),

Demonstrator of Chemistry, in St. Mary's Hospital Medical School.

The alkaloids contained in 300 lbs. of fresh aconite herb (*A. Napellus*), grown at Foxton, in Cambridgeshire, were isolated by the methods described in last year's report, viz., crushing, maceration in alcohol, expression of extract, evaporation to a smaller bulk, and treatment of the liquid (weighing about 59 lbs.) with soda, and repeatedly shaking with ether. A quantity of alkaloidal matter was thus readily dissolved out, a small portion remaining permanently dissolved in the alkaline fluid, in a form difficultly soluble in ether; the alkaloidal matter thus retained yielded nothing crystalline on precipitation with mercuro-iodide of potassium, and treatment with sulphuretted hydrogen, and appeared to be all but destitute of the characteristic physiological action of aconite, producing little or no tingling of the lips, when applied thereto; it greatly resembled the corresponding substance similarly obtained from the extracts derived from the various kinds of aconite roots examined in previous reports, consisting of a mixture of amorphous bases of lower molecular weight than aconitine, some of which differ therefrom markedly in being readily soluble in caustic and carbonated alkalies, and in being only imperfectly removed from such solutions by ether.

The alkaloidal substances dissolved out by the ether treatment, being mixed with a large quantity of greenish soft resin, were separated therefrom by agitation with tartaric acid solution and separation of the tartrate solution thus formed; on treating this with sodium carbonate and ether, about 15 grams of alkaloids were finally obtained by the spontaneous evaporation of the ethereal solution. No artifice employed was successful in making this product either crystallize or yield crystallized salts of any kind; it appeared, however, to contain a notable amount of aconitine, producing an energetic action on the lips when cautiously applied thereto, though it was by no means so powerfully active as pure aconitine. On combustion it yielded the following numbers indicating, as did also its physical properties, that it was substantially the same mixture of alkaloids as that occurring in *A. Napellus* roots, only differing therefrom in containing a smaller percentage of aconitine, the quantity of uncrystallizable bases being relatively much larger.*

(1). ·2845 gram of substance dried at 110° gave ·6735 CO_2 and ·217 H_2O.

·459 gram of substance burnt with soda lime gave ·01222 N.

A portion of the substance was dissolved in dilute hydrochloric acid, and the solution precipitated by slow addition to a dilute solution of sodium carbonate; the flakes thrown down after collection and washing, gave these numbers :—

(2). ·290 gram gave ·694 CO_2 and ·195 H_2O.

·387 gram gave ·00993 N.

	(1)	(2)
Carbon	64·56	65·26
Hydrogen	8·47	7·47
Nitrogen	2·66	2·57

The sodium carbonate solution contained about a gram of a soft alkaloid readily soluble in alkalies and for the most part soluble in water, and but sparingly soluble in ether, doubtless therefore consisting largely of aconine, either produced by the saponification of aconitine during the process of working out the bases present in the herb, or else originally present therein.

The above numbers and general results are practically identical with those obtained from the mixture of aconitine and uncrystallizable alkaloids accumulating in the mother liquors from which the aconitine from *A. Napellus* root (described in report 1877, p. 461), had separated by crystallization, two samples of them giving the following numbers.

Carbon	65·80	65·46
Hydrogen	7·78	7·58
Nitrogen	2·71	3·05
Benzoic acid formed by saponification	14·4	14·1

On boiling up the mixture of alkaloids (1) above, benzoic acid was formed to a somewhat greater extent than with these two samples; 2·227 grams gave of purified acid, by titration ·3904 grams, by direct weighing (including a minute amount of resinous matter), ·397 gram.

By titration 17·5. By weighing 17·8

The benzoic acid produced melted at 120°; it gave no trace of coloration with ferric chloride after fusion with caustic potash at 250°, acidulation, and treatment with ether; whence evidently no veratric (dimethylprotocatechuic) acid was present, and therefore no pseudaconitine was contained in the herb employed.

Hence it results that the quantity of active alkaloid contained in the aconite herb is probably somewhat less than that contained in the roots, reckoned on the dry substance; for a quantity of roots was found (Report 1876, p. 539), to contain about ·07 per cent of total bases, of which aconitine constituted so large a proportion that about two-fifths of the total alkaloid was obtained as pure crystallized aconitine. Admitting the 300 lbs. (or about 135 kilos) of fresh herb to represent one-fifth of that amount of substance in the same state of dryness as the roots (an estimate probably in excess of the truth), the total yield of alkaloids readily soluble in ether being about 15 grams, this would represent about ·05 per cent. of total alkaloids contained in the dry herb; the percentage of aconitine in this amount of total alkaloids being much less than that in the root alkaloids, so that the relatively large amount of non-crystalline bases wholly prevented crystallization.

It can, however, hardly be concluded from these two cases that it is a general rule that aconite roots are richer in crystallizable aconitine than the dry herb; for we are informed by Mr. John Williams that it has sometimes happened in his factory that no crystallizable aconitine at all but only non-crystalline bases could be isolated from batches of roots worked up on the manufacturing scale in precisely the same way as other batches which readily yielded crystals; whence it would seem that the roots occasionally are either poorer in aconitine or richer in non-crystalline bases than those described in the Report for 1876; and it is therefore much to be desired that further experiments should be made as to the quantity of crystallized aconitine that can practically be isolated on the manufacturing scale from roots of various ages and grown in different soils and climates, etc. Such experiments as these, like the analogous questions as to what precise method of manipulating and what menstrua will best suffice on the large scale to separate aconitine economically from the non-crystalline alkaloids accompanying it, cannot readily be carried out by the scientific chemist working in his laboratory on a comparatively small scale; but they are indispensable in order to put the economical production of crystallized aconitine on a sound commercial footing.

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* It would seem to be highly probable that the presence in excess of non-crystalline bases, preventing crystallization of what aconitine is present, is the main cause of the difficulty which we understand is sometimes experienced in isolating the crystallizable alkaloid from *A. Napellus* roots in the process of manufacture on the large scale.

At the present moment the pharmaceutical aspect of the production of aconitine is as follows. Prior to the last eight or ten years the term "aconitine," was applied to an amorphous alkaloidal substance extracted by processes investigated by Von Planta, Geiger and Hesse, and other chemists from *A. Napellus*, and probably mixtures of that and other species. During the last decade the experiments of T. B. Groves and Duquesnel, together with those carried out by the aid of the Pharmaceutical Conference grants by Alder Wright and collaborateurs, and described in the series of reports of which this is the concluding one, have demonstrated that the active alkaloid of *A. Napellus* (to which for some years the name "aconitine" has been restricted) is a definite crystallizable substance occurring naturally intermixed with larger or smaller quantities of amorphous bases of much less highly active characters, and is readily split up by various chemical reagents into benzoic acid and a base (aconine), comparatively speaking inert: the want of uniformity in physiological action of the product obtained by processes such as those employed by the older chemists being due partly to the presence of variable quantities of the natural amorphous alkaloids co-existing with aconitine, and partly to the decomposition of a large portion of the aconitine originally present by the action of the particular chemicals and mode of treatment employed during the extraction operations. Further, the relationships of this aconitine to other analogous aconite alkaloids derived from other species (*e. g.* pseudaconitine from *A. ferox*), and to organic bodies generally have been attentively studied.

As a consequence of these experiments, a demand for pure crystallized aconitine has sprung up, more especially in America, the object being to replace the amorphous unreliable preparations generally met with in the market by the pure uniform alkaloid; but at the present moment this demand is to a great extent unsatisfied because, whilst the supply of *A. Napellus* of American growth is too limited to enable American drug manufacturers to prepare the pure alkaloid themselves, its manufacture in Europe has not yet been carried out to any considerable extent; from whence it results that whilst the Committee of the American Pharmaceutical Association on the Revision of the U. S. Pharmacopœia is desirous that the forthcoming new edition of that Pharmacopœia should exclude the amorphous preparations and should define aconitine solely as the crystallized uniform body $C_{33}H_{43}NO_{12}$, described in detail in former Reports to the Pharmaceutical Conference,* yet it appears at present somewhat doubtful whether it will be practicable for this desire to be carried out, simply because this pure article is not to be found in the market, at any rate to an extent at all comparable with the demand for it.

Professor **Attfield** said the Conference should not lose sight of the question raised by Dr. Wright as to the influence of age, climate and soil on the quantities of active matter present in the aconite; nor of the other question raised as to the best mode of commercially manufacturing the alkaloid. It might be a question whether the latter matter should be left now to commercial enterprise or whether the Conference should do any more in that direction. Experiments respecting the influence of soil and climate on plants required a great deal of time and a great deal of money; but as had been already intimated the Conference had money to spend on these very matters, and it seemed a pity that this question should be finally disposed of in this concluding report by Dr. Wright. At any rate, he hoped the matter would not be altogether lost sight of.

Mr. **Schacht** said he should like to lay stress on one observation made by Dr. Wright, viz., that the crystallizable principle in these solutions was rendered more difficult of crystallization by the presence of uncrystallizable matter. It occurred to him that that was somewhat opposed to one's usual experience in such mixtures, and he ventured to ask if it was one which other scientific chemists would be prepared to endorse. Dr. Wright was so shrewd and able a man that one would like to receive everything he suggested, even a scientific guess, with great respect, but it seemed a little outside his own experience at any rate.

Mr. **Umney**, though he had had no experience in this particular alkaloid, had found in the quinine manufacture, when the mother liquor contained a large quantity of crystallizable alkaloid, it was most difficult to crystallize it when the amorphous alkaloid was also present. He had no doubt there was the same difficulty in crystallizing sugar when there was a large quantity of treacle present. At any rate he could speak positively as to the cinchona alkaloid.

Mr. **Gerrard** said he could corroborate Mr. Umney's statement with regard to another alkaloid, pilocarpine, and also eserine. He had found great difficulty in crystallizing the eserine salts he had prepared in the presence of some amorphous or syrupy bodies. There seemed some amorphous bodies present generally in some plants, which when evaporated to a certain extent greatly retarded crystallization.

Mr. **Reynolds** said there was another view of the case and that was the possibility of a still more serious condition of things, the conversion of the crystallizable alkaloid into an uncrystallizable product. He thought this might be possible under some circumstances which had not been sufficiently studied.

Mr. **Schacht** said that was just the point he was urging the solution of.

Professor **Attfield** said the uncrystallizable matters, so called by Dr. Wright, were simply those which he had not yet succeeded in crystallizing. It might be, when better methods of separation were devised, much of this matter would turn out to be crystalline, and, being separated, not prevent, to the same extent as at present, the crystallization of the true aconitine. If it were necessary to give any further answer to the question raised by Mr. Schacht he might say that for several years he had a great deal of experience in the crystallization of matter from fluids obtained from herbs, and his almost constant experience was that syrupy fluids of that kind did yield crystals very easily, and which looked very beautiful, but they always turned out to be sulphate of lime; whereas the alkaloid and organic matter which he was in search of were considerably retarded in crystallization by the presence of uncrystallizable matter.

Mr. **Reynolds** remarked that old pupils of Dr. Pereira would no doubt remember one of his stock stories, that when Dr. Thomson's collection of alkaloids was examined the crystals unfortunately turned out to consist largely of sulphate of lime.

Mr. **Greenish** had observed that in a large number of roots of aconite a change had occurred which was probably due to the conversion of starch into a gummy body. This applied more to the *A. ferox*, which came from India, than to the *A. Napellus*, grown in Germany; he had found it occur in the latter, and it sometimes made the whole root so hard that in making sections it actually turned the edge of the knife. Whatever this hard substance was he could only recognize it as some gummy body; it might interfere very much with the crystallization of the alkaloid.

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* For an epitome of the characters (physical and chemical) of aconitine and other allied aconite alkaloids, *vide The Pharmaceutical Journal*, July 3, 1880, and following numbers, in which some points connected with the practical economical side of the question are discussed, the origin of these communications being an application to the subscriber by Dr. Charles Rice, Chairman of the Revision Committee of the U. S. Pharmacopœia, for a *précis* of the characters of aconitine and other information concerning it for the guidance of the Committee.—C. R. Alder Wright.

The **President** said a vote of thanks was due to Dr. Wright for his very able paper.

The next paper read was entitled—

NOTES ON THE ESSENTIAL OIL OF BUCHU LEAVES.

BY PROFESSOR FLÜCKIGER.

If thin layers of buchu oil are exposed to spontaneous evaporation, a crystallized substance makes its appearance. On submitting 35 kilograms of round buchu leaves to distillation (*Barosma betulina*), I obtained 180 grams of essential oil, *i.e.*, a little more than ½ per cent. From this the crystals can be extracted by means of caustic lye. The oil repeatedly shaken with an equal volume of soda lye, 1·14 sp. gr., forms a yellowish turbid mixture soon separating into two clear layers (A) and (B). The heavier (A) then displays a bright red colour; it should be washed several times with ether, in order to remove that portion of the oil which is simply dissolved in, not combined with the alkaline liquid. One volume of the washed portion (A) is then diluted with 4 volumes of alcohol sp. gr. 0·83 and neutralized with an acid, either sulphuric, acetic or carbonic, when an oily layer separates. In a couple of hours or sooner it concretes, and affords a crystallized mass of what we may call *diosphenol*, with allusion to Diosma, the original Linnean name bestowed on the buchu plants. The upper lighter layer (B), on being extracted repeatedly with warm water, further affords a small amount of diosphenol. The crude oil, as obtained from *Barosma betulina*, yielded nearly ⅕ of its weight of the phenol.

A mixture of one volume of alcohol 0·83 sp. gr., and five volumes of ether is a good solvent for recrystallizing the diosphenol; by gently warming the crude crystals with three times their weight of the mixture, they dissolve, and on cooling afford pure crystals.

The results of two elementary analyses of them were as follows:—

I. 0·2236 gram of diosphenol gave CO_2: 0·5752 gram = 0·1569 C and OH_2: 0·1910 gram = 0·0212 H.

II. 0·2236 gram of diosphenol gave CO_2: 0·5758 gram = 0·1570 C and OH_2: 0·1946 gram = 0·0216 H.

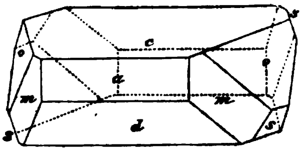
From these figures, the formula $C_{14}H_{22}O_3$ may be calculated, viz.:—

			Found. I.	II.
14 C	168	70·58	70·17 per cent.	70·21 per cent.
22 H	22	9·24	9·48 „	9·69 „
3 O	48	20·18	—	—
	238	100·00		

Diosphenol usually forms acicular crystals; by slow crystallization somewhat larger, well defined crystals were obtained, which were crystallographically examined in Professor Groth's laboratory by Dr. A. Cathrein. They will be fully described in Professor Groth's *Zeitschrift für Krystallographie*; in the meantime I am indebted to Dr. Cathrein for summarizing his observations as follows: Diosphenol belongs to the monosymmetrical (*monoclinic*) system. Ratio of axes:—

$$a : b : c. = 1·3017 : 1 : 1·5435$$
$$\beta = 81° 7'$$

Colourless prisms, elongated parallel to the axis *b*, generally tabulated parallel to *c* (see fig.). Faces observed: $c = (001)$, $d = (\bar{1}01)$, $a = (100)$, $o = (121)$, $m = (110)$, $s = (\bar{1}21)$.



$a : c = (100)\ (001)$ 81° 7′
$c : d = (001)\ (\bar{1}01)$ 55° 7
$m : a = (110)\ (100)$ 52° 8′
$m : c = (110)\ (001)$ 84° 33½′
$o : c = (121)\ (001)$ 70° 6′
$s : c = (\bar{1}21)\ (001)$ 75° 58′

Cleavage distinct, parallel to *a* (100).

The optical axes for red light in the plane of symmetry, for yellow the substance is uniaxe, for green the plane of the axes is normal to the plane of symmetry. Double refraction negative.

The crystals of diosphenol melt at 83° (181·4° F.) and boil at 233° (451·4° F.); I have, however, not been able to distil it in the usual way without a partial decomposition. By subliming diosphenol in the temperature of a steam-bath, thin prisms 2 inches long are easily to be obtained. It is readily soluble in alcohol 0·83 sp. gr., less so in ether, but very sparingly in water. The aqueous solution in boiling water on cooling affords small acicular crystals. The solutions are perfectly neutral, and on addition of an alcoholic solution of ferric chloride assume a dark coloration of dingy green. The crude oil as well as the water distilled from buchu leaves exhibit the same behaviour. Diosphenol has a slightly aromatic odour and taste, "*sui generis*," by no means reminding of buchu leaves. It is soluble in concentrated sulphuric acid, but without forming a crystallizable compound; on saturating the brown solution thus obtained with carbonate of baryum and duly concentrating the filtrate, I obtained only a small quantity of an uncrystallizable baryum salt.

By caustic lye, diosphenol is also readily dissolved, but it is not able to decompose the carbonates; by carbonic acid on the other hand, it is precipitated from its solution in potash, soda or hydroxide of baryum. In 50 parts of the latter ($Ba(OH)_2 + 8OH_2$ in 20 parts of water) diosphenol dissolves very slowly. By allowing such a solution to evaporate slowly over lumps of potash, no well-defined baryum compound of diosphenol could be obtained, crystals of the pure phenol even gradually making their appearance on the sides of the beaker. Nor have I succeeded in preparing a solid potassium or sodium compound.

These few experiments show that the substance under notice belongs to the class of phenols, although its action on sulphuric acid and the hydroxides of potassium, sodium and baryum, is less manifest than with many other substances of the phenol class.

As to the other constituents of buchu oil, the portion which had been exhausted with caustic lye was again shaken with the same, when it was entirely dissolved, but immediately separated on addition of much water. This oil, washed with water and dehydrated with powdered chloride of calcium, was distilled. Very little passed until 205° C. (401° F.) was reached. The main portion came over between 205° and 210° C., a small amount only was collected above the latter boiling point. All the various fractions of the oil assumed likewise a green coloration when mixed with aqueous or alcoholic perchloride of iron.

The oil boiling between 205° and 210° C. is remarkable on account of its odour, which agrees very nearly with that of peppermint; I know in fact of no other essential oil possessed of this aroma except peppermint. The oil under examination is devoid of rotatory power; submitted to elementary analysis, 0·1942 gram of it gave CO_2 : 0·5528 gram = 0·1508 C. and OH_2 : 0·2064 gram = 0·0229 H, that is to say C : 77·65 per cent., and H : 11·79 per cent. The formula $C_{10}H_{18}O$ requires 77·92 C. and 11·69 per cent. H. The main portion of the buchu oil, after the extraction of the phenol, is thus shown to consist of one of the numerous modifications of the molecule $C_{10}H_{18}O$, the presence of which is the more and more frequently ascertained among the constituents, both solid and liquid, of essential oils. From some experiments with the crude oil of buchu, instituted by Dr. Power, it would appear the compound $C_{10}H_{18}O$ is contained in the oil in the form of a compound ether.

In concluding, I may say, that I have not found in the buchu oil salicylic acid, which has been announced by Wayne (*American Journal of Pharmacy*, 1876, 19); also 'Year-Book of Pharmacy,' 1876, 229), to be yielded by the oil. It remains, however, to be examined, whether this holds good for other varieties of buchu leaves than that examined by myself.

The **President** said the thanks of the Conference were due to Professor Flückiger for his able paper on a rather abstruse subject.

Professor **Attfield** said the interest of this subject lay in the fact that this substance was very much like carbolic acid; though the author did not seem to have succeeded in uniting it with alkalies. But he noticed that Professor Flückiger had used solutions in alkalies, and it was not very easy to get perfectly definite compounds which would stand evaporation by putting carbolic acid into alkaline solutions; but if carbolic acid were mixed with the solid alkali fusion was effected and it was quite possible that if this phenol were mixed with its equivalent proportion of solid alkali a compound must be produced. Perhaps Dr. Power could say whether the compound which yielded the colour was a solid body.

Dr. **Power** said the colour depended entirely on the phenol. It did not give the colouring action with chloride of lime. There would be a little of the crystalline principle in the oil.

The next paper read was entitled—

Notes on the Constituents of Peppermint Oil.

BY PROFESSOR FLUCKIGER AND DR. F. B. POWER.

The oil of peppermint is one of the few essential oils which are produced on a very large scale. According to the statistics contained in 'Pharmacographia,' oil of turpentine, oil of lemon and of bergamot, grass oil, and oil of caraway, would appear to be the only ones which are sent to the market in much more considerable quantities than peppermint oil. Oil of cassia in this respect approaches apparently more nearly to the last named.

Peppermint oil owes its value to the solid compound termed menthol, $C_{10}H_{19}OH$. This substance, the alcoholic nature of which was first demonstrated by Oppenheim* by the formation of several compound ethers, has been shown by Beckett and Alder Wright† to be connected both with the paraffin series and the benzene series, inasmuch as by the action of dehydrating agents it is easily converted into menthene, $C_{10}H_{18}$, which, by the action of bromine, combines to form tetrabromdecane, and the latter compound, by heating, being readily split into hydrobromic acid and cymene, or, as expressed by the equation—

$$C_{10}H_{18}Br_4 = 4HBr + C_{10}H_{14}.$$

The hydrocarbon menthene therefore occupies an intermediate position between the decane of the paraffin series, $C_{10}H_{22}$, and the cymene of the "aromatic" series, $C_{10}H_{14}$.

With the exception of menthol, no other constituent of peppermint oil has as yet been duly isolated; it seemed to us therefore of considerable interest to determine the chemical nature of the liquid constituents of the oil.

In the beginning we had the intention to submit the Japanese oil to examination, having been obligingly supplied with the fresh herb, as imported into London, by Mr. Thomas Christy, F.L.S., and on the other hand with peppermint oil, imported by Mr. Chantre, F.L.S., of London. The herb, upon being submitted to distillation, yielded immediately an abundance of menthol, accompanied by a small amount of liquid compounds. The oil, presented to us by Mr. Chantre, on the contrary, refused to crystallize, even when exposed for a month to a temperature of from about 15° C. —(+5° F.) to—20° C. (—4° F.) Upon submitting the oil to distillation, we found it to be largely adulterated with alcohol, after the removal of which the residual oil afforded a good yield of menthol. This unsatisfactory result prompted us to work on the Mitcham oil.

The oil employed for analysis was obtained from Messrs. Schimmel and Co., of Leipsic, and consisted of Mitcham oil, which they had deprived by repeated rectification as completely as possible of menthol.

According to information furnished us by Dr. Bertram, the superintending chemist of Schimmel's laboratory, the crude Mitcham oil yields 80—85 per cent. of a liquid product, sold by the firm as "extra strong oil," and consisting principally of menthol, together with about 10 per cent. of an oil which has remained as yet uninvestigated; the loss of 5—10 per cent. resulting from the separation of the constituents consisting of soft resinous matters. The oil from which the menthol had been separated was submitted by us to fractional distillation. The largest portion was found to distil at 165—175° C., a smaller fraction of somewhat viscid character being collected at 250—275° C. The first fraction, or that collected at 165—175° C., was then submitted to elementary analysis with the following result:—

0·1690 gram of substance gave 0·5348 gr. CO_2 = 0·1458 C., and 0·1868 gr. H_2O = 0·0207 H.

Calculated.					Found.	
$C_{10}H_{16}$.			$C_{10}H_{18}$.			
C_{10}	120	88·23	C	87·00	C	86·27
H_{16}	16	11·77	H	13·00	H	12·25
	136	100·00		100·00		98·52

This result would serve to prove that the body consisted essentially of a hydrocarbon, contaminated with a small amount of oxygenated substances. It was then purified by repeated distillation over metallic sodium, and was so divided into two fractions, boiling respectively at 165—170° C., and 173—176° C.; at the same time the peppermint odour of the original liquid having disappeared, and given place to that of freshly distilled oil of turpentine. The two fractions were then separately submitted to analysis with the following result:

I. Fraction 165—170° *C.*

9·2428 gram of substance gave 0·7844 gr. CO_2 = 0·2139 C., and 0·2624 gr. H_2O = 0·0291 H.

Calculated for $C_{10}H_{16}$.			Found.	
C_{10}	120	88·23	C	88·09
H_{16}	16	11·77	H	11·98
	136	100·00		100·07

The specific gravity of the liquid is 0·859 at 20° C.

Its rotation in sodium light in a tube of 100 mm. at 25° C., is 13° to the left.

II. Fraction 173—176° *C.*

0·1874 gram of substance gave 0·6032 gr. CO_2 = 0·1645 C., and 0·2004 gr. H_2O = 0·0223 H.

Calculated for $C_{10}H_{16}$.			Found.	
C_{10}	120	88·23	C	87·87
H_{16}	16	11·77	H	12·08
	136	100·00		99·95

The specific gravity of the liquid is 0·856 at 20° C.;

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* *Comptes Rendus*, liii., 329; *Jahresbericht der Chemie*, 1861, p. 683.

† 'Year-Book of Pharmacy,' 1875, p. 605.

its rotation, in sodium light, in a tube of 100 mm. at 25° C., is 24° 4′ to the left.

The two fractions, when treated with the nitric acid mixture, afforded after standing for some time no crystals of terpine, and upon saturation with dry hydrochloric acid gas, only liquid hydrochloric compounds were formed.

III. The small fraction collected at 250—275° C., afforded after repeated rectification over metallic sodium a colourless, limpid liquid, boiling at 255—260° C. It was analysed with the following results:—

0·1962 gram of substance gave 0·6312 gr. CO_2 = 0·1721 C., and 0·2132 gr. H_2O = 0·0237 H.

Calculated for $C_{10}H_{16}$.			Found.	
C_{10}	120	88·23	C	87·87
H_{16}	16	11·77	H	12·08
	136	100·00		99·95

The molecular formula of this fraction in view of its high boiling point is undoubtedly a multiple of the simple formula $C_{10}H_{16}$, and would be more correctly expressed by the formula $C_{15}H_{24}$, in accordance with the molecular formula of those terpenes having similar boiling points. Its specific gravity is 0·912 at 21° C.; its rotation in sodium light, in a tube of 100 mm., at 25° C., is 9° 2′ to the right.

The liquid portion of Mitcham peppermint oil is thus seen to consist simply of isomeric and polymeric terpenes, containing no menthene, as might be supposed from the dehydration of the menthol, and the absence of compound ethers in the oil is also herewith established.

According to Beckett and Wright,* the liquid portion of *Japanese* peppermint oil contains a small amount of a substance isomeric with borneol, an inference drawn from analytical numbers obtained from a fraction boiling at 210—215°, and which by treatment with zinc chloride yielded principally menthene.

That no body of the formula $C_{10}H_{18}O$ is present in the liquid portion of Mitcham peppermint oil is conclusively established by the analysis of the oil itself, previously freed as completely as possible from menthol, and before treatment with metallic sodium. As has been pointed out in 'Pharmacographia,' some specimens of peppermint oil are capable of yielding a small amount of a crystalline compound with alkaline bisulphites. This observation we have now confirmed with the crude Mitcham oil; the body in question appearing, however, to be principally contained in the so-called "extra strong oil," and has, therefore, probably a boiling point approximating closely to that of menthol. It is furthermore contained in the oil in such exceedingly small amounts that its isolation for the present must remain uneffected.

It would also seem possible that to this body the remarkable colour reaction and fluorescence is due, which is displayed by fresh peppermint oil, when allowed to remain a short time in contact with a few drops of nitric acid, sp. gr. 1·20, as the reaction is not displayed by the terpenes, nor by the menthol.† Peppermint oil by age gradually loses the faculty of assuming this coloration with nitric acid, which would also point to a substance easily undergoing chemical change. We have had as yet no opportunity of submitting the terpenes of peppermint oil to oxidation, which should form a subject for a special study, although it is probable that the lower boiling fractions would furnish the same products as turpentine oil, and terpenes having similar boiling points, viz.: acetic, terebinic, terpenylic and terephthalic acids, while menthol, according to the observations of Oppenheim,‡ is converted by oxydizing agents chiefly into what he calls "resinous bodies."

The **President** said the Conference was much indebted to Dr. Power for this paper, which had a considerable bearing on the question of the adulteration of these oils.

Dr. **Power** regretted that he was not able to present specimens of these products. It was a remarkable fact that the liquid portion of peppermint oil when entirely free from menthol had an odour entirely distinct from peppermint, but somewhat reminding one of lemon oil, though corresponding more nearly to that of freshly distilled turpentine oil.

Professor **Attfield** remarked that one paragraph in the paper illustrated very well the risks run by experimenters who depended on the commercial articles. The presence of the alcohol in one of the samples examined showed that when essential oils were to be examined, as matter of original research, they should be either carefully isolated by the experimenter himself or else obtained from a manufacturer who would guarantee their purity.

Mr. **Mason** said he believed the specimen referred to was manufactured on the continent. It was quite unusual for oil of peppermint to be adulterated with alcohol in this country.

Mr. **Greenish** thought the results showed that adulteration varied over a large number of specimens, and it was difficult to determine what could be relied upon unless the experimenter were present, and saw the oil made, or made it himself. It seemed as difficult to obtain pure peppermint oil as genuine port wine, which, it was said, could only be secured by going to Portugal and buying a cask, and sitting on it all the way home. In many of these experiments the results could not be relied upon, simply because the article was not genuine.

Dr. **Symes** thought some of the results obtained would be due to the presence of a resinous matter, and this would vary with the age of the oil. Probably some of the resinous matter would be produced in the distillation, and there would be some oxidation which would also vary in different samples. He should like to know if the experiments had been conducted with oil of a known age or with specimens of different ages, and whether the amount of resin was found to be constant in different samples.

Mr. **Umney** said the Mitcham oil of peppermint would always contain a large amount of this resinous principle, and its presence was owing to the crude way in which the essential oil was manufactured. If anyone visited the fields at Mitcham, Carshalton, or the neighbourhood, he would see the herb cut with a sickle and thrown bodily into a still, not heated by steam but by direct fire, and very often some portions got actually charred; thus the empyreumatic matter was driven over, and a large quantity of resinous matter would be present in the oil. He considered that no specimen of English manufacture could be considered pure unless it had been rectified the second time with water, and then a very small quantity of the resinous principle would be present.

Mr. **Reynolds** said it was quite necessary to go beyond the mere fact that an article was called "best," because unless there was something added to the superlative, the mere market name carried no guarantee of purity. He had just lit upon a quotation from Southey, in which he said that there was an ingenious tradesman who sold gloves, and whose worst gloves were distinctly known as "best." He had, however, four other kinds, which he called "better than best," "better than better than best," "best of all," and "the real best."

Dr. **Power**, in reply to Dr. Symes, said the oil used in these analyses was quite fresh, and had been redistilled by Messrs. Schimmel and Co.; there was very little resinous matter contained in the oil as sent for analysis, though according to the report of their own chemist it usually showed from 5 to 10 per cent. of resinous matter on rectification.

(*To be continued.*)

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* *Journ. of the Chem. Soc.*, 1876, p. 3.

† See 'Pharmacographia.'

‡ *Compt. Rend.*, lvii., p. 360.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Section A, *Mathematical and Physical Science*, met on Thursday, in the Argyle School, under the Presidency of Professor W. Grylls Adams, M.A., F.R.S., etc., who proceeded to deliver the following Address :—

On the Constitution of Bodies.

It has been said by a former President of this Section of the British Association that the President of a section ought to occupy your time, not by speaking of himself or his own feelings, but by a review "more or less extensive of those branches of science which form the proper business of his Section." He may give a rapid sketch of the progress of mathematical science during the year, or he may select some one special subject, or he may take a middle course, neither so extensive as the first nor so limited as the second.

There are many branches of science which have always been regarded as properly belonging to our Section, and the range is already wide; but it is becoming more and more true every day that the sciences which are dealt with in other sections of the Association are becoming branches of physics, *i.e.*, are yielding results of vast importance when the methods and established principles of physics are applied to them. It is not long since the theory of exchanges became thoroughly recognized in the domain of radiant heat, and yet it is already recognized and accepted in the theory of chemical combination. Just as the molecules of a body which remains at a constant temperature are continuously giving up their heat motion to surrounding molecules, and getting back from them as much motion of the same kind in return, so in a chemical compound which does not appear to be undergoing change, the combining molecules are continuously giving up their chemical or combining motions to surrounding molecules, and receiving again from them as much combining motion in return. We may say that each molecule is, as far as we can see, constantly dancing in perfect time with a partner, and yet is continuously changing partners. When such an idea of chemical motion is accepted, we can the more easily understand that chemical combination means the alteration of chemical motion which arises from the introduction of a new element into the space already occupied, and the consequent change in the motion of the new compound as revealed to us in the spectroscope. We can also the more readily understand that in changing from the old to the new form or rate of motion, there may be a development of energy in the shape of heat motion which may escape or become dissipated wherever a means of escape presents itself. We know from the experiments of M. Favre that as much heat is absorbed during the decomposition of an electrolyte as is given out again by the combination of the substances composing it.

We are making rapid strides towards the exact determination of those relations between the various modes of motion or forms of energy which were so ably shadowed forth, and their existence established long ago, by Sir William Grove in his Correlation of the Physical Forces, where, in stating the conclusion of his comparison of the mutual interchange of physical forces, he distinctly lays down the principles of energy in this statement. "Each force is definitely and equivalently convertible into any other; and where experiment does not give the full equivalent, it is because the initial force has been dissipated, not lost, by conversion into other unrecognized forces. The equivalent is the limit never practically reached."

The laws of Faraday, that (1) when a compound is electrolysed, the mass of the substance decomposed is proportional to the quantity of electricity which has produced the change, and that (2) the same current decomposes equivalent quantities of different substances, *i.e.* quantities of their elements in the ratio of their combining numbers, have given rise to several determinations of the relation between chemical affinity and electromotive force. In a paper lately communicated to the Physical Society, Dr. Wright has discussed these several determinations, and has given an account of a new determination by himself. The results obtained are compared with the heat given out by the combustion of hydrogen and oxygen, and the value of the mechanical equivalent of heat is deduced from these determinations.

The value obtained by Dr. Wright, which depends on the value of Clark's standard cell, agrees fairly well with Joule's determination from the heat produced by an electric current in a wire, but is greater than Joule's value as obtained from his water-friction experiments. This may be accounted for by supposing an error in the value of the ohm or B.A. unit, making it too large by 1·5 or 2 per cent. Kohlrausch has also made comparisons of copies of the B.A. unit with standard coils, and comes to the conclusion that the B.A. unit is 1·96 per cent. too large. On the other hand, Professor Rowland, in America, has made a new determination, and finds that according to his calculations the B.A. unit is nearly 1 per cent. too small. These differences in the values obtained by different methods clearly point to the necessity for one or more new determinations of the unit, and I would venture to suggest that a discrimination should be made under the authority of this Association, by a committee appointed to carry out the work. And it is not sufficient that this determination should be made once for all, for there is reason to think that the resistance of standard coils alters with time, even when the material has been carefully selected. It has been found that coils of platinum silver which were correct copies of the standard ohm have become so altered, and have their temperature coefficients so changed, that there are doubts as to the consistency of the standards themselves. Pieces of platinum-silver alloy cut from the same rod have been found to have different temperature coefficients. The value ·031 for 1° C. is given by Matthiessen for this alloy, yet two pieces of wire drawn from the same rod have given, one ·021 per cent. and the other ·04 per cent. for 1° C.

Possibly this irregularity in the platinum-silver alloys may be due to something analogous to the segregation which Mr. Roberts has found to take place in copper-silver alloys in their molten state, and which Matthiessen in 1860 regarded as mechanical mixtures of allotropic modifications of the alloy. A recommendation has been made that apparatus for determining the ohm should be set up in London, and that periodically determinations be made to test the electrical constancy of the metals and alloys used in making coils. A committee should be authorized to test coils and issue certificates of their accuracy, just as is done by the Kew Committee with regard to meteorological instruments. The direct relation between heat and chemical work has been established, and the principles of conservation of energy been shown to be true in chemistry by the experiments and deductions of Berthelot and of Thomsen, so that we may say that when a system of bodies passes through any succession of chemical changes, the heat evolved or absorbed when no external mechanical effect is produced depends solely upon the initial and final states of the system of bodies, whatever be the nature or the order of the transformations. The extension of this principle to the interaction of the molecules and atoms of bodies on one another is of vast importance in relation to our knowledge of the constitution of matter, for it enables us to state that each chemical compound has a distinct level or potential which may be called its own, and that when a compound gives up one of its elements to another body, the heat evolved in the reaction is the difference between the heat of formation of the first compound, and that of the resulting product. It has been well said by a former President of this Section that quality and quantity are the primary features to be observed in scientific inquiry, and the domain of quantity has everywhere encroached on that of quality. Lest that should be the case in my address, I wish to direct your attention to investigations of another kind which are being made in that fertile region for discovery, the "border land" between chemistry and physics, where we have to deal with the constitution of bodies, and where we are tempted to speculate on the existence of matter and on the nature of the forces by which the different parts of it are bound together, or become so transformed that all resemblance to their former state is lost. We have become accustomed to regard matter as made up of molecules, and those molecules to be made up of atoms separated from one another by distances which are great in comparison with the size of the atom, which we may regard as the smallest piece of matter that we can have any conception of.

Each atom is surrounded by an envelope of ether which accompanies it in all its movements. The density of the ether increases rapidly as an atom is approached, and it would seem that there must be some force of attraction between the atom and its ether envelope. All the atoms have motions of translations in all possible directions, and according to the theories of Maxwell and Boltymann, and the experiments of Kundt, Warburg, and others on the specific heat of vapours, in one-atom molecules in the gaseous state there is no motion of rotation. According to the theory of Pictet, the liquid state being the first condensation from the gaseous state must consist of at least two gaseous atoms combined. These two atoms are bound to one another through their ether envelopes. Then the solid state results from the condensation of a liquid, and so a solid molecule must consist of at least two liquid molecules, *i.e.* at least four gaseous molecules, each surrounded by an atmosphere of ether. M. Pictet imagines these atoms to be centres of attraction; hence in the solid with four such centres the least displacement brings into action couples tending to prevent the molecule from bursting as soon as external forces act upon it. All the molecules constituting a solid will be rigidly set with regard to one another, for the least displacement sets in action a couple or an opposing force in the molecules on one another.

Let us now follow the sketch which M. Pictet has given of changes which we may consider it to undergo when we expend energy upon it. Suppose a solid body is at absolute zero of temperature, which may be regarded as the state in which the molecules of a body are in stable equilibrium and at rest, the application of heat gives a vibratory motion to the molecules of the solid, which increases with the temperature, the mean amplitude of vibration being a measure of the temperature. We may regard the sum of all the molecular forces as the specific heat of the body, and the product of the sum of all the molecular forces by the mean amplitude of the oscillations; *i.e.* the product of the specific heat and the temperature will be the quantity of heat or the energy of motion of the body. As more and more heat is applied, the amplitude of vibration of the molecules increases until it is too great for the molecular forces, or forces of cohesion, and the melting point of the solid is reached. Besides their vibratory motion, the molecules are now capable of motions of translation from place to place among one another. To reduce the solid to the liquid state, *i.e.* to make the amplitude of vibration of the molecules sufficient to prevent them from coming within the sphere of the forces of cohesion, requires a quantity of heat which does not appear as temperature or molecular motion, and hence it is termed the latent heat of fusion. The temperature remains constant until the melting is complete, the heat being spent in bursting the bonds of the solid. Then a further application of heat increases the amplitude of vibration, or raises the temperature of the liquid at a rate depending on its specific heat until the succession of blows of the molecules overcomes the external pressure and the boiling point is reached. An additional quantity of heat is applied which is spent in changing the body to a gas, *i.e.* to a state of higher potential, in which the motion of translation of the molecules is enormously increased. When this state is attained, the temperature of the gas again begins to increase, as heat is applied, until we arrive at a certain point, when dissociation begins, and the molecules of the separate substances of which the body is composed have so large an amplitude of vibration that the bond which unites them can no longer bring them again into their former positions. The potential of the substances is again raised by a quantity which is proportional to its chemical affinity. Again, we may increase the amplitude of vibration, *i.e.* the temperature of the molecules, and get higher and higher degrees of dissociation. If temperature means the amplitude of vibration of the molecules, then only those bodies which have their temperatures increased by the same amount when equal amounts of heat are applied to them can possibly combine with one another; and so the fact that the increase of temperature bears a fixed ratio to the increase of heat may be the cause in virtue of which bodies can combine with one another. Were other bodies to begin to combine together at any definite temperature, they would immediately be torn to pieces again when the temperature is even slightly raised, because the amplitudes of vibration of their molecules no longer remain the same. This idea of temperature is supported by the fact that a combining molecule of each substance requires the same amount of heat to raise its temperature by the same number of degrees, the atomic weights being proportional to the masses of the combining molecules. The celebrated discovery of Faraday, that in a voltameter the work done by an electric current always decomposes equivalent quantities of different substances, combined with the fact that in the whole range of the physical forces work done is equivalent to the application heat, is quite in accordance with the view that no molecule can combine with another which has not its amplitude of vibration altered by the same amount when equal quantities of heat are applied to both.

As soon as we get any divergence from this state of equal motions for equal increments of heat, then we should expect that a further dissociation of molecules would take place, and that only those which are capable of moving together can remain still associated. Just as in the change of state of a body from the solid to the liquid, or from the liquid to the gas, a great amount of heat is spent in increasing the motion of translation of the molecules without altering the temperature, so a great amount of heat is spent in producing dissociation without increasing the temperature of the dissociated substances, since the principle of conservation of energy has been shown by M. Berthelot to hold for the dissociation of bodies. We may conveniently make use of the term latent heat of dissociation for the heat required to dissociate a unit of mass of a substance.

We may thus sum up the laws of physical and chemical changes :—

1. All the physical phenomena of change of state consist in the subdivision of the body into molecules or particles identical with one another.

2. The reconstitution of a body into a liquid or a solid being independent of the relative position of the molecules, only depends on the pressure and temperature.

3. Dissociation separates bodies into their elements, which are of different kinds, and the temperature remains constant during dissociation.

4. The reunion of dissociated bodies depends on the relative position of the elements, and so depends on the grouping of the molecules. The atomic weight being the mass of a molecule as compared with hydrogen, the specific volume, *i.e.* the atomic weight divided by the density, is the volume or *mean free path* of a molecule.

Building up his theory of heat on these principles, M. Pictet arrives at a definite relation between the atomic weight of a body, its density, its melting point, and its coefficient of expansion, which may be stated thus—

The volume of a solid body will be increased as the temperature rises by an amount which is proportional to the number of molecules in it, and inversely as its specific heat. At a certain temperature peculiar to each body, the amplitude of the heat oscillation is sufficient to melt the solid, and we are led to admit that for all bodies the intermolecular distance corresponding to fusion ought to be the same. The higher the point of fusion of a body, the shorter, on this theory, must be its heat vibrations. The product of the length of *swing* (the heat oscillations) by the temperature of fusion ought to be a constant number for all solid bodies.

A comparison of the values of the various quantities involved in these statements shows a very satisfactory agreement between theory and experiment, from which it appears that for twenty-three different substances the product of the length of swing by the temperature of fusion lies between 2·3 and 3·7 for most substances. We know very little about the latent heat of dissociation. In order to determine it, say, for the separation of oxygen and hydrogen, we should have to determine the amount of work required to produce a spark in a mixture of oxygen and hydrogen, and to measure the exact amount of water or vapour of water combined by the spark as well as the range of temperature through which it had passed after its formation.

Our usual mode of producing heat is by the combination of the molecules of different substances, and we are limited in the production of high temperatures, and in the quantity of available heat necessary to dissociate any considerable quantity of matter. If we heat vapours or gases, we may raise their temperatures up to a point corresponding to the dissociation of their molecules, and we are limited in our chemical actions to the temperatures which can be obtained by combining together the most refractory substances, as we are dependent on this combination for our supply of heat.

The combination of carbon and hydrogen with oxygen will give us high temperatures, so that by the oxyhydrogen blow-pipe most of the salts and oxides are dissociated.

The metalloids bromine, iodine, sulphur, potassium, etc., are the results of the combination of two or more bodies bound together by internal forces much stronger than the affinity of hydrogen or carbon for oxygen, for approximately they obey the law of Dulong and Petit.

For higher temperatures, in order to dissociate the most refractory substances, we require the electric current, either a continuous current, as in the electric arc from a battery, or, more intense still, the electrical discharges from an electrical machine or from an induction coil.

This electric current may be regarded as the most intense furnace for dissociating large quantities of the most refractory substances, and the electric spark may be regarded as something very much hotter than the oxyhydrogen blow-pipe, and therefore of service in reducing very small quantities of substances which will yield to no other treatment. The temperature of the electric arc is limited, and cannot reach above the temperature of dissociation of the conductor, and in the case of the constant current, which will not leap across the smallest space of air unless the carbons have first been brought in contact, the current very soon ceases when the point of fusion has been reached. Yet in the centre of the arc we have the gases of those substances which form the conductor; and, as Professor Dewar has shown, we have the formation of acetyline and cyanogen and other compounds, and therefore must have attained the temperature necessary for their formation, *i.e.* the temperature of their dissociation. The temperature of the induction spark, or, at least, its dissociating power, is higher than that of the arc. We know that the spark will pass across a space of air or a gaseous conductor, and we are limited by the dissociation of the gaseous conductor, and get only very small quantities of the dissociated substances, which immediately recombine, unless they are separated. If the gases formed are of different densities they will diffuse at different rates through a porous diaphragm, and so may be obtained separated from one another. As the molecules of bodies vibrate they produce vibrations of the ether particles, the period of the oscillations depends on the molecules of the body, and these periodic vibrations are taken up by their ether envelopes and by the luminiferous ether, and their wave-length determined by means of the spectroscope. The bright line spectrum may be regarded as arising from the vibratory motions of the atoms. As the temperature is increased, the amplitudes of oscillation of the molecules and of the ether increase, and from the calculations of Lecoq de Boisbaudran, Stoney, Soret, and others, it would appear that many of the lines in the spectra of bodies may be regarded as harmonies of a fundamental vibration. Thus Lecoq de Boisbaudran finds that in the nitrogen spectrum the blue lines seen at a high temperature correspond to the double octave of certain vibrations, and that, at a lower temperature, red and yellow lines are seen which correspond to a fifth of the same fundamental vibrations.

The bright line spectrum may be regarded as arising from the vibratory motions of the atoms. A widening of the lines may be produced at a higher temperature by the backward and forward motions of the molecules in the direction of the observer. A widening of the lines may also be produced by increase of pressure, because it diminishes the free path of the molecules, and the disturbances of the ether arising from collisions become more important than vibrations arising from the regular vibrations of the atoms.

Band spectra, or channelled space spectra, more readily occur in the case of bodies which are not very readily subject to chemical actions, or, according to Professors Liveing and Dewar, in the case of cooler vapours near the point of liquefaction.

The effects of change of temperature on the character of spectra is very well illustrated by an experiment of M. Wiedmann with mixtures of mercury with hydrogen or nitrogen in a Geissler's tube. At the ordinary temperature of the air the spectrum of hydrogen or nitrogen was obtained alone; but on heating the tube in an air-bath the lines of mercury appeared and became brighter as the temperature rose, and at the same time the hydrogen lines disappeared in the wider portion of the tube and at the electrodes. The hydrogen or nitrogen lines disappeared first from the positive electrode and in the luminous tuft, and as the temperature rose disappeared altogether. With nitrogen in a particular experiment, up to 100° C., the nitrogen lines were seen throughout the tube, but from 100° to 230° the nitrogen lines appear towards the negative pole, and the mercury lines are less bright at the negative than at the positive pole, while about 230° C. no nitrogen lines appear. The experiments of Roscoe and Schuster, of Lockyer and other observers, with potassium, sodium, and other metalloids in vacuum tubes, from which hydrogen is pumped by a Sprengel pump, also show great changes in the molecular condition of the mixture contained in the tubes when they are heated to different temperatures. The changes of colour in the tube are accompanied by changes in the spectrum. Thus, when potassium is placed in the bottom of the tube, and the spark passes in the upper part of it, as the exhaustion proceeds and the tube is slightly heated, the hydrogen lines disappear, and the red potassium line makes its appearance; then as the temperature is increased, the red line disappears, and three lines in the yellowish-green make their appearance, accompanied by a change in the colour of the tube, and at a higher temperature, and with a Leyden jar joined to a secondary circuit of the induction coil, the gas in the tube becomes of a dull red colour, and with this change a strong line comes out in the spectrum, more refrangible than the usual red potassium line. In this case, on varying the conditions, we get a variation in the character of the spectrum, and the colours and spectra are different in different parts of the tube. In Lockyer's experiments, at the temperature of the arc obtained from a Siemens dynamor machine, great differences appear in different parts of the arc: for instance, with carbon poles in the presence of calcium, the band spectrum of carbon, or the carbon flutings and the lines of calcium, some of them reversed, are seen separated in the same way as mercury and hydrogen, the carbon spectrum appearing near one pole and the calcium near the other, the lines which are strongest near that pole being reversed or absorbed by the quantity of calcium vapour surrounding it. On introducing a metal into the arc, lines appear which are of different intensities at different distances from the poles, others are strong at one pole and entirely absent at or near the other, while some lines appear as broad as half-spindles in the middle of the arc, but are not present near the poles. Thus, the blue line of calcium is visible alone at one pole, the H and K lines without the blue line at the other.

We may probably regard these effects as the result, not of temperature alone, but must take into account that we have powerful electric currents which will act unequally on the molecules of different bodies according as they are more or less electro-positive. It would seem that we have here something analogous to the segregation which is observed in the melting of certain alloys to which I have already referred in my address.

The abundance of material in some parts of the arc surrounding the central portion of it gives rise to reversal of the principal lines in varying thicknesses over the arc and poles, so that bright lines appear without reversal in some regions, and reversals or absorption lines without bright lines in others. The introduction of a substance into the arc gives rise to a flame of great complexity with regard to colour and concentric envelopes, and the spectra of these flames differ in different parts of the arc. Thus, in a photograph of the flame given by maganese, the line at wave-length 4234·5 occurs without the triplet near 4030, while in another the triplet is present without the line 4234·5.

The lines which are reversed most readily in the arc are generally those the absorption of which is most developed in the flame; thus the manganese triplet in the violet is reversed in the flame, and the blue calcium line is often seen widened when the H and K lines of calcium are not seen at all. In consequence of the numerous changes in spectra at different temperatures, Mr. Lockyer has advanced the idea that the molecules of elementary matter are continually being more and more broken up as their temperature is increased, and has put forward the hypothesis that the chemical elements with which we are acquainted are not simple bodies, but are themselves compounds of some other more simple substances. This theory is founded on Mr. Lockyer's comparisons of spectra and the maps of Augstrom, Thalèn, and others, in which there are coincidences of many of the short lines of the spectra of different substances. These short lines are termed basic lines, since they appear to be common to two or more substances. They appear at the highest temperatures when the longest lines of those substances and those which are considered the test of their presence are entirely absent.

Mr. Lockyer draws a distinction between weak lines, which are basic, *i.e.* which would permanently exist at a higher temperature in a more elementary stage, and other weak or short lines which would be more strongly present at a lower temperature, in a more complex stage of the molecules. Thus, in lithium, the red line is a low temperature line, and the yellow is feeble; at a higher temperature, the red line is weak, the yellow comes out more strongly, and the blue line appears; at a higher temperature still, the red line disappears, and the yellow dies away; whilst at the temperature of the sun the violet lithium line is the only one which comes out strongly. These effects are studied by first producing the spectrum of the substance in the Bunsen flames, and observing the changes which are produced on passing a spark through the flame; thus, in magnesium a wide triplet or set of three lines (5209·8, b^1 and b^2) is changed with a narrow triplet (b^1, b^2, and b^4) of the same character. We have here what some observers regard as a recurrence of the same harmonic relation of the vibrations of the same body at a higher temperature.

If the so-called elements are compounds, they must have been formed at a very high temperature, and as higher and higher temperatures are reached the dissociation of these compound bodies will be effected, and the new line spectra, the real basic lines of those substances which show coincidences, will make their appearance as short lines in the spectra. In accordance with this view, Mr. Lockyer holds that the different layers of the solar atmosphere may be regarded as a series of furnaces, on the hottest of which, A, we have the most elementary forms of matter capable of existing only in its uncombined state; at a higher and cooler level, B, this form of matter may form a compound body, and may no longer exist in a free state at the lower temperature; as the cooler and cooler levels, C, D, and E, are reached, the substances become more and more complex, and form different combinations, and their spectra become altered at every stage. Since the successive layers are not at rest, but in a state of disturbance, we may get them somewhat mixed, and the lines at the cooler levels D and E may be associated with the lines of the hotter levels; these would be basic or coincident lines in the spectra of two different compounds which exist at the cooler levels D and E. We might even get lines which are not present in the hottest furnace A coming into existence as the lines of compounds in B or C, and then extending among the lines belonging to more complex compounds which can only exist at a lower temperature, when they might be present as coincident weak lines in the spectra of several compound bodies. Thus Mr. Lockyer regards the calcium lines H and K of the solar spectrum as evidence of different molecular groupings of more elementary bodies. In the electric arc with a weak current the single line 4226 of calcium, which is easily reversed, is much thicker than the two lines H and K; but the three lines are equally thick with a stronger current, and are all reversed. With a spark from a large coil and using a condenser the line 4226 disappears, and H and K are strong lines. In the sun, the absorption bands H and K are very broad, but the band 4226 is weak. Prof. Young, in his observation of the lines of the chromosphere, finds that H and K are strongly reversed in every important spot and in solar storms; but the line 4226, so prominent in the arc, was only observed three times in the chromosphere.

One of the most interesting features among the most recent researches in Spectrum Analysis is the existence of rhythm in the spectra of bodies, as has been shown by M. Mascart, Cornu, and others, such as the occurrence and repetition of sets of lines, doublets, and triplets in the spectra of different substances and in different parts of the spectrum of the same body. Professors Liveing and Dewar, using the reversed lines in some cases for the more accurate determination of wave-lengths, have traced out the rhythmical character in the spectra of sodium, potassium, and lithium. They show that the lines of sodium and potassium form groups of four lines each, which recur in a regular sequence, while lithium gives single lines, which, including the green line, which they show really to belong to lithium, though it was ascribed to cæsium by Thalèn, also recur in a similar way. In these three metals the law of recurrence seems to be the same, but the wave-lengths show that the whole series are not simple harmonies of one fundamental, although between some of the terms very simple harmonic relations can be found. Between the lines G and H are two triplets of iron lines, which, according to Mr. Lockyer, do not belong to the same molecular grouping as most of the other lines. In many photographs of the iron spectrum these triplets have appeared almost alone. Also the two triplets are not always in the same relation as to brightness, the more refrangible being barely visible with the spark. Combining this with Young's observations, in which some short weak lines near G appear in the chromosphere thirty times, while one of the lines of the less refrangible triplet only appears once, and with the fact that in the solar spectrum the more refrangible triplet is much the more prominent of the two, Mr. Lockyer is led to the conclusion that these two triplets are again due to two distinct molecular groupings. There is one difficulty which must be taken account of in connection with Mr. Lockyer's theory with regard to the production of successive stages of dissociation by means at our command: (1) by combustion of different substances; (2) by an electric arc, which will probably give slightly different temperatures according as it is produced by different dynamo-electric machines; (3) by the induction spark without; and (4) with a condenser.

At each stage of the process there must be a considerable absorption of heat to produce the change of state, and our supply of heat is limited in the electric arc because of the dissociation of the conductors, and more limited still in quantity in the electric spark or in the discharge through a vacuum tube; also we should expect a recombination of the dissociated substances immediately after they have been first dissociated. Hence it seems easier to suppose that at temperatures which we can command on the earth, the dissociation of molecules by the arc or the spar is accompanied by the formation of new compounds, in the formation of which heat and light, and especially chemical vibrations, would be again given out, and would appear as new substances in the spectroscope.

To the lines C, F, G, and H belonging to hydrogen, which have a certain rythmical character, Mr. Lockyer adds D_3 and Kirchoff's line "1474," regarding "1474" (wave-length) as belonging to the coolest or most complex form, and rising to F, which is again subdivided into C and G, using the spark without a condenser, which again gives H with the spark and condenser, which is again split up and gives D_3, a more simple line than H, in the chromosphere. Professors Liveing and Dewar, on the other hand, trace a rhythmical character or ratio between three of the brightest lines of the chromosphere, two of which are lines "1474" and "f" of Lorenzoni, similar to the character of C, F, and H of hydrogen, and also trace a similar relation between the chromospheric line D_3 and "1474" to the ratio of the wave-lengths of F and G. They infer the probability that these four lines are due to the same at present unknown substance as had been suggested by Young with regard to two of them.

The harmony of this arrangement is somewhat disturbed by the fact that D_3 lies on the wrong side of "1474" to correspond with G of the hydrogen spectrum.

If we inquire what our sun and the stars have to say to these changes of spectra of the same substance at different temperatures, Dr. Huggins gives us the answer.

In the stars which give a very *white* light, such as Sirius or *a* Lyræ, we have the lines G and H of hydrogen and also H; but the K line of calcium is weak in *a* Lyræ, and does not appear in Sirius. In passing from the white or hottest stars to the yellow stars like our sun, the typical lines diminish in breadth and are better defined, and K becomes stronger relatively to H, and other lines appear. In Arcturus we have a star which is probably cooler than our sun, and in it the line K is stronger in relation to H than it is in the solar spectrum, both being very strong compared with their state in the solar spectrum.

Professors Liveing and Dewar find that K is more easily reversed than H in the electric arc, which agrees with the idea that this line is produced at a lower temperature than H, and Dr. Vogel has pointed out a coincidence of a line of hydrogen with H.

Besides the absence or weakness of K, the white stars have twelve strong lines winged at the edges, in which there are three of hydrogen, viz., G, *h*, and H, and the remaining nine form a group which are so related to one another that Dr. Huggins concludes they probably belong to one substance. Three of these lines are said by Dr. Vogel to be lines of hydrogen. Liveing and Dewar have made considerable progress in determining the conditions and the order of reversal of the spectral lines of metallic vapours. They have adopted methods which allow them to observe through greater thicknesses of vapour than previous observers have generally employed. For lower temperatures tubes of metal or other material placed vertically in a furnace were used, and the hot bottom of the tube was the source of light, the absorption being produced by vapours of metals dropped into the hot tube and filling it to a greater or less height. By this means many of the more volatile metals, such as sodium, thallium, irridium, cæsium, and rubidium, magnesium, lithium, barium, strontium, and calcium, each gave a reversal of its most characteristic line or pair of lines, *i.e.* the red line of lithium, the violet lines of rubidium and calcium, the blue line of strontium, the sharp green line of barium (5535), and no other lines which can certainly be ascribed to these metals in the elementary state.

For higher temperatures tubes bored out in blocks of lime or of gas carbon, and heated by the electric arc, were used. By keeping up a supply of metal and in some cases assisting its volatilization by the admixture of a more volatile metal, such as magnesium, and its reduction by some easily oxidizable metal, such as aluminum, or by a current of coal gas or hydrogen, they succeeded in maintaining a stream of vapour through the tube so as to reverse a great many lines. In this way the greater part of the bright lines of the metals of the alkalies and alkaline earths were reversed, as well as some of the strongest lines of manganese, aluminum, zinc, cadmium, silver, copper, bismuth, and the two characteristic lines of iridium and of gallium. By passing an iron wire into the arc through a perforated carbon electrode they succeeded in obtaining the reversal of many of the lines of iron. In observing bright line spectra they have found that the arc produced by a De Meriteus machine arranged for high tension gives, in an atmosphere of hydrogen, the lines C and F, although the arc of a powerful Siemens machine does not bring them out, and they have observed many metallic lines in the arc which had not been previously noticed. The temperature obtained by the De Meriteus machine is thus higher than that obtained in the Siemens machine.

From observations on weighed quantities of sodium, alone as in amalgam, introduced into a hot bottle of platinum filled with nitrogen, of which the pressure was varied by an air-pump, they conclude that the width of the sodium lines depends rather on the thickness and temperature of the vapour than upon the whole quantity of sodium present. Very minute quantities diffused into the cool part of the tube give a broad diffuse absorption, while a thin layer of compressed vapour in the hot part of the tube gives only narrow absorption lines. Professors Liveing and Dewar have observed the reversal of some of the well-known bands of the oxides and chlorides of the alkaline earth metals. The lines produced by magnesium in hydrogen form a rhythmical series extending all across the well-known B group, having a close resemblance in general character to the series of lines produced by an electric discharge in a vacuum tube of olefiant gas.

The series appears at all temperatures except when a large condenser is employed along with the induction coil, provided hydrogen is present as well as magnesium, while they disappear when hydrogen is excluded, and never appear in dry nitrogen or carbonic oxide.

From their experiments on carbon spectra they conclude with Augstrom and Thalèn that certain of the so-called "carbon bands" are due to some compound of carbon with hydrogen, probably acetylene, and that certain others are due to a compound of carbon with nitrogen, probably cyanogen.

They describe some ultra-violet bands: one of them coincides with the shaded band P of the solar spectrum which accompanies the other violet bands in the flame of cyanogen as well as in the arc and spark between carbon electrodes in the nitrogen. All the bands which they ascribe to a compound of carbon and nitrogen disappear when the discharge is taken in a non-nitrogenous gas, and they reappear on the introduction of a minute quantity of nitrogen.

They appear in the flame of hydrocyanic acid or of cyanogen, even when cooled down as much as possible, as shown by Watts, or when raised to the highest temperature by burning the cyanogen in nitric oxide; but no flames appear to give these bands unless the burning substance contains nitrogen already united with carbon. As the views of Mr. Lockyer with regard to the multiple spectra of carbon have very recently appeared in the pages of *Nature*, I need only say that these spectra are looked upon as supporting his theory that the different flutings are truly due to carbon, and that they represent the vibrations of different molecular groupings. The matter is one of very great interest as regards the spectra of comets, for the bands ascribed to acetylene occur in the spectra of comets without the bands of nitrogen, showing that either hydrocarbons must exist ready formed in the comets, in which case the temperature need not exceed that of an ordinary flame, or else nitrogen must be absent, as the temperature which would produce acetylene from its elements would also produce cyanogen, if nitrogen were present.

Quite recently, Professors Liveing and Dewar have, simultaneously with Dr. Huggins, described an ultra-violet emission spectrum of water, and have given maps of this spectrum.

It is not a little remarkable that by independent methods these observers should have deduced the same numbers for the wave-lengths of the two strong lines at the most refrangible end of this spectrum.

Great attention has been paid by M. Mascart and by M. Cornu to the ultra-violet end of the solar spectrum. M. Mascart was able to fix lines in the solar spectrum as far as the line R (3179), but was stopped by the faintness of the photographic impression. Professor Cornu has extended the spectrum still further to the limit (2948), beyond which no further effect is produced, owing to complete absorption by the earth's atmosphere. A quartz-reflecting prism was used instead of a heliostat. The curvature of the quartz lens was calculated so as to give minimum aberration for a large field of view. The Iceland spar prism was very carefully cut. A lens of quartz was employed to focus the sun on the slit. Having photographed as far as possible by direct solar light, Professor Cornu compared the solar spectrum directly by means of a fluorescent eye-piece with the spectrum of iron, and then obtained, by photographing, the exact positions of the iron lines which were coincident with observed lines in the solar spectrum. M. Cornu states that the dark absorption lines in the sun and the bright iron lines of the same refrangibility are of the same relative importance or intensity in their spectra, indicating the equality between the emissive and the absorbing powers of metallic vapours; and he thinks we may get by the comparison of bright spectra with the sun some rough approximation to the quantity of metallic vapours present in the absorption layers of the sun's atmosphere. He draws attention to the abundance of the magnetic metals—iron, nickel, and magnesium—and to the fact that these substances form the composition of most meteorites. M. Cornu has studied the extent of the ultra-violet end of the spectrum, and finds that it is more extended in winter than in summer, and that, at different elevations, the gain in length of the spectrum for increase of elevation is very slow (only a hundred and sixth of a mm. in 868 metres), on account of atmospheric absorption, so that we cannot hope greatly to extend the spectrum by taking elevated observing stations. The limit of the solar spectrum is reached very rapidly, and the spectrum is sharply and completely cut off at about the line U (wave-length 2948). From photographs taken at Viesch, in the valley of the Rhone and at the Riffelberg, 1910 metres above it, M. Cornu finds the limits to be at wave-lengths 2950 and 2980 respectively. In the actual absorption of bright line spectra by the earth's atmosphere, M. Cornu observed among others three bright lines of aluminum, which M. Soret calls 30, 31, and 32 (wave-lengths about 1968, 1930, and 1860), and he found that 32 could not be seen at the distance of 6 metres; but on using a collimator, and reducing the distance to 1½ metres, the line 32 became visible, notwithstanding the absorption of the extra lens; at 1 metre, line 32 was brighter than 31, and at a quarter of a metre 32 was brighter than either 30 or 31.

With a tube 4 metres in length between the collimator and prism ray 32 is not seen; but when the tube is exhausted, ray 31 gains in intensity and 32 comes into view, and gradually gets brighter than 31, whilst 30 changes very little during the exhaustion. With the same tube he found no appreciable difference between the absorption by air very carefully dried and by moist air, and concludes that this absorption is not due to the vapour of water, and it follows the law of pressure of the atmosphere which shows it to be due to the whole mass or thickness of the air. Also, M. Soret has shown that water acts very differently on the two ends of the spectrum, distilled water being perfectly transparent for the most refrangible rays, since a column of water of 116 c.m. allowed the ray 2060 in the spectrum of zinc to pass through: on the other hand, water is so opaque to the ultra-red rays that a length of 1 c.m. of it reduces the heat spectra of metals to half their length and one quarter of their intensity. In his discussion of the magnetic effects observed on the earth's surface, General Sabine has shown the existence of diurnal variations due to the magnetic action of the sun; also the magnetic disturbances, aurora and earth currents, which are now again beginning to be large and frequent, have been set down to disturbances in the sun.

Although iron, when raised to incandescence, has its power of attracting a magnet very greatly diminished, we have no proof that it has absolutely no magnetic power left, and with a slight magnetic action the quantity of iron in the sun would be sufficient to account for the diurnal variations of the magnetic needle. During the last few weeks I have been engaged in examining the declination curves for the month of March, 1879, which have been kindly lent to the Kew Committee by the Directors of the Observatories of St. Petersburg, Vienna, Lisbon, Coimbra, and Stonyhurst. Other curves are on their way from more distant stations, but have not yet been examined. On comparing them with the Kew curves for the same period, I find the most remarkable coincidences between the curves from these widely distant stations.

It was previously known that there was a similarity between disturbances at different stations, and in one or two cases a comparison between Lisbon and Kew had been made many years ago by Señor Capello and Professor Balfour Stewart, but the actual photographic magnetic records from several stations have never been previously collected, and so the opportunity for such comparisons had not arisen.

Allow me in concluding my address to draw attention to a few of the more prominent features of these comparisons which I have made. On placing the declination curves over one another, I find that in many cases there is absolute agreement between them, so that the rate of change of magnetic disturbances at widely distant stations like Kew, Vienna, and St. Petersburg is precisely the same: also similar disturbances take place at different stations at the same absolute time. It may be stated generally, for large as well as small disturbances, that the east and west deflections of the declination needle take place at the same time and are of the same character at these widely distant stations.

There are exceptions to this law. Some disturbances occur at one or two stations and are not perceived at another station. Many instances occur where, up to a certain point of time, the disturbances at all the stations are precisely alike, but suddenly at one or two stations the disturbance changes its character: for instance, on comparing Kew and St. Petersburg, we get perfect similarity followed by deflections of the needle, opposite ways at the same instant, and in some such cases the maxima in opposite directions are reached at the same instant, showing that the opposite deflections are produced by the same cause, and that the immediate cause or medium of disturbance in such a case is not far off; probably it is some change of direction or intensity of the earth's magnetism arising from solar action upon it.

Generally, after an hour or two, these differences in the effects of the disturbance vanish, and the disturbances again become alike and simultaneous. In such cases of difference, if the curve tracing of the horizontal or the vertical force be examined, it is generally found that, at the very same instant of absolute time, with the beginning of these opposite movements there was an increase or a diminution in the horizontal force, and that the horizontal force continues to change as long as there is any difference in the character of the declination curves. It is clear, then, from these effects that the cause or causes of magnetic disturbances are in general far distant from the earth's surface, even when those disturbances are large; but that not unfrequently these causes act on magnetic matter nearer to the surface of the earth, and therefore at times between two places of observation, and nearer to one than another, thus producing opposite effects on the declination needle at those places; in such cases, the differences are probably due to changes in the earth's magnetic force.

Now, if we imagine the masses of iron, nickel, and magnesium in the sun to retain even a slight degree of magnetic power in their gaseous state—and we know from the researches of Faraday that gases on the earth are some of them magnetic—we have a sufficient cause for all our terrestrial magnetic changes, for we know that these masses of metal are ever boiling up from the lower and hotter levels of the sun's atmosphere to the cooler upper regions, where they must again form clouds to throw out their light and heat, and to absorb the light and heat coming from the hotter lower regions; then they become condensed and are drawn again back towards the body of the sun, so forming those remarkable dark spaces or sun spots by their downrush towards the lower levels.

In these vast changes, which we know from the science of energy must be taking place, but of the vastness of which we can have no conception, we have abundant cause for these magnetic changes which we observe at the same instant at distant points on the surface of the earth, and the same cause acting by induction on the magnetic matter within and on the earth may well produce changes in the magnitude or in the direction of its total magnetic force, and alter the direction of its magnetic axis. These magnetic changes on the earth will influence the declination needles at different places, and will cause them to be deflected; the direction of the deflection must depend on the situation of the earth's magnetic axis or the direction of its motion with regard to the stations where the observations are made. Thus both directly and indirectly we may find in the sun not only the cause of diurnal magnetic variations, but also the cause of these remarkable magnetic changes and disturbances over the surface of the earth.

Dispensing Memoranda.

[443].

℞ Magnes. Calc.	gr. xx.
Tinct. Assafoet.	♏ xx.
Aquæ	ad ℥j.

Misce.

On using the light magnesia and after standing a few hours, the subsidence of magnesia and assafoetida resin developed a bright green colour. The heavy magnesia was then tried, the green colour was much longer in appearing and was not so bright.

After prolonged standing in the first case the colour faded to a dull green, and in the second case the deposit assumed several colours in successive layers.

To what are these changes due?

J. Wilford.

[444]. Will some reader kindly say if there are any special precautions necessary in making an emulsion of phosphorized cod liver oil? I can turn out an emulsion with the plain cod liver oil, tragacanth and glycerine being the excipients, but where phosphorus is present I fail to succeed.

S. E. Clarke.

[445]. R. L. G. would like to know what preparation should be dispensed when "chloroformyl" is prescribed. It has been ordered with sedative ingredients (Scheele's acid, tinct. digitalis and camphor).

[446]. What would be the best method of dispensing the following?—

1 doz. suppositories, ¼ grain chloroform in each.

Embryo.

Correspondence.

"*Eblana.*"—We do not remember a paper that answers exactly to your description, but one on "The Preparation of Syrup of Ferrous Phosphate from Metallic Iron" will be found in vol. v. of the present series, p. 541.

L. R. Oswald.—The questions will be published in the Journal for October 9, which will contain an account of the distribution of the prizes.

W. Miller.—The specimen of supposed savin does not seem to have been enclosed.

H. O. I.—The following recipe for a "crystal varnish for negatives" was given in vol. i., p. 716:—Dissolve 2¼ lbs. white shellac, ¼ lb. mastic, and ¼ oz. camphor in 1 gallon of hot alcohol, 64 o.p., and filter.

E. W. W.—Probably a coating of nickel would best answer your purpose. See vol. ii., [3], p. 363.

H.—(1) *Papaver somniferum.* (2) *Hippocrepis comosa.* (3) *Brassica campestris.* (4) *Stellaria media.* (5) *Epilobium hirsutum.* (6) *Veronica Buxbaumii.* *Veronica* should always be sent with the fruit well developed.

W. Stewart.—(1) *Ranunculus acris.* (2) *Potentilla reptans.* (3) *Circœa lutetiana.* (4) *Epilobium hirsutum.* (5) Too fragmentary to determine. (6) *Lychnis diurna.* (7) *Lythrum Salicaria.* (8) *Geum urbanum.*

W. Stewart.—(1) *Erythrœa Centaurium.* (2) *Ranunculus Flammula* (*R. Lingua* has much larger flowers). (3) *Euphorbia Helioscopia.* (4) *Hypericum pulchrum.* (5) *Anagallis arvensis.* (6) *Hypericum Androsœmum.*

E. Coleman.—(1) Probably *Brassica Eruca.* (2) *Reseda luteola.* (3) Probably *Thalictrum minus.* (4) *Jasione montana.* (5) *Scabiosa succissa.* (6) *Scutellaria minor.* Send better specimens next time. Nos. 1 and 3 cannot be named with certainty because of being too fragmentary.

"*Fraxinus.*"—(1 and 2) *Athyrium Filix-fœmina.* (3) *Blechnum Spicant.* (4) *Agrostis vulgaris.* Grasses should always have two or three stem leaves attached.

H. C. H.—(1) *Nepeta Glechoma.* (2) *Oxalis acetosella.* (3) *Veronica Chamædrys.* (4) *Mochringia trinervis* (*Arenaria*). (5) *Stellaria Holostea.*

PREPARATION OF OPIUM FOR SMOKING.

BY HUGH MCCALLUM,

Pharmaceutical Chemist, Government Analyst, Hong Kong.

As the policy of the opium trade from India to China is receiving considerable attention among philanthropists, etc., in England, probably the following account of the process of preparing opium for smoking purposes, as conducted by the present opium farmer in Hong Kong, may be of some interest to pharmacists.

The boiling operations are carried on in a moderate sized building at Shek-tong-tsui, in the west end of the city of Victoria, where there are over eighty Chinese coolies and a few Indian watchmen employed, all of whom live on the premises. The majority sleep in a loft immediately above the boiling rooms, the others in a room on the ground floor, which also does duty as a kitchen, mess room and general store, and is in open communication with the boiling rooms. The *employés* may therefore be said to live in an atmosphere saturated with the odour of opium, yet all seem in good health. On inquiring if many of them were habitual opium smokers, the information received was that only one head-man smoked regularly, but that some of the others indulged occasionally when any of their friends paid them a visit.

The boiling is conducted in two rooms in open connection with each other, one being set apart for the first boiling, the other for the final. The first boiling room has a row of furnaces along each side, with a few rows running transversely between them; the other has four rows, extending along the whole length of the room. The furnaces are made of a kind of fire clay and are of two sizes, the large size having a diameter of about 24 inches, the small size a diameter of 18 inches, the depth of each being about 9 inches; they are built in with brick, the fuel used is wood charcoal. The pans in which the opium is boiled are made of some kind of copper alloy, and are of two sizes so as to fit the furnaces, their shape being somewhat like a shallow evaporating dish.

The opium is sent every day from the hong (*i.e.*, shop or firm) to the boiling house, the previous day's boiling being then returned to the hong. The average quantity boiled each day is from six to eight chests of Patna opium, this being the only kind used.

The opium is removed from its covering of leaves, etc., moistened with a little water, and allowed to stand for about fourteen hours; it is then divided into pans, 2½ balls of opium and about 10 pints of water going to each pan; it is now boiled and stirred occasionally, until a uniform mixture having the consistence of a thin paste is obtained. This operation takes from five to six hours. The paste is at once transferred to a larger pan and cold water added to about 3 gallons, covered and allowed to stand for from fourteen to fifteen hours. A bunch of tang suin (lamp wick, the pith of some plant) is then inserted well into the mass, the pan slightly canted, when a rich clear brown fluid is thus drawn off and filtered through chi mui (paper made from bamboo). The residue is removed to a calico filter and thoroughly washed with boiling water, the wash water being reboiled and used time after time. The last washing is done with pure water; these washings are used in the next day's boiling. The residues on the calico filters are transferred to a large one of the same material and well pressed; this insoluble residue, called nai chai (opium dirt), is the perquisite of the head boiling coolie, who finds a ready market for it in Canton, where it is used for adulterating or rather in manufacturing the moist inferior kinds of prepared opium. The filtrate or opium solution is concentrated by evaporation at the boiling point, with occasional stirring, until of a proper consistence, the time required being from three to four hours; it is then removed from the fire and stirred with great vigour till cold, the cooling being accelerated by coolies with large fans. When quite cold it is taken to the hong and kept there for some months before it is considered in prime condition for smoking. As thus prepared it has the consistence of a thin B.P. or treacly extract, and is called boiled or prepared opium. In this state it is largely exported from China to America, Australia, etc., being carefully sealed up in small pots having the name of the maker (*i.e.*, hong) on each.

The Chinese recognize the following grades of opium:—(1) "Raw opium:" as imported from India. (2) "Prepared opium:" opium made as above. (3) "Opium dross:" the scrapings from the opium pipe. This is reboiled and manufactured as a second class prepared opium. A Chinese doctor stated lately at a coroner's inquest on a case of poisoning that it was more poisonous than the ordinary prepared opium. (4) "Nai chai" (opium dirt): the insoluble residue left on exhausting the raw opium thoroughly with water.

What strikes one very forcibly on witnessing these operations is that the morphia value of the opium can have little to do with its smoking value, because, if so, the mode of manufacture must deteriorate it considerably, owing to the long continued moist heat it undergoes; however, there can be no doubt but the process described has after long experience been found to yield the drug in the most approved form for smoking. This opinion naturally raises the question, which of the definite principles of opium or combinations thereof has the power when smoked, or rather burned in a pipe, the vapours being inhaled, of producing such peculiar effects? The elucidation of this point must be of great interest both to the chemist and physiologist.

HYDROBROMIC ACID.*

BY EDWARD GOEBEL, PH.G.

Of the various formulas recommended for the preparation of dilute hydrobromic acid, the one probably most used by pharmacists, on account of its simpleness, is that in which solutions of potassium bromide and tartaric acid are mixed and exposed to a low temperature to separate the potassium bitartrate formed. This formula, however, yields an acid by no means as pure as desirable, as it retains a very large amount of bitartrate of potassium in solution, for although this salt is but sparingly soluble in water, it dissolves freely in mineral acids. My attention was first drawn to this fact while preparing bromide of calcium from an acid prepared according to the above formula, by neutralizing it with calcium carbonate, when a very considerable precipitate of calcium tartrate was noticed. The acid contains about 10 per cent. of its weight of potassium bitartrate. Even by using alcohol in this formula, as has been recommended by Dr. Rice, a product is obtained which still contains considerable bitartrate. Another objection is that under certain circumstances bromine is liberated.

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* From *New Remedies*, September, 1880.

Professor F. Schaeffer suggesting its preparation from barium bromide, some experiments were made for determining a ready method by which this salt can be obtained. It was found that by heating together bromide of ammonium and carbonate of barium a satisfactory result is gained. The equivalents of these two salts are about the same (98), but it is best to use a slight excess of carbonate of barium to insure the complete decomposition of the bromide of ammonium. The following is a good working formula:—

Pure carbonate of barium	100 parts.
Bromide of ammonium	95 „
Distilled water . . .	a sufficient quantity.

Triturate the salts well together with a few drops of distilled water so as to make a damp powder. Put this in an evaporating dish or a crucible and apply heat, at first moderate, gradually increasing, stir frequently, and continue the heat until vapours of carbonate of ammonium can no longer be detected by hydrochloric acid. After cooling, dissolve the residue in distilled water, filter, and evaporate, stirring constantly towards the last, until a perfectly dry salt remains.

The salt thus obtained is freely soluble in water and from it dilute hydrobromic acid can be prepared by simply decomposing it with the requisite amount of sulphuric acid. To prepare a 10 per cent. acid proceed as follows:—

Bromide of barium	148 grains.
Sulphuric acid, U.S.P. (96·8 per cent. $HO.SO_3$)	50·6 grains.
Distilled water	a sufficient quantity.

Dissolve the barium bromide in about ½ ounce, and dilute the acid with about 2 drachms of distilled water. Add the diluted sulphuric acid to the solution of the barium bromide, filter, and wash the precipitated barium sulphate with sufficient distilled water to make the filtrate weigh 810 grains. The commercial sulphuric acid usually being weaker than the officinal acid, more than the above quantity will be required to precipitate all the barium, and more diluted acid must therefore be added very carefully until it no longer produces a precipitate. By this method a perfectly pure hydrobromic acid can be prepared without distillation, provided, of course, the materials used are pure; it is especially important that the carbonate of barium has been well washed, as the adhering chloride of sodium will otherwise contaminate the bromide of barium and also the hydrobromic acid.

The 10 per cent. acid can by careful evaporation be concentrated so as to represent 30 per cent. or even more of hydrobromic acid gas.

THE APPLICATION OF CHEMISTRY TO AGRICULTURE.*

BY J. H. GILBERT, PH.D., F.R.S., V.P.C.S., F.L.S.

Some of my predecessors in this chair, whose duties a teachers of chemistry lead them to traverse a wide range of the subject every year, have appropriately and usefully presented to the Section a *résumé* of the then recent progress in the manifold branches of the science which have now such far-reaching ramifications. Such a course has, however, come to be of much less importance and interest of late years since the systematic publication by the Chemical Society of abstracts of chemical papers in home and foreign journals as soon as possible after their appearance. Some, on the other hand, have confined attention to some department with which their own inquiries have more specially connected them. And, when the Council of the Association request a specialist like myself to undertake the Presidency of the Section, it is to be supposed they take it for granted that he will select for his opening address some branch of the subject with which he is known to be mainly associated.

But it seems to me that there is a special reason why I should bring the subject of Agricultural Chemistry before you on the present occasion. Not only is the application of chemistry to agriculture included in the title of this Section; but in 1837 the Committee of the Section requested the late Baron Liebig to prepare a report upon the condition of Organic Chemistry, and it is now exactly forty years since Liebig presented to the British Association the first part of his report, which was entitled 'Organic Chemistry in its Application to Agriculture and Physiology;' and the second part was presented two years later, in 1842, under the title of 'Animal Chemistry, or Organic Chemistry in its Application to Physiology and Pathology.' Yet so far as I am aware, no President of the Section has, from that time to the present, taken as a subject of his address the Application of Chemistry to Agriculture.

Appropriate as, for these reasons, it would seem that I, who have devoted a very large portion of the interval since the publication of Liebig's works, above referred to, to agricultural inquries, should occupy the short time that can be devoted to such a purpose in attempting to note progress on that important subject, it will be readily understood that it would be quite impossible to condense into the limits of an hour's discourse anything approaching to an adequate account, either of the progress made during the last forty years, or of the existing condition of agricultural chemistry.

For what is agricultural chemistry? It is the chemistry of the atmosphere; the chemistry of the soil; the chemistry of vegetation; and the chemistry of animal life and growth. And but a very imperfect indication of the amount of labour which has been devoted of recent years to the investigation of these various branches of what might at first sight seem a limited subject will suffice to convince you how hopeless a task it would be to seek to do more than direct attention to a few points of special interest. Indeed, devoting to the purpose such leisure as I have been able to command, the more I have attempted to become acquainted with the vast literature which has been accumulated on the subject, the more difficulty have I felt in making a selection of illustrations which should best convey an idea of the limits, rather than of the extent, of the labour which has been expended, and of the results which have been attained, in agricultural research.

The works of Liebig to which I have referred have, as you all know, been the subject of a very great deal of controversy. Agricultural chemists, vegetable physiologists, and animal physiologists have each vehemently opposed some of the conclusions of the author, bearing upon their respective branches. But if the part which has fallen to my own lot in these discussions qualifies me at all to speak for others as well as myself, I would say that those who, having themselves carefully investigated the points in question, have the most prominently dissented from any special views put forward in those works, will—whether they be agricultural chemists, vegetable physiologists, or animal physiologists—be the first to admit how vast has been the stimulus, and how important has been the direction, given to research in their own department, by the masterly review of then existing knowledge, and the bold, and frequently sagacious, generalizations of one of the most remarkable men of his time!

Confining attention to researches bearing upon agriculture, it will be well, before attempting to indicate either the position established by Liebig's first works, or the direction of the progress since made, to refer very briefly to the early history of the subject.

From what we now know of the composition and of the sources of the constituents of plants, it is obvious that a knowledge of the composition of the atmosphere and of water was essential to any true conception of the main features of the vegetative process; and it is of interest to observe that it was almost simultaneously with the establishment, towards the end of the last century, of definite knowledge as to the composition of the air and of water, that their mutual relations with vegetation were first pointed out. To the collective labours of Black, Scheele, Priestly, Lavoisier, Cavendish, and Watt, we owe the knowledge that common air consists chiefly of nitrogen and oxygen, with a little carbonic acid; that carbonic acid is composed of carbon and oxygen; and that water is composed of hydrogen and oxygen; whilst Priestly and Ingenhousz, Sennebier and Woodhouse, investigated the mutual relations of these bodies and vegetable growth. Priestly observed that plants possessed the faculty of purifying air vitiated by combustion or by the respiration of animals; and, he having discovered oxygen, it was found that the gaseous bubbles which Bonnet had shown to be emitted from the surface of leaves plunged in water consisted principally of that gas. Ingenhousz demonstrated that the action of light was essential to the development of these phenomena; and Sennebier proved that the oxygen emitted resulted from the decomposition of the carbonic acid taken up.

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* Presidential Address delivered before the Chemical Section of the British Association, Swansea, 1880.

So far, however, attention seems to have been directed more prominently to the question of the influence of plants upon the media with which they were surrounded, than to that of the influence of those media in contributing to the increased substance of the plants themselves. Towards the end of the last century, and in the beginning of the present one, De Saussure followed up these inquiries; and in his work entitled, 'Recherches Chimiques sur la Végétation,' published in 1804, he may be said to have indicated, if not indeed established, some of the most important facts with which we are yet acquainted regarding the sources of the constituents stored up by the growing plants. De Saussure illustrated experimentally, and even to some extent quantitatively, the fact that in sunlight plants increase in carbon, hydrogen, and oxygen, at the expense of carbonic acid and of water; and in the case of his main experiment on the point, he found the increase in carbon, and in the elements of water, to be very closely in the proportion in which these are known to exist in the carbohydrates. He further maintained the essentialness of the mineral or ash constituents of plants; he pointed out that they must be derived from the soil; and he called attention to the probability that the incombustible constituents so derived by plants from the soil were the source of those found in the animals fed upon them.

With regard to the nitrogen which plants had already been shown to contain, Priestly and Ingenhousz thought their experiments indicated that they absorbed free nitrogen from the atmosphere; but Sennebier and Woodhouse arrived at an opposite conclusion. De Saussure, again, thought that his experiments showed rather an evolution of nitrogen at the expense of the substances of the plant than any assimilation of it from gaseous media. He further concluded that the source of the nitrogen of plants was more probably the nitrogenous compounds in the soil, and the small amount of ammonia which he demonstrated to exist in the atmosphere.

Upon the whole, De Saussure concluded that air and water contributed a much larger proportion of the dry substance of plants than did the soils in which they grew. In his view a fertile soil was one which yielded liberally to the plant nitrogenous compounds, and the incombustible or mineral constituents; whilst the carbon hydrogen, and oxygen, of which the greater proportion of the dry substance of the plant was made up, were at least mainly derived from the air and water.

Perhaps I ought not to omit to mention here that, each year for ten successive years, from 1802 to 1812, Sir Humphry Davy delivered a course of lectures on the 'Elements of Agricultural Chemistry,' which were first published in 1813, were finally revised by the author for the fourth edition in 1827, but have gone through several editions since. In those lectures, Sir Humphry Davy passed in review and correlated the then existing knowledge, both practical and scientific, bearing upon agriculture. He treated of the influences of heat and light; of the organization of plants; of the difference, and the change, in the chemical composition of their different parts: of the sources, composition, and treatment of soils; of the composition of the atmosphere, and its influence on vegetation; of the composition and the action of manures; of fermentation and putrefaction; and finally of the principles involved in various recognized agricultural practices.

With the exception of these discourses of Sir Humphry Davy, the subject seems to have received comparatively little attention, nor was any important addition made to our knowledge in regard to it during the period of about thirty years from the date of the appearance of De Saussure's work in 1804 to that of the commencement of Boussingault's investigations.

About 1834, Boussingault became, by marriage, joint proprietor with his brother-in-law of the estate of Bechelbronn, in Alsace. His brother-in-law, M. Lebel, was both a chemical manufacturer and an intelligent practical farmer, accustomed to use the balance for the weighing of manures, crops, and cattle. Boussingault seems to have applied himself at once to chemico-agricultural research; and it was under these conditions of the association of "practice with science" that the first laboratory on a farm was established.

From this time forward, Boussingault generally spent about half the year in Paris, and the other half in Alsace; and he has continued his scientific labours, sometimes in the city, and sometimes in the country, up to the present time. His first important contribution to agricultural chemistry was made in 1836, when he published a paper on the amount of nitrogen in different foods, and on the equivalence of the foods, founded on the amount of nitrogen they contained; and he compared the results so arrived at with the estimates of others founded on actual experience. Although his conclusions on the subject have doubtless undergone modification since that time, the work itself marked a great advance on previously existing knowledge and modes of viewing the question.

In 1837, Boussingault published papers—on the amount of gluten in different kinds of wheat, on the influence of the clearing of forests on the diminution of the flow of rivers, and on the meteorological influences affecting the culture of the vine. In 1838 he published the results of an elaborate research on the principles underlying the value of a rotation of crops. He determined by analysis the composition, both organic and inorganic, of the manures applied to the land, and of the crops harvested. In his treatment of the subject he evinced a clear perception of the most important problems involved in such an inquiry; some of which, with the united labours of himself and many other workers, have scarcely yet received an undisputed solution.

Thus, in the same year (1838), he published the results of an investigation on the question whether plants assimilate the free or uncombined nitrogen of the atmosphere; and although the analytical methods of the day were inadequate to the decisive settlement of the point, his conclusions were in the main those which much subsequent work of his own, and much of others also, has served to confirm.

As a further element of the question of the chemical statistics of a rotation of crops, Boussingault determined the amount and composition of the residues of various crops; also the amount of constituents consumed in the food of a cow and of a horse respectively, and yielded in the milk and excretions of the cow, and in the excretions of the horse. Here, again, the exigencies of the investigation he undertook were beyond the reach of the known methods of the time. Indeed, rude as the art of agriculture is generally considered to be, the scientific elucidation of its practices requires the most refined, and very varied, methods of research; and a characteristic of the work of Bossingault may be said to be, that he has frequently had to devise methods suitable to his purpose, before he could grapple with the problems before him.

In 1839, chiefly in recognition of his important contributions to agricultural chemistry, Boussingault was elected a member of the Institute; and in 1878, thirty-nine years later, the Council of the Royal Society awarded to him the Copley Medal, the highest honour at their disposal, for his numerous and varied contributions to science, but especially for those relating to agriculture.

The foregoing brief historical sketch is sufficient to indicate, though but in broad outline, the range of existing knowledge on the subject of agricultural chemistry prior to the appearance of Liebig's memorable work in 1840. It will be seen that some very important and indeed fundamental facts had already been established in regard to vegetation, and that Boussingault had not only extended inquiry on that subject, but he had brought his own and previous results to bear upon the elucidation of long recognized agricultural practices. There can be no doubt that the data supplied by his researches contributed important elements to the basis of established facts upon which Liebig founded his brilliant generalizations. Accordingly, in 1841, Dumas and Boussingault published, jointly, an essay which afterwards appeared in English under the title of 'The Chemical and Physiological Balance of Organic Nature;' and, in 1843, Boussingault published a larger work, which embodied the results of many of his own previous original investigations.

But there can be no doubt that the appearance of Liebig's two works, which were contributions made in answer to a request submitted to him by the Committee of this Section of the British Association, constituted a very marked epoch in the history of the progress of agricultural chemistry. In the treatment of his subject he not only called to his aid the previously existing knowledge directly bearing upon it, but he also turned to good account the more recent triumphs of organic chemistry, many of which had been won in his own laboratory. Further, a marked feature of his expositions was the adoption of what may be called the *statistical* method—I use the statistical rather than quantitative, as the latter expression has its own technical meaning among chemists, which is not precisely what I wish to convey.

It seems that, notwithstanding the conclusive evidence afforded by the direct experiments of De Saussure and his predecessors, vegetable physiologists continued to hold the view that the humus of the soil was the source of the carbon of vegetation. Not only did Liebig give full weight to the evidence of the experiments of De Saussure and others, and illustrate the possible or probable transformations within the plant already established in organic chemistry, but he demonstrated the utter impossibility of humus supplying the amount of carbon assimilated over a given area. He pointed out that humus itself was the product of previous vegetable growth, and that it could not therefore be an original source of carbon; and that, from the degree of its insolubility, either in pure water or in water containing alkaline or earthy bases, only a small fraction of the carbon assimilated by plants could be derived from the amount of humus that could possibly enter the plant in solution. He maintained that so far as humus was beneficial to vegetation at all, it was only by its oxidation, and a consequent supply of carbonic acid within the soil; a source which he considered only of importance in the early stages of the life of a plant, and before it had developed and exposed a sufficient amount of green surface to the atmosphere to render it independent of soil supplies of carbonic acid.

With regard to the hydrogen of plants, at any rate that portion of it contained in their non-nitrogenous products, he maintained that its source must be water; and that the source of the oxygen was either that contained in carbonic acid or that in water.

With regard to the nitrogen of vegetation, both from the known characters of free nitrogen, and as he considered a legitimate deduction from direct experiments, he argued that plants did not take up free or uncombined nitrogen, either from the atmosphere, or dissolved in water and so absorbed by the roots. The source of the nitrogen of vegetation was, he maintained, ammonia; the product of the putrefaction of one generation of plants and animals supplying the ammonia for the next. He pointed out that, in the case of a farm receiving nothing from external sources, and selling off certain products, the amount of nitrogen in the manure derived by the consumption of some of the vegetable produce on the farm itself, together with that due to the refuse of the crops, must always be less than was contained in the crops grown; and he concluded that though the quantity so returned to the land was important, a main source of the nitrogen assimilated over a given area was that brought down from the atmosphere in rain.

There can be no doubt that, owing to the limited and defective experimental evidence then at command on the point, Liebig at that time (as he has since) greatly overestimated the amount of ammonia available to vegetation from that source. In Boussingault's '*réclamation*' already referred to, he gave much more prominence to the importance of the nitrogen of manures. In Liebig's next edition (in 1843) he combated the notion of the relative importance of the nitrogen of manures; maintained, in opposition to the view put forward in his former edition that the atmosphere afforded a sufficient supply of nitrogen for cultivated as well as for uncultivated plants; that the supply was sufficient for the cereals as well as for leguminous plants; that it was not necessary to supply nitrogen to the former; and he insisted very much more strongly than formerly on the relative importance of the supply of the incombustible, or, as he designated them, the "inorganic" or "mineral," constituents.

As to the incombustible or mineral constituents themselves, Liebig adduced many illustrations in proof of their essentialness. He called attention to the variation in the composition of the ash of plants grown on different soils; and he assumed a greater degree of mutual replaceability of one base by another, or of one acid by another, than could be now admitted. He traced the difference in the mineral composition of different soils to that of the rocks which had been their source; and he seems to have been led by the consideration of the gradual action of "*weathering*," in rendering available the otherwise locked-up stores, to attribute the benefits of fallow exclusively to the increased supply of the incombustible constituents which would by its agency be brought into a condition in which they could be taken up by plants.

The benefits of an alternation of crops Liebig considered to be in part explained by the influence of the excreted matters from one description of crop upon the growth of another. He did not attach weight to the assumption that such matters would be directly injurious to the same description of crop; but he supposed rather that the matters excreted were those which the plant did not need, and would therefore be of no avail to the same description of plant, but would be of use to another. He, however, attributed much of the benefits of a rotation to different mineral constituents being required from the soil by the respective crops.

Treating of manure, he laid the greatest stress on the return by it of the potass and the phosphates removed by the crops. But he also insisted on the importance of the nitrogen, especially that in the liquid excretions of animals, and condemned the methods of treatment of animal manures by which the ammonia was allowed to be lost by evaporation. It is curious and significant, however, that some of the passages in his first edition, in which he the most forcibly urges the value of the nitrogen of animal manures, are omitted in the third and fourth editions.

The discussion of the processes of fermentation, decay and putrefaction, and that of poisons, contagions, and miasma, constituted a remarkable and important part of Liebig's first report. It was the portion relating to poisons, contagions and miasms, that he presented to this Section as an instalment, at the meeting of the Association held at Glasgow in 1840. It was in the chapters relating to the several subjects here enumerated that he developed so prominently his views on the influence of contact in inducing chemical changes. He cited many known transformations, other than those coming under either of the heads in question, in illustration of his subject; and he discussed with great clearness the different conditions occurring, and the different results obtained, in various processes—such as the different modes of fermenting beer, the fermentation of wine from different kinds of grapes, the production of acetic acid, etc. As is well known, he claimed a purely chemical explanation for the phenomena involved in fermentation. He further maintained that the action of contagions was precisely similar. In his latest writings on the subject (in 1870), he admits some change of view; but it is by no means easy to decide exactly how much or how little of modification he would wish to imply.

Liebig's second report, presented at the meeting of this Association in 1842, and published under the title of 'Animal Chemistry, or Organic Chemistry in its applications to Physiology and Pathology,' perhaps excited even more attention than his first; and, probably from the manner as much as from the matter, aroused a great deal of controversy, especially among physiologists and physicians. Liebig was severe upon what he considered to be a too exclusive attention to morphological characters in physiological research, and at any rate too little attention to chemical phenomena, and, so far as these were investigated, an inadequate treatment of the subject according to strictly quantitative methods.

He combated the view that nervous action, as such, could be a source of any of the heat of the body; and he adduced numerous illustrations and calculations in support of the view that the combustion of carbon and hydrogen in the system was sufficient to account for, and was the only source of animal heat.

He compared and contrasted the general composition of plants and animals. In accordance with Mulder, he pointed out that whilst plants formed the nitrogenous bodies which they contain from carbonic acid, water and ammonia, animals did not produce them, but received them ready-formed in their vegetable food; that, in fact, the animal begins only where the plant ends. But, going beyond Mulder, and beyond what had then, or has since, been established, he maintained the identity in composition of the admittedly analogous nitrogenous compounds in plants and in the blood of animals.

Omitting the fat which the carnivora might receive in the animals they consumed, he stated the characteristic difference between the food of carnivora and herbivora to be, that the former obtained the main proportion of their respiratory material from the waste of tissue; whilst the latter obtained a large amount from starch, sugar, etc. These different conditions of life accounted for the comparative leanness of carnivora and fatness of herbivora.

He maintained that the vegetable food consumed by herbivora did not contain anything like the amount of fat which they stored up in their bodies; and he showed how nearly the composition of fat was obtained by the simple elimination of so much oxygen, or of oxygen and a little carbonic acid, from the various carbohydrates. Much less oxygen would be required to be eliminated from a quantity of fibrine, etc., containing a given amount of carbon, than from a quantity of carbohydrates containing an equal amount of carbon. The formation of fatty matter in plants was of the same kind; it was the result of a secondary action, starch being first formed from carbonic acid and water.

He concluded from the facts adduced that the food of man might be divided into the *nitrogenised* and the *non-nitrogenised* elements. The former were capable of conversion into blood, the latter incapable of such transformation. The former might be called the *plastic elements of nutrition*, the latter *elements of respiration*. From the plastic elements, the membranes and cellular tissue, the nerves and brain, cartilage, and the organic part of bones, could be formed; but the plastic substance must be received ready-made. Whilst gelatine or chondrine was derived from fibrine or albumen, fibrine or albumen could not be reproduced from gelatine or chondrine. The gelatinous tissues suffer progressive alteration under the influence of oxygen, and the materials for their re-formation must be restored from the blood. It might, however, be a question whether gelatine taken in food might not again be converted into cellular tissue, membrane, and cartilage in the body.

At that time, adopting and attaching great importance to Mulder's views in regard to proteine, he says:—"All the organic nitrogenised constituents of the body, how different soever they may be in composition, are derived from proteine. They are formed from it by the addition or subtraction of the elements of water or of oxygen, and by resolution into two or more compounds."

He seeks to trace the changes occurring in the conversion of the constituents of food into blood, of those of blood into the various tissues, and of these into the secretions and excretions.

He states that the process of chymification takes place in virtue of a purely chemical action, exactly similar to those processes of decomposition or transformation which are known as putrefaction, fermentation, or decay. Thus, the clear gastric juice contains a substance in a state of transformation, by the contact of which with the insoluble constituents of the food they are rendered soluble, no other element taking any share in the action excepting oxygen and the elements of water. All substances which can arrest the phenomena of fermentation and putrefaction in liquids, also arrest digestion when taken into the stomach. Putrefying blood, white of egg, flesh, and cheese, produce the same effects in a solution of sugar as yeast or ferment; the explanation being, that ferment, or yeast, is nothing but vegetable fibrine, albumen, or caseine, in a state of decomposition.

Referring to the derivation of the animal tissues, he says they all contain, for a given amount of carbon, more oxygen than the nitrogenous constituents of blood. In hair and gelatinous membrane there is also an excess of nitrogen and hydrogen, and in the proportions to form ammonia. We may suppose an addition of these elements, or a subtraction of carbon, the amount of nitrogen remaining the same. The gelatinous substance is not a compound of proteine; it contains no sulphur, or phosphorus; and it contains more nitrogen, or less carbon than proteine.

He next, as he says, attempts to develop analytically the principal metamorphoses which occur in the animal body. He adds that the results have surprised himself no less than they will others, and have excited in his own mind the same doubts as others will conceive. He nevertheless gives them, because he is convinced that the method by which they have been obtained is the only one by which we can hope to acquire an insight into the nature of organic processes.

Referring to the animal secretions, he argues that they must contain the products of the metamorphosis of the tissues. He says a starving man with severe exertion secretes more urea than the most highly fed individual in a state of rest; and he combats the idea that the nitrogen of the food can pass into urea without having previously become part of an organised tissue.

Having shown the chemical relations of bile and urine to the proteine bodies, he illustrates, by formulæ, the connection between allantoine and the constituents of the urine of animals that respire. He insists that in the herbivora the carbohydrates must take part in the formation of bile; and he calculates the number of equivalents of proteine, starch, oxygen, and water, which would yield a given number of equivalents of urea choleic acid, ammonia, and carbonic acid. The non-nitrogenous constituents in the food of the herbivora retard the metamorphosis of the nitrogenous bodies, rendering this less rapid than in the carnivora. It may be said that proteine, starch, and oxygen give the secretions and excretions, carbonic acid by the lungs, urea and carbonate of ammonia by the kidneys, choleic acid by the liver. It is the study of the phenomena which accompany the metamorphoses of the food in the organism, the discovery of the share which the atmosphere and the elements of water take in these changes, by which we shall learn the conditions necessary for the production of a secretion or of an organized part.

He traces the possible formation of taurine from caffeine or asparagine by their assumption of oxygen and of the elements of water. And from the composition of the vegetable alkaloids he suggests the possibility of their taking a share in the formation of new, or the transformation of existing, brain and nervous matter.

Finally, in reference to these various illustrations and considerations, he says, however hypothetical they may appear, they deserve attention in so far as they point out the way which chemistry must pursue if she would really be of service to physiology and pathology. Chemistry, he says, relates to the conversion of food into the various tissues and secretions, and to their subsequent metamorphosis into lifeless compounds.

After this lapse of time, it will certainly be granted that, quite irrespectively of the admissibility or otherwise of the particular illustration adduced, or of the truth or error of any of the conclusions drawn—and some at least are so true that they seem to us now all but truisms, and you may be disposed to ask me why I should tell you over again a story so often told before—there is no doubt that Liebig's manner of treating the subject did exert an immense influence by stimulating investigation, by fixing attention on the points to be investigated, and on the methods that must be followed, and thus by leading to the establishment or the correction of any special views he put forward, and to a vast extension of our knowledge on the complicated questions involved.

In the third part of Liebig's second volume he treats of the phenomena of motion in the animal organism. It is to his views in regard to one aspect only of this very wide and very complicated subject that I propose to call your attention here, as it is chiefly in so far as that aspect is concerned that the question is of interest from the point of view of the agricultural chemist. He says:—

"We observe in animals that the conversion of food into blood, and the contact of the blood with the living tissues, are determined by a mechanical force, whose manifestation proceeds from distinct organs, and is effected by a distinct system of organs, possessing the property of communicating and extending the motion which they receive. We find the power of the animal to change its place and to produce mechanical effects by means of its limbs dependent on a second similar system of organs or apparatus."

He points out that the motion of the animal fluids proceeds from distinct organs (as, for example, that of the blood from the heart), which do not generate the force in themselves, but receive it from other parts by means of the nerves; the limbs also receive their moving force in the same way. He adds:—"Where nerves are not found, motion does not occur." Again:—

"As an immediate effect of the manifestation of mechanical force, we see that a part of the muscular substance loses its vital properties, its character of life: that this portion separates from the living part, and loses its capacity of growth and its power of resistance. We find that this change of properties is accompanied by the entrance of a foreign body (oxygen) into the composition of the muscular fibre . . ; and all experience proves that this conversion of living muscular fibre into compounds destitute of vitality is accelerated or retarded according to the amount of force employed to produce motion." He adds that a rapid transformation of muscular fibre determines a greater amount of mechanical force, and that conversely a greater amount of mechanical motion determines a more rapid change of matter.

"The change of matter, the manifestation of mechanical force, and the absorption of oxygen, are, in the animal body, so closely connected with each other that we may consider the amount of motion and the quantity of living tissue transformed as proportional to the quantity of oxygen inspired and consumed in a given time by the animal." Again:—

"The production of heat and the change of matter are closely related to each other; but although heat can be produced in the body without any change of matter in living tissues, yet the change of matter cannot be supposed to take place without the co-operation of oxygen."

Further, on the same point:—"The sum of force available for mechanical purposes must be equal to the sum of the vital forces of all tissues adapted to the change of matter. If, in equal times, unequal quantities of oxygen are consumed, the result is obvious in an unequal amount of heat liberated, and of mechanical force. When unequal amounts of mechanical force are expended, this determines the absorption of corresponding and unequal quantities of oxygen."

Then, more definitely still, referring to the changes which take place coincidently with the exercise of force, and to the demands of the system for repair accordingly, he says:—

"The amount of azotized food necessary to restore the equilibrium between waste and supply is directly proportional to the amount of tissues metamorphosed. The amount of living matter, which in the body loses the condition of life, is, in equal temperatures, directly proportional to the mechanical effects produced in a given time. The amount of tissue metamorphosed in a given time may be measured by the quantity of nitrogen in the urine. The sum of the mechanical effects produced in two individuals, in the same temperature, is proportional to the amount of nitrogen in their urine, whether the mechanical force has been employed in the voluntary or involuntary motions, whether it has been consumed by the limbs, or by the heart and other viscera."

Thus, apparently influenced by the physiological considerations which have been adduced, and notwithstanding in some passages he seemed to recognize a connection between the total quantity of oxygen inspired and consumed and the quantity of mechanical force developed, Liebig nevertheless very prominently insisted that the amount of muscular tissue transformed—the amount of nitrogenous substance oxidated—was the measure of the force generated. He accordingly distinctly draws the conclusion that the requirement for the azotized constituents of food will be increased in proportion to the increase in the amount of force expended.

It will be obvious that the question whether in the feeding of animals for the exercise of mechanical force, that is, for their labour, the demands of the system will be proportionally the greater for an increased supply of the nitrogenous or of the non-nitrogenous constituents of food, is one of considerable interest and practical importance. To this point I shall have to refer further on.

(*To be continued.*)

QUASSIA v. MOSQUITOES.

An infusion of 1 pound of quassia to 8 gallons of water has been recently recommended, not only as a preventive of blight in plants and as effectual against green fly and other insects, but when applied to the face and hands as a thorough protection against mosquitoes. The editor of the *Canadian Pharmaceutical Journal* says, "This may be all very well for English gnats, but we fancy that the American insect, that bites through a pair of cow hide boots soaked in carbolic acid, will pay very little attention to common house-fly poison."

The Pharmaceutical Journal.

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MEDICO-PHARMACEUTICAL ABUSES IN THE UNITED STATES.

THE Philadelphia Medico-Legal Society is a society of which we confess we know little beyond the fact that it appears to rejoice in a rather high-sounding title, and that it would seem to have adopted and made public a report from a committee on the subject of medico-pharmaceutical abuses. We intend to show no disrespect to this society therefore when we say that its ordinary proceedings and conclusions would not be likely to present many features of interest to the readers of this Journal, and we propose to refer to the report—which in its literary style and the faith manifested by the reporters in the efficiency of some of their conclusions betrays considerable traces of juvenility—only because it discusses several topics that are of importance to pharmacists on this side of the Atlantic as well as the other.

The report commences by drawing attention to some "mistakes" into which physicians are alleged to have perhaps unconsciously drifted. The first "mistake" charged against the physician is that, unlike as "in the earlier days of the healing art, "when the professional status of medical men was "animated by a higher atmosphere of professional "tone," he now, by allowing the compounding and dispensing to drift into the pharmacists' hands, has practically delegated to another class almost the exclusive management of the therapeutics of medical practice and has abdicated the driving of the medical team. Moreover, it is alleged that the physician has by the system of prescription writing cultivated in the public the habit of relying upon the judgment of the pharmacist, and developed so much confidence in his discretion and skill that to a large degree the pharmacist and not the physician has become the one consulted for remedies and treatment. Another consequence of this enhanced importance of the druggist is said to be that he is able to select a particular physician and specially "run" him to the detriment of his less favoured *confrères*.

The suggestion implied in the first of these allegations, that each physician should, like his earliest predecessors in the practice of the healing art or a modern Indian "medicine man," prepare as well as dispense and prescribe his medicines is one that not even the countenance of a medico-legal society can render worthy of discussion. As to the consequence said to follow the increased confidence in the pharmacist, due to his being entrusted with the making up of physicians' prescriptions, it may safely be said that, whatever may be the case in Pennsylvania, in this country there would be nothing so conducive to the reduction of counter practice within the narrowest limits as the fuller occupation of the pharmacist in his more congenial and natural function of dispensing. At any rate, it is not quite clear how the proclivities of the pharmacist towards "running" a particular physician can be compatible with his greed for prescribing himself.

Another mistake attributed to the physician we can only mention, since criticism of the allegation lies outside our domain. It is the practice of charging round fees for professional visits, even when there is little occasion for such visits, and the prescribing of unnecessarily large quantities of expensive drugs. This, it is alleged, builds up the business of the druggist, while it depletes the pocket of the patient and drives him to the patent medicine vendor or the homœopathist.

The last mistake, alleged, however, only against some Philadelphia physicians, is that they have smirched the reputation of the profession by making a dirty compact with unscrupulous druggists for a percentage on prescriptions diverted to the stores of the latter. A similar "mistake" has been heard of in this country, but when we read that in Philadelphia such prescriptions are made up at excessive prices, and that bottles and boxes of unused medicine are needlessly set aside by the astute doctor at successive visits to be substituted by others no less expensive, we are reminded of the paradoxical "deeper still" of the lowest depths.

The report next draws attention to a series of complaints which it is considered physicians are entitled to make against druggists in respect to various customs that injuriously affect the professional and business functions of the medical practitioner, and the first of these relates to unfaithfulness in making up prescriptions. The report here takes a hypothetical form, and says that if an expensive drug be prescribed and a cheaper be substituted, if preparations not up to the standard formulæ be used, or if one preparation be substituted for another not in stock, the pharmacist so doing practises a deception wholly at variance with his duties as a compounder. With this opinion we entirely concur, but cannot help remarking that there is much virtue in the "if," and that otherwise the complaint has hardly a fair *raison d'être*, for whilst upon mere conjecture it ought not to be made, with certainty as to such a practice by any pharmacist the remedy would lie in the prescriber's hands.

The subject of the next complaint is the repetition of prescriptions by pharmacists without the order of the prescriber, and it is urged that there can be no doubt that a vicious habit of consuming narcotics or alcohol has been in numerous cases engendered by this practice, and further that many persons have undoubtedly been permanently injured by overdrugging the system with remedies, potent in themselves as correctives of diseased conditions, but contra-indicated except where used under the observation of a prudent prescriber. In the opinion of the reporters the pharmacist who makes up a prescription repeatedly without fresh instructions from the prescriber, or who dispenses it for a person for whom it was not originally prescribed, "assumes an unwarranted responsibility "wholly impertinent to the province of his vocation "as a responder to the dicta of the physician, who "adapted his prescription to the indications of a "particular case." This question of repeating prescriptions is, however, one that cannot be settled by simple denunciation of pharmacists by the medical profession; it is one upon which the public will have its say as a party concerned. Moreover it cannot be maintained that the objections urged apply to all prescriptions to the same extent, and in the case of a prescription likely to prove hurtful if indiscriminately repeated, the medical man always has it in his power at least to order it not to be dispensed more than once.

But the complaint which is made in the bitterest tones has for its theme the sale of patent and proprietary medicines, and the injury caused to regular practice and the general medical profession by the part pharmacists have taken in this traffic is warmly denounced and described as beyond computation. "Was the pushing or sale of patent nostrums the "object of the pharmaceutist's studies and graduation?" it is indignantly asked; whilst the two succeeding questions, "Who is it that has trained the people "to go to drug stores for all the paraphernalia of "patent medicine makers?" and "Who is it that is "ever putting the endlessness of these stuffs into stock "and introducing them to the people for percentages on sales?" recall the style of a ditty that once had considerable popularity in the nursery. Notwithstanding, however the virago shrillness of the scolding there is some justice in this remonstrance against the progressive development of the nostrum trade, which, however, has had its abettors among the members of the medical profession also, and the pharmacists of this country are at last becoming alive to the fact that although it for a time presented an alluring prospect it is destructive to the best interests of true pharmacy.

We have thus referred to the principal points in this report, not because we are inclined to attribute to it any factitious importance, but because it seemed to have some interest as showing that the transatlantic "medico-pharmaceutical abuses" are very similar in their nature to grievances that are not unfrequently put forward in this country. So far as these grievances are real, every well wisher to the art of medicine—and pharmacy as a part of it—will be desirous of their removal. But in our opinion this will not be effected by the opening of opposition drug stores or the drawing up of a black list of offending pharmacists, as proposed by the present reporters, but by cultivating an increase in the mutual respect and confidence between prescribers and dispensers, and the entrusting of dispensing more entirely to the pharmacists' hands, notwithstanding that the reporters curiously enough indicate a similar course in the past as having been the origin of the evils lamented.

ALLEGED MISUSE OF PILOCARPINE.

An inquiry has been in progress in Cork, which turns upon a point not without its interest to those inclined to experiment with new remedies. It appears, according to the account given in *The Times* of Thursday last, that a boy who was admitted to the Fever Hospital during the recent epidemic of scarlatina in Cork came under the attention of Dr. McNaughton Jones, who considered him to be suffering from suppressed scarlatina. Dr. Jones prescribed the usual remedies at first, but afterwards, regarding the case as a serious one and thinking the boy not likely to recover, he decided to inject pilocarpine subcutaneously. A ten per cent. solution was after some difficulty obtained and equal to one-third of a grain of the alkaloid injected under the patient's skin. According to the evidence of the resident surgeon of the hospital the injection was followed by a marked change for the worse; the child became delirious and a cold clammy perspiration, with extreme depression of the vital powers, no pulse and great restlessness followed. Death supervened in five hours. A charge was then brought forward by the father of the boy that Dr. Jones had caused the death of the child by the administration of the pilocarpine, and the investigation which has been conducted by the committee of the Hospital has already occupied five days. In support of the charge it was alleged that Dr. Jones had used the pilocarpine as a simple experiment; that he had no experience in the hypodermic use of the drug and that he had adopted the novel treatment without consultation with his colleagues. On the other hand it was contended that the injection of pilocarpine was neither novel nor dangerous, and various authorities were quoted for its use in scarlatina and exanthematous fevers where there is a suppression of the eruption. Dr. Jones also said that he had frequently used it before in the treatment of ophthalmic diseases. The treatment adopted by Dr. Jones was endorsed by Professor O'Keeffe, of Queen's College, Cork, as well as by Dr. Duffey, of Mercer's Hospital, Dublin. The inquiry, so far as taking evidence is concerned, is understood to be closed, but at the time of writing the committee had not given its decision.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Continued from page* 221.)

The next paper read was entitled—

THE RESTORATION OF DISCOLOURED SYRUP OF IODIDE OF IRON.

BY THOS. B. GROVES, F.C.S.

Numberless articles by accredited writers in the *Pharmaceutical Journal* and elsewhere have shown that the preparation of a nearly colourless syrup of iodide of iron is not a difficult matter, and there has been a pretty general concurrence in the belief that the process of the British Pharmacopœia leaves little to be desired. As to its keeping properties, there has been and probably there still is a good deal of difference of opinion; some going so far as to say that it keeps perfectly well, and needs no special precaution for its preservation, whilst others have devised elaborate ways of bottling and storing or chemical treatment intended to enable the pharmacist to dispense a creditable article when called upon by the prescriber. It is doubtless true that when made with pure sugar, a substance by-the-bye difficult at all times to procure, the syrup, when in reasonable demand, does keep fairly well, so well in fact that well accustomed dispensing establishments fail to see any difficulty in the matter. Such, however, is not the case with those who perhaps are not called upon to dispense the article once in a month, or even less frequently. Then on searching the cupboard it is often found that the syrup without *some* treatment is not presentable, and frequently it happens that for want of knowing what to do in the case the syrup is sacrificed and the patient incommoded. With the view of assisting my brother pharmacists when in this dilemma I venture to offer a few observations. I must, however, confess that instances have to my knowledge occurred where the pharmacist has not been too scrupulous, and ignoring the refinements of pharmacy has not hesitated to supply his customer with a discoloured syrup. I have myself been hauled over the coals for supplying a colourless and comparatively flavourless article, "apparently not so strong as Mr. Dash's"; in fact have suffered for a time, as did George the First's cooks, who supplied his majesty's table with fresh oysters, "not so 'igh in flaviour" as those to which his Hanoverian Highness had been accustomed.

The discoloration of syrup of iodide of iron is doubtless due mainly to the presence of free iodine; when turbidity is present there is probably also a basic persalt of iron in suspension which adds to the effect. To get rid of both of these it is only necessary to dilute the syrup with say a third of its volume of water, to boil briskly for a few minutes, then filter through paper, and finally reduce by evaporation to its original bulk. The syrup will then have resumed its original appearance.

The strength of the preparation will not have been materially altered by this treatment, for it takes a wonderfully small quantity of iodine in the free state to colour a large amount of liquid. Thus it will be found that one drop of liquor ferri perchloridi added to half a fluid ounce of freshly prepared syrup of iodide of iron will produce in it the tint of golden sherry, to be completely dissipated by a few minutes' boiling. There is, I am aware, nothing new in this treatment by boiling, etc.; it has, I know, been mentioned already by some writer whose name I have unhappily forgotten, but whose useful though often unused suggestion has not escaped me.

I will now refer to some experiments I have recently made in the same direction, and having for their object the avoidance of the delay attendant on the process already mentioned.

The text-books tell us that when a persalt of iron is brought in contact with a soluble iodide, the salt is reduced to the proto condition, and free iodine is eliminated. It was at one time thought that under these circumstances a per-iodide was formed, but Mr. Squire, junr., some years since proved conclusively that such was not the case by showing that the colour could be removed from such a liquid by simply shaking it with an ordinary solvent for iodine such as benzine or chloroform. If to such a liquid containing iodine in solution, caustic potash or soda be added, precipitation of ferric oxide will result, and the iodine will combine with the base of the precipitant. Applied to a discoloured syrup of iodide of iron the process does not answer, and that in consequence of the sugar, as it appears to me, exercising a solvent action on the precipitated oxides. In fact it is after filtration more discoloured than ever.

In a paper published in the ninth volume, second series, of the *Pharmaceutical Journal* ("Preservation of Syrup of Iodide of Iron"), I pointed out the effect produced by the presence in the syrup of a trace of phosphoric acid, how that by seizing at the moment of its formation the peroxide of iron and rendering it insoluble, it effectually prevented the reaction ending in the elimination of free iodide that would otherwise have resulted. Syrup, even dilute, will keep for years after being so treated, but of course one gets instead of the discoloration the slight turbidity occasioned by the deposit of perphosphate of iron; this however, being colourless and easy of removal by deposit or filtration, is of but little moment. Addition of phosphoric acid to syrup already discoloured is of no avail; the mischief has been done and no persalt remains for it to act upon. If, however, previous to the addition of the acid, a few drops of liquor potassæ be stirred into the syrup the colour disappears almost immediately, and, the acid being in slight excess, will not again return.

Thus I found by experiment that when to half a fluid ounce of syrup discoloured by one drop of liquor ferri perchloridi, I added enough liquor potassæ (the amount would vary according to the acidity of the syrup) to produce a distinct greenish coloration, the further addition of two drops of dilute phosphoric acid restored the syrup to its original tint.

The use of hyposulphite for this purpose is of course well known, but its employment is in my opinion not so recommendable as that I have just described.

The paper will, I fear, be regarded as simply hateful and utterly unorthodox by the few; but the many will, I hope, not be displeased to learn how of two evils to choose the less.

The President said the thanks of the Conference were due to Mr. Groves for this paper, which was interesting pharmaceutically to them all. There were two very important points in it,—one the decoloration of the coloured syrup, and the other the question of the purity of sugar. The latter had no doubt presented itself to all pharmacists who had endeavoured to obtain pure sugar.

Mr. **UMNEY** said that from 70 to 80 per cent. of the sugar of commerce at the present day was beet sucrose, and such would not do for the manufacture of syrup of iodide of iron, so far as his experience went. He had seen a syrup made from this sugar, even when it had been brought most accurately to the proper specific gravity, become after a time perfectly solid. He had compared it with syrup made in exactly the same way from English refined cane sucrose, and the same result did not take place. He had not had an opportunity of investigating whether this was due to the presence of inverted sugar in the beet sucrose, but perhaps some one could throw some light upon the question.

Mr. **HUGHES** said he used Martineau's sugar in making all his syrups.

Mr. **ANDREWS** could quite corroborate what Mr. Umney said. He had had a great deal of trouble with various syrups, and particularly with syrup of the phosphates and Easton's syrup, from discoloration. He had in fact, commenced a series of experiments on the subject, intending to communicate the results to that meeting, but pressure of other business, public and private, had prevented his completing the investigation. He felt sure, however, that such a paper would be most valuable. He had adopted the plan of procuring his sugar from one of the large lozenge houses in London, for he could not get it pure from the neighbouring grocers, and by getting better sugar his results were much more favourable.

Mr. **Naylor** said he had noticed latterly amongst the sugar which had come into the market, especially American sugar, that it contained an appreciable quantity of sulphur; and when a syrup had been made containing acid salts, such as hypophosphites or phosphorous acid, where the phosphorous acid was somewhat in excess, after a time the syrup had become turbid and had given off sulphuretted hydrogen. He had not estimated the quantity, but it was quite sufficient to be detected by the smell, and of course it could be readily detected by the ordinary tests, such as acetate of lead. There appeared to him to be very considerable difficulty in obtaining pure cane sugar. There was a difficulty in getting any quantity of Martineau's sugar, according to his experience, but he should like to know the opinion of those who were in the habit of buying large quantities. With reference to the manufacture of iodide of iron, he was scarcely prepared to say that he was dissatisfied with the Pharmacopœia process, but at the same time he believed that manufacturers did not adhere strictly to the directions given. One defect in the process was that the mixture was ordered to be boiled to effect the combination of the iodine and iron. According to his experience there was no such necessity. Again, if the solution were filtered and the filtrate washed with cold water, a basic iron salt would be thrown down, and it would be quite impossible to keep that liquor so that it would retain its colour. In fact it would begin to show signs of decomposition in half an hour. But if the iodide of iron had not been boiled, and if there were an excess of iron, which appeared to influence it to some extent, the liquor could be kept for some few hours. If no wash water were used it would not throw down a basic compound of iron. Of course it would not keep for an indefinite time; but for a reasonable time it would show no change.

Dr. **Symes** said the subject of keeping syrup of iodide of iron had been a matter of discussion in the *Pharmaceutical Journal* and other papers connected with chemistry and pharmacy almost as long as he could remember. Mr. Groves mentioned a druggust searching his cupboard for this preparation and finding it discoloured; but he should say the cupboard was about the last place in which to keep it. If it were filled into small bottles and these put in a strong light it would keep much better. He had met with samples which had readily become decolorized by being treated in the way mentioned, but on the other hand he had met with specimens which entirely resisted such efforts. It remained even yet a problem what caused the discoloration. He scarcely thought it was free iodine, but believed it was a case of oxidation. The subject, however, of most interest, was probably that of the sugar, which some few years ago he had dealt with, though not perhaps so fully as it deserved, and he was not then so thoroughly aware as he was now of one common impurity in sugar. If he remembered rightly he then pointed out that if beet sugar were properly treated it could be made almost as pure as cane sugar. For instance Say's sugar was regarded by some as the best to use, and that was entirely from beet; it was the best refined French sugar. The American granulated sugar which he then mentioned he had since used, and found it to be probably the purest; and it was reliable as being cane sugar, and certainly had not to undergo the same treatment as beet sugar had. The fact was, crude cane sugar required much less manipulation than beet sugar, to arrive at a state of purity, and consequently there would appear to be more stability about it. The greatest difficulty in the present day, was not the small quantity of glucose which might exist, so much as the presence of sulphur, which arose from the use of ultramarine to make yellowish sugars more white. If a moist crystal of citric acid were wrapped up in a sheet of blue writing paper, and held in a warm hand, it would smell of sulphuretted hydrogen. He had observed this when using such paper to wrap up chemicals, and Mr. Tanner had also noticed it quite independently. Precisely the same thing occurred in a great deal of refined sugar, which was rendered white by the use of ultramarine. He happened unfortunately to have a cask of German granulated sugar, made to look like the American, because that had obtained a reputation as a pure article, and if he made a syrup from it there would be a decidedly blue scum on the surface. He thought pharmacists should insist on having pure sugar, and if there were a sufficient protest made against this kind of adulteration some good might be done. He did not see why public analysts should not take it up with far greater benefit than many of the matters which they now turned their attention to, and it would go far to remedy the evil they were especially considering.

Mr. **Ellinor** said that some years ago he made some syrup of iodide of iron with sugar obtained from a grocer, which turned colour, and almost solidified, and neither boiling nor anything else could restore the colour. He asked the grocer what kind of sugar it was, and was told it was the best French sugar. He therefore concluded that it was some adulteration which caused the change of colour.

Professor **Attfield** suggested that Mr. Andrews or some one else might follow up the subject he had suggested and make experiments on the solubility of cane sugar as distinguished from beet sugar. He had an impression that these two sugars even when absolutely pure did differ somewhat, though a chemist, *quâ* a chemist, might not bo able to say how. Possibly if some physical experiments were made it would be found that they were only isomeric with each other, not identical.

Mr. **Andrews**, who was understood to consent, said he knew it was a fact that they differed in solubility.

Professor **Attfield** said Mr. Groves raised the question why syrup of iodide of iron was not discoloured when a little potash or soda was added, and had suggested that it might have something to do with the ferric compound being kept in solution by the sugar. The salt which would be precipitated by an alkali no doubt would be kept in solution by the sugar. The fact was there probably was a persalt of iron present; though what that persalt might be he did not know. It might be ferric saccharate; but there was possibly a persalt of iron which was reduced to a ferrous salt with the liberation of iodine, just as perchloride or persulphate would be; and so long as that were so a few drops of solution of alkali would not suffice for removal of free iodine.

Mr. **Clark** asked if Professor Attfield had ever tried the large crystals of sugar such as were introduced by Finzl, of Bristol; because he believed that all English refiners now used beet sugar, but these large crystals could not be made except from cane sugar. This sugar had only been boiled down once from the sugar cane, and it gave these large crystals. He feared that they would see no more of the granulated American sugar which Dr. Symes had referred to, as the process had been patented in England, so that it could not now be imported.

Dr. **Symes** said thousands of tons of the large crystal sugar were made in Liverpool containing beet sugar. There was danger of a slight impurity there in the form of lime, because he believed it was made by a patent process by which the sugar was converted into sucrate of lime.

Mr. **Savage**, referring to Dr. Symes's remark that the syrup retained its colour if exposed to a strong light, wished to ask if it would not deteriorate by continued exposure.

Mr. Fletcher said an interesting paper on this subject, written, he believed, by Mr. Creuse, had appeared some time since in the *American Journal of Pharmacy*. The author pointed out that in discoloured syrup of iodide of iron there were always two substances present, viz., grape sugar and hydriodic acid. He observed that the discoloration never went beyond a certain point, namely, that which had been called golden-sherry colour, and there it remained. It was also proved by a number of interesting experiments that if for one-third of the cane sugar, grape sugar were substituted, this discoloration never took place. These results were strikingly confirmed by Mr. Groves's experiments, because it was very clear that on boiling a somewhat diluted syrup, the hydriodic acid present would convert a portion of the cane sugar into grape sugar, and then the discoloration stopped. It was possible also that a strong light would exert a similar influence.

The Conference then adjourned for luncheon.

On reassembling, the first paper that was read was—

THE DETECTION OF AMORPHOUS QUININE (CHINIOIDIN) IN THE FERRI ET QUINIÆ CITRAS, B.P.

BY DR. J. E. DE VRIJ.

During my visit to London in May last, one of my pharmaceutical friends asked me if I knew a method to detect the adulteration of this medicine by substituting partly the quinia by the (so called) amorphous quinine. After some reflection I replied affirmatively, and as my friend told me that he had reason to suspect that this fraud was often put into practice, the publication of my process may perhaps be useful.

The test of the B.P. for this preparation is the following:—

"Fifty grains dissolved in a fluid ounce of water and treated with a slight excess of ammonia give a white precipitate, which, when collected on a filter and dried, weighs 8 grains. The precipitate is almost entirely soluble in pure ether, and when burned leaves but a minute residue."

As the pure amorphous quinine is easily soluble in ether, it is clear that, notwithstanding the quinia is partly substituted by amorphous quinine, the medicine will answer the test of the Pharmacopœia. This substitution can, however, easily be detected by transforming the separated quinine into a neutral oxalate. This oxalate after being thoroughly dried on water-bath is dissolved in chloroform and the solution, if necessary, filtered. If a few drops of water are put on the top of this solution in a test tube the oxalate of quinine will take a part of the water and crystals of oxalate of quinine will appear in the chloroform, whilst the water on the top remains clear and *uncoloured* if the medicine is not sophisticated. If it contains, however, amorphous quinine the oxalate of *this* base will be taken up from the solution in chloroform, and the water on the top of this solution will be more or less yellow coloured by the oxalate of amorphous quinine which has been dissolved by the water.

The **President** said this was a practical and useful test, which must commend itself to notice.

Mr. Umney thought the test put forward by Dr. De Vrij seemed simple and elegant, and might prove valuable. There could be no question that amorphous quinine was almost always to be found in the citrate of iron and quinine to some certain extent, and there could also be no doubt that the alkaloid was converted from the crystallizable into the amorphous state during the process of manufacture, but this only occurred to a small extent, and if pure crystalline sulphate of quinine were used, this change would be very slight. He looked upon this test as one which was very simple, and could be applied by almost any one. It was known how insoluble oxalate of quinine was, and the paper showed that the oxalate of amorphous quinine was soluble in water.

Mr. Fletcher said he had hoped when he saw the title of the paper that the test proposed by Dr. De Vrij would have been a quantitative, instead of, as it appeared, a qualitative one. As Mr. Umney had said, amorphous quinine might be found in any sample of citrate of iron and quinine, and if the Pharmacopœia process were strictly followed he would undertake to say that at least one-fourth of the quinine would be converted into the amorphous condition, the heat employed in evaporating the solution to a syrupy consistence being quite sufficient to convert a large proportion of the crystallizable quinine into the amorphous state, as he had found by practical experience. In the paper he read at the last meeting of the Conference, he described a process for the estimation of quinine in the citrate of iron and quinine, which was based on the fact that when the alkaloid was obtained, as in the usual way, by precipitation with ammonia and re-solution in ether, evaporating the ether, and weighing the anhydrous quinine (dried at 120°), one was able to calculate exactly how much sulphuric acid was required to convert that quinine into basic sulphate, and if the requisite number of cubic centimetres of decinormal sulphuric acid were added to this anhydrous quinine, and the vessel in which it was contained were kept for a short time at a gentle heat, the whole of the quinine would be converted into basic sulphate, which crystallized out on cooling. Further experience, however, had convinced him that it was not advisable to dry the quinine at 120°, because at that temperature a very considerable portion of it was converted into amorphous quinine. He had made a number of experiments to verify this by taking pure sulphate of quinine—not that of commerce—but that which had been freed from cinchonidine by five recrystallizations. Taking a weighed quantity of this sulphate, precipitating by ammonia, extracting by ether, and drying at 120°, and reconverting that into sulphate by the addition of the requisite number of cubic centimetres of decinormal sulphuric acid, there was a loss of from 5 to 10 per cent. on the theoretical quantity. Not only that, but if the filtered solution from the first crystallization of the sulphate were examined it would be found that a large quantity of the quinine which was missing as crystallizable sulphate was present in the solution as amorphous quinine, as could be easily proved by precipitating with ammonia, redissolving in ether, and drying that at 120°, when the precipitate, instead of being white, as in the first instance, would be quite yellow, and it would have precisely the taste of amorphous quinine. He thought Dr. De Vrij's process would very possibly condemn as sophisticated, citrate of iron and quinine which had been prepared according to the British Pharmacopœia process, and the more strictly that process was followed the more amorphous quinine would be produced. There was a very simple test which every pharmacist could use for himself with a very little practice, and which would detect 5 per cent. of amorphous quinine. It was simply necessary to take a scale and place it on the tongue, the difference in taste between that and the genuine preparation would be so distinct that no one could possibly mistake it. The bitter was as distinct as was the bitter of aloes from that of quassia. From experiments he had made he had conclusively proved that there was no better test for the presence of amorphous quinine than this.

Professor **Attfield** suggested that possibly Dr. De Vrij's process might be made quantitative by treatment of the aqueous solution, evaporation and so on.

Dr. Senier said it seemed to him that although in the hands of experienced chemists this process which had been suggested might be useful, in the hands of an ordinary pharmacist, or one who had not had special training in the crystallization of these salts, it would be found difficult. One portion of the process involved the formation of neutral oxalate from a certain amount of base, but that amount was not mentioned. It would be necessary to use a certain quantity, several grams at least, of citrate of iron and quinine, and then he doubted whether a chemist without special experience would be able to neutralize satisfactorily the alkaloid. As far as his experience went the formation of a neutral salt of a cinchona alkaloid, so as to secure practically complete crystallization, was no easy matter. He should like to ask Mr. Fletcher a question with regard to his paper of last year. Mr. Fletcher there recommended, and now repeated the recommendation, the total amount of alkaloid to be calculated from the sulphuric acid added to convert it into a neutral sulphate. From his experience he (Dr. Senier) should have thought it exceedingly doubtful whether, although the calculation might be made, the measurement of the sulphuric acid would be at all accurate enough for the complete conversion of the alkaloid into neutral sulphate. He had found it exceedingly difficult to convert quinine into neutral sulphate of quinine, and it required a considerable amount of care. He should have said, on the face of it, it could never have been done by any measurement of a decinormal solution of sulphuric acid. Another question was whether the amorphous quinine derived from white crystallized sulphate of quinine would necessarily be coloured.

Mr. Fletcher said he recommended in this test 20 grams of sulphate to be used for the examination. From that amount there was a very fair proportion of quinia obtained, and if the decinormal solution of sulphuric acid was made carefully, and tested gravimetrically, there could not possibly be any more accurate method. Certainly it was much more accurate than deciding whether one had enough sulphuric acid to convert the alkaloid into basic sulphate by testing with litmus. As far as his own experience went, the quantity of sulphuric acid theoretically indicated had been found absolutely correct. The whole of the alkaloid went into solution, a perfectly transparent solution was obtained, which was alkaline to litmus, and from this solution the basic sulphate crystallized out in splendid crystals. With regard to the second question, he certainly should expect that the amorphous alkaloid would be slightly coloured, because he believed that it was always so, however pure or however prepared. He thought the colour combined with taste was as good an indication of the presence of amorphous quinine as could be obtained, provided it had been extracted by ether, and dried at 120°.

Mr. Naylor said he had made a great number of quantitative estimations of quinine by Mr. Fletcher's process, and always found it answer admirably, nor had he met with the difficulty of neutralizing the quinine to which Dr. Senier had referred. Altogether the process appeared a very manageable one and exceedingly satisfactory. He preferred it much to the method of dissolving the quinine in sulphuric acid, and ascertaining when the solution was neutral by means of litmus, or by afterwards making it neutral by means of alkali, so as to obtain the basic sulphate. Different samples of citrate of iron and quinine differed very greatly in their acidity, and he should like to ask whether it would not be possible to get scales which were much more neutral than those generally sold in the market. Some makers prepared the citrate far less acid than others, but he did not know whether the presence of amorphous quinine exercised any influence on this.

Mr. Fletcher said the citrate of iron and quinine which he found most appreciated by pharmacists was that which dissolved readily without any deposit; but such citrate contained much more citrate of ammonia than the Pharmacopœia preparation. A short time ago a wholesale house applied to him for an explanation of a reaction which had been pointed out to them by a chemist in the country, as occurring when dispensing citrate of iron and quinine with iodide of potassium. A large precipitate occurred slightly coloured, which caused the mixture to be returned with the remark that the pharmacist who had previously dispensed it had supplied a mixture perfectly clear and bright. On examining the citrate of iron and quinine which had been supplied, he found it in all respects perfectly pure, but it was rather slow in dissolving, from which he inferred that the citrate of ammonia was somewhat deficient. He tested a sample of Howard's citrate of iron and quinine with iodide of potassium, and found that it gave a precipitate, which was no doubt hydriodate of quinine, and its colour and quantity would be dependent on the one hand on the acidity of the citrate of iron and quinine, and on the other on the alkalinity of the iodide of potassium. As he had said, the citrate which was most appreciated contained an excess of citric acid and citrate of ammonia, and a preparation of that sort he found would not give a precipitate immediately with iodide of potassium.

Mr. Gerrard said Dr. De Vrij's paper pointed out a defect in citrate of iron and quinine with which few were previously acquainted, and one practical result would perhaps be to try and remedy that defect. One of the best ways of doing so would be to dispense only a solution of citrate of iron and quinine which had not been submitted to the amount of heat required to get it in the scale form.

Mr. Greenish observed that in dispensing iodide of potassium in a mixture of citrate of iron and quinine there was occasionally a separation, but he had always considered it was hydriodate of quinine formed, and did not think it was influenced by the solution, because he had used it both in solution and not in solution.

Mr. Gerrard said it was the drying which produced the amorphous alkaloid.

Mr. Hughes said he had found some difficulty in dispensing iodide of potassium with quinine, and if anyone could suggest a means of overcoming it he should be very grateful.

Mr. Fletcher said if the citrate of iron and quinine dissolved rather slowly and did not form an absolutely brilliant solution, one might at once come to the conclusion that it was somewhat deficient in citrate of ammonia, and he should add either a little excess of citric acid or a solution of citrate of ammonia containing an excess of citric acid.

Mr. Howell said Dr. Langdon Down frequently ordered citrate of iron and quinine with iodide of potassium, to which he generally added a small quantity of citric acid. When the prescription was in that form it ceased to precipitate.

Mr. Greenish thought Mr. Fletcher's remark really opened a very grave question, whether a dispenser was justified in adding such a thing as citric acid with a view of obviating a decomposition which must occur in more or less time. He did not think he was.

Dr. Symes could not endorse that view. He was the last to tamper unduly with a prescription, but as they had heard that day citrate of iron as found in the market was not a definite chemical substance which could neither be more acid nor more alkaline than originally intended, but in fact was received in all sorts of conditions. One of his earliest difficulties as a dispenser was to dispense a prescription often written by a eminent physician at Leamington, containing a small quantity of sal volatile with citrate of iron and quinine. They found that with the article of one manufacturer when manipulated properly, dissolving it first in a large bulk of water and using an acid citrate of iron and quinine, the mixture could be kept from depositing to any extent. In the case of iodide of potassium he had an idea that it was a slight alkalinity of the iodide and a very neutral condition of the citrate of iron and quinine which brought about the precipitation. If it were known as a fact that one manufacturer would supply citrate of iron and quinine slightly acid, whilst another supplied it neutral, he saw no difficulty in adding a minute percentage of citric acid, which should really exist in the substance. It was useless discussing matters of difficulty if they could not escape them, but it seemed to him if they could see a means of remedying an evil without bringing about any unsatisfactory results they should adopt it.

Mr. Morris said if this fact were better known, medical men would be able to introduce a little citric acid in such cases without the pharmacist undertaking it on his own responsibility.

Mr. Umney said the truth might sometimes be known with advantage. Nine years ago in the *Pharmaceutical Journal* he pointed out that if citrate of iron and quinine were made by the form given in the Pharmacopœia the resulting scaled salt invariably, when dissolved by water, was turbid. He had for about ten years used about 2½ per cent. more of citric acid, and in this way produced a preparation that would form a proper solution without a trace of turbidity, at the same time it was exceedingly soluble.

Mr. Grose asked it citrate of iron and quinine when dispensed with iodide of potassium would liberate the iodine. He sometimes had a peculiar prescription to make up containing citrate of iron and quinine and iodide of potassium, and he got a nasty looking mixture, which was not at all right. The question was, was he, as a retail pharmacist, justified in supplying the defects of the manufacturer. Take the case of iodide of potassium and spirit of nitrous ether; if they got a decomposition were they justified in neutralizing the free acid in the spirit of nitrous ether?

Mr. Savage thought the lesson to be deduced from this discussion was a practical one, not that chemists themselves in retailing should vary a prescription in any way, but that manufacturers like Mr. Umney should learn the lesson, and send the preparation out to them in such a form as they could use it.

Mr. Grose said the question was, if the manufacturers did not do so what must the chemists do. Now-a-days there was a good deal of competition, and people sent out a good-looking salt which would take with the customers, and were not always very particular if it did not turn out quite as it should do according to the Pharmacopœia.

The President said he could assure Mr. Grose that manufacturing chemists had a great deal to think about in this way as well as retail ones. They must try and get on as well as they could together.

Mr. Grose said he had found in the case of the ammonio-citrate of iron that sometimes it was very acid. He frequently had prescriptions of ammonio-citrate of iron and bicarbonate of potash or soda, and unless he was very careful bang went the bottle. It was not at all satisfactory if they sent out a mixture in a hurry for the servant to come in the next day and say the bottle had burst and his suit of clothes had been spoilt.

A vote of thanks was passed to Dr. De Vrij for his paper.

The next paper read was entitled:—

NEW AND UNOFFICIAL PHARMACEUTICAL PREPARATIONS.

BY CHARLES SYMES, PH.D.

On the present occasion I do not propose to read a paper giving the result of original investigations or research, but simply and shortly to bring before the members of the Conference a subject which I believe to be of importance to all practical pharmacists, and the discussion of which it is hoped will be both interesting and profitable.

Two years ago, at Dublin, it will be remembered a discussion arose as to the precise strength of the article that should be used when aq. flor. aurantii was prescribed, and it was found that in the absence of any authority, the usage of dispensing houses differed widely, some regarding that known as the "triple" water, others considering the "diluted" as proper to supply. Unfortunately no satisfactory conclusions were arrived at and the matter remains to-day where it did then, viz., in an undetermined and unsatisfactory state. If now, such a simple article as this admits of so wide a variation, we shall not be surprised to find that many other less commonplace preparations do so equally, with the obvious result of creating confusion and raising doubts in the minds of physician, pharmacist and patient, the former often failing to obtain results which from the published experience of other members of the profession he has a right to expect, the second feeling doubts as to whether he is carrying out with precision the wish of the prescriber, and the latter, from differences in appearance, etc., when the prescription is dispensed at different pharmacies, losing confidence in the treatment. Some manufacturers devote special attention to certain classes of preparations, and by producing old compounds possessing marked excellence, or new combinations having distinctive characters, they aquire a reputation for such and have a kind of proprietary right therein. It is not, however, to these I desire to direct attention, but to those in which no one appears to possess such claims as to priority in specialty of character and for which no authoritative or recognized formulæ exist. Tincture of gelsemium is an example, which, according to a recent article in the *British Medical Journal*, varies in strength from 1 in 5 to 1 in 10, or 100 per cent., and there appears no evidence to show whether the stronger or the weaker is correct. Tinctures of jaborandi, eucalyptus, boldo, etc., may vary similarly. In the early days of croton chloral hydrate we prepared a syrup therefrom as follows:—

Croton (or butyl) chloral hydrate .	480 grs.
Boiling distilled water.	6 ozs.
Glycerine.	6 ozs.
Syrup of orange peel.	18 ozs.

One fluid drachm containing 2 grains of the active ingredient. There was evidence that such a preparation was desired on the part of the medical profession, and doubtless other firms and individuals equally early with ourselves, possibly before us, prepared somewhat similar compounds, but it is scarcely probable that these all accorded in strength and character. A dozen or more formulæ exist for the syrup known as chemical food (the original formula of Parrish not yielding satisfactory results); hence it varies in colour, density, acidity and strength.

Medicinal bromohydric or hydrobromic acid is now largely prescribed, and for its preparation several formulæ have been published; one by Dr. Wade, the physician who originated the idea of using it internally as a medicine, which provides for 10 grains of combined bromine in the drachm; another by Dr. Fothergill yielding a product of about half that strength; and one by Dr. Squibb of Brooklyn, producing a purer acid and containing 38·4 per cent. The weaker acid is the one best known and most generally used in this country, but as Dr. Wade points out it is not that with which the original experiments were made and results obtained which recommended it as a useful therapeutic agent.

Fluid extracts are in the United States so prepared that a fluid ounce shall as nearly as possible represent one ounce of the crude drug. No rule of this kind exists in Great Britain. Indeed the official fluid extracts vary so much in strength that we have as it were a licence to prepare the unofficial of any strength we please; therefore, when a new drug is introduced, half a dozen manufacturers may prepare fluid extracts from it of as many different strengths; the physician who prescribes and the pharmacist who dispenses it both being ignorant of the exact relation it bears to the drug. Quebracho, coca, rhamnus frangula, etc., are examples.

Perfect as is the present Pharmacopœia when compared with its predecessor, it nevertheless contains some unsatisfactory formulæ, which are generally known to be so. Now each operator remedies these defects according to his own views or to those of others who, after investigation, publish the conclusions arrived at; thus certain official formulæ became replaced by unofficial of greater or less variation.

My object is not to enumerate instances but to illustrate the fact already stated, that a large number of preparations in general or occasional demand exist for which there are no recognized formulæ or strength, and thus an element of uncertainty is created which should not obtain in the domain of pharmacy.

If the British Medical Council could see its way to a decennial revision of the Pharmacopœia (which at present it does not appear to do) it would scarcely cope fully with the difficulties I have mentioned, although some of them would be remedied more readily than they now are. At present we are abandoned to the winds of uncertainty as to when reform is likely to be brought about, and it behoves us to seek some means by which we may bridge over the difficulty. *Apropos* of this, it has occurred to me as desirable that some standing authority should exist to give semi-official or official sanction to formulæ for tinctures, fluid extracts, etc., as occasion might arise, which would ensure greater uniformity and provide a means by which many remedies could receive a far more satisfactory trial than they now do.

If the discussion resulting from these few remarks indicates that the difficulty is regarded by others as of the same importance that I have assumed it to be, it will remain for the Conference to consider the desirability of adopting some means for constituting such an authority either from its own members or partly so and partly from the Medical Council, if that body could be induced to take up the matter jointly with us.

The **President** said many of these preparations had given pharmacists great difficulty. The subject was worthy of discussion, what authority could be established by which preparations might be guaranteed when they become of sufficient importance to demand such a position.

Mr. **Grose** said he could bear out Dr. Symes's opinion that the number of unofficial preparations caused a great deal of inconvenience, especially to country pharmacists. He sometimes had a thing ordered by medical men who had seen it recommended in the *Lancet*, or some other medical journal, and he knew nothing whatever about it. He could only write to town for it, and perhaps it came too late for the patient. Only the other day a customer of his was very ill; something was ordered which he could not get in the town, and the next morning the man was dead. Of course it was not an official preparation. A little while before that the liquid extract of spigelia was ordered: he sent to his wholesale house for it, but they could not get it anywhere, though they kindly sent him the formula from which to prepare it.

Mr. **Greenish** said he had practically found that one great difficulty in connection with these things was that they were introduced in such numbers that their name was legion, and many of them were of so ephemeral a character that half of them, or more, were out of the market almost as soon as they were in, and perhaps sometimes before. If they had any Committee of the Medical Council, or of pharmacists, or any other body of men to attend to this matter, it would have to be a permanent committee constantly taking into consideration the preparations coming before the public, some of which had not apparently any claim to be prescribed. The question of aqua aurantii floris came before the Conference at Dublin, when he expressed the opinion that it being a triple preparation it must occur to any pharmacist that it should be mixed 1 part with 2 of water. With regard to chloral hydrate, it was almost a pity that there were such things as simple solutions introduced into the Pharmacopœia. He could not understand syrup of chloral hydrate being prescribed. Let there be a solution of the chloral hydrate, and let the medical man order so many grains as he thought fit to be mixed in syrup or anything else as he desired. Why should there be a form which was simple chloral hydrate mixed with syrup and water? This led to the great difficulty that pharmacists had to keep a number of compounds which might just as well be made up at the time they were wanted. He thought it would be well if there were a sort of Appendix to the Pharmacopœia, to which new preparations should be added, and there might be also another part, of perhaps as many pages, forming a sort of limbo, into which the old ones might be put as new ones came in, and thus the Pharmacopœia itself might be kept tolerably clear, and about its present size. With regard to these new preparations, if they were not found in the *Pharmaceutical Journal* itself they would be usually found in the advertisement part, and if they were all to be put into the Pharmacopœia, it would soon become very much larger than a family Bible.

Mr. **Mason** thought that Mr. Greenish had overlooked the fact that when chloral hydrate was first introduced several wholesale houses manufactured a syrup of it. When manufacturers made a new thing they did their best to get medical gentlemen to order it, and the consequence would be that different houses might send out syrups of different composition and different strength. This was one of the cases where the Pharmaceutical Committee would come in and say that syrup of chloral hydrate when supplied should be of a certain strength.

Mr. **Greenish** said he did not want a syrup at all; let a medical man, if he wanted 15 grs. of chloral hydrate to be given, order it, and the pharmacist might put it into the mixture; the medical man might order syrup if he liked.

Mr. **Umney** said in spite of what Mr. Greenish had remarked were was very great weight in Dr. Symes's statements. He was frequently put on the horns of a dilemma to know what he was to do with a certain class of preparations when orders were put in his hands for same. He generally searched the Pharmacopœia first, and if he found the preparation there prescribed according to a formula, unless his experience told him that it was dictated wrongly (which did sometimes occur), he so prepared it. If he did not find it there he searched other pharmacopœias, the *Pharmaceutical Journal*, or the 'Year-Book of Pharmacy.' Many of these new preparations were to be found in the American Pharmacopœia, and if that was the case he thought they ought to be loyal to it and prepare them according to the directions there given. Many too could be found in the Pharmacopée Universelle and L'Officine. Still there was the difficulty that there were these new preparations, some of which were not to be handled with impunity. For instance, tincture of gelsemium, which he always made 1 in 5, and which some made 1 in 10. Both formulæ had been published, and it was in these matters that the great difficulty arose. If there were some committee, as Dr. Symes suggested, probably there might from time to time be a certain amount of responsibility taken out of the hands of practical men; and it would tend to give a certain amount of uniformity to dispensing. The Conference was much indebted to Dr. Symes for bringing the subject forward.

Mr. **Savage** said this was an important subject, and only showed more than ever the desirability of pharmacists being properly represented when the new Pharmacopœia was compiled. He thought the President and the Vice-President of the Pharmaceutical Society would form a capital committee to refer matters of this kind to.

Professor **Attfield** said the difficulty to which Dr. Symes had drawn attention existed in the United States as well as in Great Britain, and only on the previous day had formed the subject of a conversation between Professor Maisch and himself. They came, however, to the conclusion that the doctrine of evolution might be trusted to give a good account of a large number of the substances introduced; there would no doubt be a survival of the fittest, and the others might be disregarded. But the question was, what to do with those preparations which did survive for some considerable time, with a view to insure uniformity of strength. In America some desired to have a new Pharmacopœia once every ten years, and probably that idea would be carried out; but there was a large party who wished to have it every five years, chiefly in order that new preparations which were worthy of it should have an official character given to them. Professor Maisch said that he and several prominent pharmacists in the States were of opinion that a pharmacopœia coming out every five years would cause an endless amount of trouble both to medical men and to pharmacists; they were of opinion that ten years was quite often enough to have a new pharmacopœia, and they proposed to meet the difficulty in some such way as this: a committee of gentlemen engaged in the construction of the Pharmacopœia should be appointed with power to consider the value of newly introduced preparations, and that those which seemed to have anything like a trustworthy character and to be valuable should be placed in an appendix which might be published every two or three years, or certainly every five years, and that then, decennially, those preparations of the appendix which seemed to show that they were worthy of being placed in the Pharmacopœia itself should be placed there, and the others omitted altogether. There would thus be something between an official pharmacopœia and an unofficial notice of the preparations in journals which would facilitate the introduction of good new remedies into medical practice.

Mr. **Naylor** agreed with Dr. Symes's remarks, but should not have risen except for the fact that he had referred to quebracho. A little time ago none could be obtained in the market, and it was not at all known what was the strength of the preparation then sold. Since that time repeated inquiries had been made with reference to the strength, and he might say that that generally sold was a liquid extract made of such a strength that two parts of the fluid extract should correspond to one part of the bark. He quite agreed with the remarks of Mr. Umney, and had always followed the same plan himself, namely, in a case of this kind to refer to various pharmacopœias and then to look up the literature on the subject.

Mr. **Lloyd** thought it would lessen the difficulty if wholesale houses would mention the composition of the article and the strength of the preparation.

Mr. **Naylor** thought wholesale houses were always very ready to give every information desired.

Mr. **Andrews** said this was a very wide subject, and a very important one, and if all were to be said on it that could be said it would occupy the whole of the afternoon. He rose to make one suggestion, that when medical men ordered a new preparation they should give some indication of the strength required. He had occasionally found for instance, that when it was a new medicine for which there was no official formula they had put 1 × 20, which he understood meant 1 in 20. If medical men would do that it would relieve chemists of a vast amount of responsibility and trouble and they would know at once what was intended. This was far more common in foreign prescriptions than in English, for in this country some of these new remedies were ordered in a sort of random way, which caused great difficulty to pharmacists. He had now from fifty to one hundred preparations which he had only used once or twice and never heard of afterwards. Of course it could not be expected that medical men should confine themselves to old remedies if new ones were suggested, for it was only by experiment that the useful could be singled out from the worthless.

Mr. **Schacht** said the difference in the strength of medicines was a matter which every one must regret, and to that extent he felt grateful to Dr. Symes for having introduced the subject; but he did not sympathize so much with one of the suggested remedies where reference was made to the possibility of escaping from the dilemma by something like an authoritative declaration from that Conference. He should regret very much if the Executive regarded it as part of its duty to lay down any rules whatever for the guidance of anybody; he thought rather its aim should be to elicit individual opinion to the fullest extent, but that it belonged to another body, a more distinctly representative body, to declare anything which had the semblance of authority. He, therefore, hoped that discussions on such matters would only take the line of eliciting individual opinion, and to that extent control the exercise of the profession in other hands.

Mr. **Morris** said the great evil was the different strength of preparations, and although the plan adopted by Mr. Umney was very good so far as it went it frequently happened that there were two or three formulæ given for one preparation; some might adopt one and some another, and by that means they had various preparations to dispense where there should be only one of uniform strength. He saw no other mode of getting over the difficulty than by having somebody whose opinion would be an authority. He thought the plan suggested by Professor Attfield a very practical one.

Dr. **Symes**, in reply, said Mr. Greenish had pointed out that there were such a number of these preparations, and their existence was exceedingly short. No doubt they were numerous, but he thought they were not so numerous as they appeared. They were troublesome, and on that account they appeared to be more numerous than they were. When a new preparation was introduced it was a source of some trouble to pharmacists, but it was part of their duty to take it. Shirking or ignoring a difficulty did not get one out of it, and when a new preparation was introduced the medical profession had a right to claim from pharmacists all the assistance they could give them to get it in the best possible form, and also of a uniform strength. As to the length of life of these new remedies it was a question, as Professor Attfield had said, of the survival of the fittest, but no pharmacist had the right of ignoring a thing, or by carelessly dealing with it to strike a nail in the coffin of the new preparation. He had not referred to syrup of chloral hydrate, but to croton chloral hydrate. It was an elegant preparation, and was largely used in Liverpool. The difficulty was, if people went from one part of the country to another a syrup of quite a different strength might be dispensed. The tincture of gelsemium he always prepared 1 in 10, which showed how the practice varied, and he had known that strength in the doses prescribed by a medical man to produce very marked toxic effects. He could scarcely agree with Mr. Schacht that it was not the work of the Conference to accept some office of this kind. If they went to the Pharmaceutical Society it would be almost certain to avoid taking any responsibility of the kind and would probably hand it back to them to deal with. In Paris, it was true, the Pharmaceutical Society had really accepted the duty he had mentioned and published a number of unofficial formulæ for the benefit of pharmacists, and he was not sure that something of that kind had not been done in the United States. It should be remembered that many pharmacists had not the opportunity of referring to a number of the works Mr. Umney had spoken of. But in addition to those he might say that he referred sometimes to the 'Homœopathic Pharmacopœia,' and it had considerably assisted him sometimes. On one occasion tincture of drosera was ordered by a physician, but it did not occur, he thought, in any of the books mentioned by Mr. Umney. He had no difficulty in finding it in the 'Homœopathic Pharmacopœia,' and it was prepared 1 in 10, as indeed were all the tinctures, he believed, from dry drugs which were used homœopathically.

The **President** said as books had been referred to he might mention two which he had found particularly useful, one was Dorvault's 'L'Officine' and the other that of the gentleman who had been with them that morning, Stillé and Maisch's 'Dispensatory.' The information was there brought up to the latest date, and it was very useful.

A vote of thanks was passed to Dr. Symes.

The next paper read was on—

THE CULTIVATION ON CALISAYA.

BY JOHN ELIOT HOWARD, F.R.S., F.L.S.

The death and *post mortem* examination of a small tree of *Calisaya anglica* will furnish a suitable introduction to some comments on the subject of this paper.

I append a photograph of this tree taken in the autumn of 1879; from which it will appear that it was in luxuriant health a few months since. On returning home last month I noticed a very unfavourable change in its appearance, and detected some white spots on the bark arising from fungus, which I knew from previous experience to be a fatal indication of disease. On further examination I found that canker had invaded the plant to a serious extent; and after trying in vain some heroic remedies I determined to root up the calisaya, and if possible gain some useful information as to the cause of its death.

The age of this small tree was eight years. The height between 7 and 8 feet, but would have been much more, had I not been compelled to cut off the top some years back in accordance with the requirements of my conservatory.

Before doing this, I succeeded in taking a strip along this upper portion and renewing the bark under moss as practised in India. The girth of the stem at the base was 9¾ inches and about 6¼ inches at the summit (where cut off). The result of the analysis of the bark of my tree was as follows:—

Calisaya Anglica Quill=1·25 Sulphate of Quinine, 0·70 Cinchonine, 0.15 Quinidine.

Calisaya Anglica Stem Bark=3·20 Sulphate of Quinine, 1·50 Cinchonine, 0·32 Quinidine.

Calisaya Anglica Root Bark=3·95 Sulphate of Quinine, 1·00 Cinchonidine, 4·00 Cinchonine, 0·27 Quinidine.

This must be considered satisfactory for a tree grown under glass in England.

I send the lower portion and also the renewed summit for inspection, together with some pressed leaves showing the character of the foliage. These were taken off just before the tree was rooted up; and I may notice, as a feature of the disease, that the petiole separated with a brownish scar, the leaves falling as those of deciduous trees in autumn.

As regard the cause of this complaint, which seems generally to supervene after my plants of cinchona have attained a certain age (say, as in this case, about eight years), I was not able to learn anything very definite. I suspect that the oxidation of the cinchotannic acid may take a wrong direction,[*] and instead of contributing to the formation of alkaloid, may produce the brown discoloured patches which extend upwards from the roots through the midst of the bark; but the source of the mischief seems to be in the roots themselves, the small fibrillæ of which perish. It has been supposed that this arises from a redundancy of moisture; but I have two fine plants of calisaya, one of the *vera* (published as such by Sir Jos. D. Hooker) the other of *Ledgeriana*. These have as yet shown no signs of the malady, though growing in the same bed of earth.

I learn from the report of a recent visitor to the plantations in Java[†] that they have there "*no* canker, and few trees die from wet feet, for the land is elaborately terraced before it is planted with cinchona." "The Ledgeriana grows best in the best soils of that country." The great superiority of the Java soil, possessing as it does, such abundant elements of fertility, is particularly noticed. "The weeds which are very abundant are cut down three times a year, and left to decompose, forming an additional source of fertilitity to the plant; whilst in their very growth they are supposed to be useful. They keep the soil together, they catch and retain the rain and dew, they prevent wash, and hinder the rays of the sun from beating down on the bare surface of the soil and keep it in the condition nature intended it to be in. They are also a safeguard, for if you denude large tracts of country of every kind of vegetation except the one kind you are cultivating, you concentrate on the devoted head of your favourite type of vegetable life all the attacks of all the enemies of vegetation which float in the air, or which burrow in the ground." So much in the defence of the weeds; but it must be borne in mind that let them consume as much as they can, there still remains enough and to spare in its richness; "neither the coffee nor the cinchona could possibly look better or grow more luxuriantly if they had all the elements of the soil to themselves without any contest or opposition." In the opinion of this observer the tree will find no spot in Ceylon, excepting a few parts of Uva, capable of affording it anything like the nourishment it requires to develop a bark yielding on analysis such magnificent proportions of the best alkaloids.

Too much stress, however, ought not to be laid on this peculiar advantage; for on the Nilghiris, though the trees grow bushy and spindly in habit, the quality of such bark as was yielded was excellent. Quite recently also bark of Ledgeriana has been sold in the London market (said to be from Darjeeling) at the high price of 14*s.* 8*d.* per pound. The development in that climate was apparently slower, but it looks as if trees in their full maturity might rival these from Java. In this latter region it appears that "no stem or root bark is ever exported that is not the produce of a tree at least eight years old, and generally of still greater age."[*]

At this age, Mr. Moens[†] calculates the average yield for officinalis to be 2 lbs. per tree, against 4 lbs. from Ledgeriana and 6 lb. for succirubra. Ledgeriana is the prince of all, for it appears that even at the low average price of 6*s.* per lb., the thirteen year old plantation, if now rooted up, would yield an average of at least £2000 per acre. (Mr. Moens makes it £4000.) But there is no idea of rooting up trees which, under the processes of gradual removal and renewal of bark, will yield a perennial flow of wealth. In this respect the management appears to be much better than in British India. Mr. Moens says: "Our 8½ bouw of Ledgeriana has given, within thirteen years till now 34·619 half-kilegrams, say 38·800 English pounds, by thinning, coppicing and scraping." "And if you saw the gardens at present you would ask where this bark had been taken, as the plantation is quite close and regular. We took only what was too much, and would hinder the growth of the finest trees."

The size of these finest trees is remarkable. They speak of a succirubra tree of fourteen years old, 63 feet high and 3½ feet in girth; a calisaya tree seventeen years old, 60 feet in height and 3 feet in girth, and a Ledgeriana thirteen years old, 48 feet high and 3 feet in girth.

I will now contrast with these results others obtained in the native country of the calisaya, in consequence of a suggestion of Mr. Ledger, who thus records them in a letter to me under date December 10, 1879:—

"In December, 1849, I was at the farmhouse of a contractor of mine for delivery of a large quantity of bark, in the Yungas of Bolivia. When conversing one evening on the distance that bark had then to be brought out of the forest to where we then were, my friend observed, pointing to the slope of a high mountain on the opposite side of the gully or cañon: 'In my father's time, and when I was fifteen or sixteen years old, from the sides of yonder mountain (*cerro*) we were for two years cutting the best bark I ever saw, almost all was "rojo."' I then said: 'Such being the case why do you not then plant there 10,000 or 20,000 plants? It is your own property, and, living near, you would in that way have a good fortune for your children.' He did plant some 6000 by March, and in the following year 10,000 more. In reply to inquiries, his letter of September, 1878, I only received in August last. He says: 'Not only I, but all the family, have very good reason to remember your visit to San José. Since 1875 we have cut 500 qs. of bark yearly, and, owing to demand, have sold at an average of 200 dollars per quintal (equal to 4s. per lb), and there is "cascarilla" (bark) in abundance for ten years. We have planted many thousands of trees since you gave us the idea. —— has done the same in Sorata.'"

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[*] It is important to seal up any accidental wound or amputation, otherwise the sap around is liable to injury.

[†] *Ceylon Observer*, June 17, 1880.

[*] *Ceylon Observer*, June 17, 1880.

[†] *Ibid* June 12.

I have much reason to believe that the supplies thus obtained have found their way to the English market, and that the details above given are correct. These, it will be observed, indicate a lower average quality than that of Java. This perhaps coincides with a more rapid growth of the trees, for Ledger's correspondent says: "We have not weighed the bark taken from each tree," which, however, must be much older than those in Java; "yet I should say that many yielded 3 or 4 quintals of the three classes, *tabla*, *charqui* and *canuto*. The bark is not all of the best, though every plant was picked."

In a subsequent letter, the same correspondent says: "For some eight years we have stripped half the bark off some thousands of trees; about 5 per cent. die. At first we covered the wound with plaintain leaves for a year or fifteen months. We find now it is best to plaister the stripped side with mud (barro) mixed with plenty of chopped straw or grass, and it answers admirably. When the new bark is well grown the mud covering falls off."

I do not think any of this bark (as imported into London) has had the appearance, or manifested the richness in alkaloid of the true Ledgeriana. Indeed, Mr. Ledger says: "I feel convinced in my own mind that no white man would or could succeed in getting such splendid seed as my faithful Manuel did. In fact, and as the good poor fellow repeatedly told me, he got seed from particularly fine old trees that we had together seen and sat under. The splendid old tree in Fr. Simon's yard we often (in 1850-51) used to look up and wonder the age it could be. It was covered with silvery bright pink moss.[*] We put its age at over five hundred years. I have often calculated with Manuel that it would yield fully 15 qqs. dry bark of the three classes."

It was in this district probably that Dr. Weddell obtained the specimens I have referred to in my 'Origin of the *Calisaya Ledgeriana* of Commerce,' as in the years above referred to Mr. Ledger says they were together in the above districts. I do not believe these were exactly identical with the Ledgeriana, though approaching very nearly to it.

The specimens given to me by Dr. Weddell were as follows:—

Calisaya viride	Prov. de Yungas, 1851.
„ zambita	
„ morada	
„ morada	Prov. de Larecaja, 1851.

Ledger thus describes[†] what he calls the "rojo":—"When in flower the leaves are red underneath. When the seed is ripe and the leaves falling they are a dark purple. Old trees in particular have on the branches a species of rough moss of a brilliant scarlet colour."

This is called *Hypochnus rubrocinctus* and is represented on the Calisaya in Goebel's *Pharmaceutische Waarenkunde*. It used to be looked upon by dealers in London as a necessary indication of the best calisaya. Ledger also speaks of the red and dark green leaves as peculiar to this cinchona. "I have often" he says, "seen, when in the Yungas, from the fork of a high tree, the *manchas* far away denoted most clearly by the wind discovering the red colour under the leaves."

Mr. Ledger sent me, in 1877, specimens of calisaya, two of which were of the "rojo" sort with white flowers; but all were unfortunately lost in transit. The white flowering calisayas would probably be the true Ledgeriana, and gathered near the banks of Mamore.[*] I am more and more inclined to think that the true Ledgeriana belongs to Eastern Bolivia, to which district the River Mamore belongs.

It will therefore be understood that the cultivation in Bolivia, although comprising fairly good qualities of calisaya, is not that of *Ledgeriana*, nor can it yield such remarkable results.

A very important reflection is that the cultivation is nevertheless remunerative, and capable of easy and of indefinite extension. The only chance for Indian cultivation in the future consists in the choice of superior sorts, and the efficacy of high cultivation. If these requisites are attended to, considering the greater facilities in India of conveyance to the markets, there is no doubt a great future open to both countries.

It will also be evident that there is practically no limit to the age up to which the calisaya may go on yielding serviceable bark. It does not change with age like the succirubra. This is owing to the difference in the tannic acid.

In Bolivia, as in Java, attention is paid to the effectual drainage of the roots. Mr. Ledger says:[†]—"I think you should advise all parties forming plantations to plant on slopes or sides of hills. I never have seen the trees growing on flats or the bottoms of gullies. Too much damp at roots is fatal. Almost all the largest and best 'patches' of cinchona are found on red (dark) soil. The bottoms are black soil."

Examination of a calisaya grown by Captain Cox in Wynaad, in the latter conditions, singularly confirmed to me this observation.

Mr. McIvor's experience led him to the same conclusion. He says,[‡] after visiting Ceylon:—"The red and crown barks seem to do best in Ceylon as they do here. But on the whole our cinchona plantations on the Nilghiris give promise of better results than the Ceylon plantations. Ceylon is wanting in the deep rich soils we possess, and cinchona is very liable to canker when the roots get down into the subsoil."

I fear that this must be admitted to have been the cause of "canker" in my Calisaya Anglica also. Perhaps in forming the bed, I did not pay sufficient attention to obviating this evil, and it is certain that one deep root found its it way beyond where I could easily trace it.

In a recently prepared bed I have at length effectually shut out the possibility of such mischief.

The following table[§] of the average prices obtained for the 100,000 half kilos of bark sent home from Java, in 1878, will give a fair idea of the relative value of the different sorts there cultivated:—

Succirubra	1·75	per cent.	per	half kilo.
Calisaya Javanica . .	1·38	„	„	„
„ Josephiana .	1·20	„	„	„
„ Anglica . .	1·58	„	„	„
„ Ledgeriana .	6·31	„	„	„
Cinchona Hasskarliana	1·23	„	„	„
„ officinalis .	2·80	„	„	„
„ lancifolia .	1·59	„	„	„
„ caloptera .	1·35	„	„	„
„ Pahudiana .	1·10	„	„	„

By this it will be seen that the Ledgeriana greatly exceeds all the others, and that it equals or excels the cultivated calisaya of Bolivia; but the average of this sort now sent will be much higher, if I may judge from that now selling at Amsterdam.

I wish this remark, however, only to apply to the true Ledgeriana, for which as much as 15s. per pound has just been paid at Amsterdam; but in packages recently bought under this name I find samples at a lower price exactly reproducing the finer calisayas of which I have been treating; but containing not more than half the quinine of the ledgeriana.

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[*] A tree of *Hasskarliana*, aged seventeen years, gave Moens 95 lbs. of dry bark.—*Ceylon Observer*, June 14, 1880; *Pharm. Journ. and Trans.*, March 13, 1880.

[†] In letter, November 24, 1875.

[*] See Ledger's letter, December 22, 1874.

[†] In letter, December 10, 1879.

[‡] In letter to myself, March 16, 1876.

[§] *Ceylon Observer*, June 15, 1880.

I have examined the officinalis bark from the same sale and find that it resembles in appearance the "knotty sort of Jussieu." It has no reference whatever to the true *C. officinalis*. I am persuaded that this (the *Uritusinga*) has never found its way to Java. In all that I have seen from thence and in the excellent botanical specimens given me I find the *angustifolia* indeed, but no trace of the *Uritusinga*.

The important question of the relative proportion of supply to demand will gradually enforce upon the planters the necessity of cultivating none but the best species. I have long been insisting on this point both as to the cultivation in Java[*] and in India.

The prospects of the future in Ceylon are almost alarming, at least if we may trust the calculations of Mr. Dobree, Dikoya, Ceylon; published in the *Ceylon Observer* of June 15th, 1880. He says:—

"I see by your Directory of 1876–78 that you estimate the total consumption of cinchona bark for the world at 12,624,000 lbs. In Dikoya and Maskiliza districts alone, during 1880, I believe I am under the mark in saying that there will be 6,000,000 cinchonas, exclusive of those planted in previous years.

"Nearly every other district in the island is also planting cinchonas; and I do not think I am over-estimating the number of cinchonas that will be planted in 1880 throughout the island at 20,000,000; allow 5,000,000 for failures, and add 5,000,000 for plants planted in previous years and now alive, and it will give you 20,000,000 cinchona trees, which in five years will yield either by taking strips, or mossing, or by the shaving process, about 10,000,000 lbs. of dry bark a year.

"Again, referring to your Directory, I see you estimate the production of cinchona bark for the world at 13,471,000, of which Ceylon is put down for 150,000; but when it produces 10,000,000, as I believe it will, in 1885, the total production of the world will exceed the demand of 1876–78 by 10,847,000 lbs."

It is proverbially uncertain to count one's chickens before they are hatched, and, considering the enormous mortality overtaking the plant (occasionally, if I mistake not, amounting to 90 per cent.), I think the above calculation far too sanguine; but, supposing it is correct (for argument sake) to the extent of one-half the estimate, I think I foresee one result. I do not choose to predict—as I never like to do this unless I am sure that my predictions will come to pass—but I think I may fairly anticipate crowded sales-rooms in this market in 1885, at which the representatives of various quinine manufacturers are attending, with the portentous word "rubbish" as a pencil note attached to certain vast consignments of Ceylon bark.

For proof of the probability of this anticipation, I refer to the account I have given of the whole of last year's importations in the *Gardeners' Chronicle*. No doubt much good and profitable bark will also be imported (as now is the case) from Ceylon, and probably this will keep up its price, or nearly so. Dr. Trimen informs me that he has two new plantations of Ledgeriana under his care, which are looking very well at present. Abundant information will be found in the *Ceylon Observer*[†] as to the successful efforts of private planters, on which I must not enlarge; but remark, by the way, that renewed officinalis bark from Prospect estate, on the Nilgiris, lately sold as high as 12s. 6d. per lb. This was from the true officinalis defined and published as such by Sir Jos. Hooker, and well described since in Bentley and Trimen's 'Medicinal Plants.' It is the *Uritusinga* of the 'Nueva Quinologia' of Pavon: and this name was retained by McIvor, from whom (before his lamented death) I received excellent specimens grown under his care. It is at the present time flourishing with me, and deserves no doubt the description given by a planter[*] as being "the largest leaved variety of the true officinalis."[†] I have leaves up to 9 inches by 6. I observe with pleasure that this writer (W. E. L., of Leangapilla, Ranjala,) says, "I think it by far the most profitable kind to grow in Ceylon." No doubt both this and bark properly renewed from *C. succirubra* will always command a good price in the market, as being rich in produce of alkaloid suited to the quinine manufacturer.

On the whole I think it is evident that the true calisaya will assert its supremacy as the prince, or, as I should call it, the queen of all the cinchonas. Such indeed is the import of its name as "the best of all barks" for the production of quinine. It is also quite clear that we are as correct in ascribing to Mr. Ledger the introduction of the unrivalled Ledgeriana as we are in speaking of Columbus as the discoverer of America. Mr. L. has the merit of employing the accurate discernment of his faithful Indian servant for collecting the very best seed; and in this he has shown the importance of knowing how to employ and to trust good subordinates—a secret of success in other enterprizes than that of the cultivation of cinchona. It is not by evolving theories out of our inner consciousness, but by patient observation of facts, and following out deductions from these to their legitimate results, that the cultivation of calisaya can be advanced. In this way Mr. Moens has the credit of introducing several improvements, which it would prolong this paper to too great a length to describe. I would simply mention the raising of the seed in porous earthenware pans, the subsequent care requisite to be extended over the young plants, the grafting of the Ledgeriana on stocks of succirubra, and the mode of harvesting the bark by scraping. On this latter point I will remark that it is not in the calisaya that we find the striking preponderance of quinine in the outer bark, which I believe I was the first to demonstrate in the face of many authorities to the contrary. In the scrapings of the calisaya, so far as appears at present, there is not a greater abundance of alkaloid than in the bulk of the bark. The reason for this is in the difference of microscopical structure between one variety of cinchona and another. I have shown how remarkably this is changed in the renewal of bark of succirubra. The "lax[‡] cellular tissue" thus formed is full of alkaloid throughout its whole extent. The whole nature of the bark is thus changed.

(*To be continued.*)

Parliamentary and Law Proceedings.

POISONING BY A LINIMENT.

An accident has occurred at Broughty Ferry, which resulted in the death of Mr. James C. Lindsay, agent for the Royal Bank, he having been accidentally poisoned. On Monday evening, September 6, Mr. Lindsay after taking supper went to bed. He was then quite well, and in his usual good spirits. About an hour afterwards, being troubled with a cough, he rose and went to a press to take a little paregoric, which he usually kept in case of emergency. He picked up a phial, and, after swallowing a teaspoonful of its contents, returned to bed. The taste appeared to him to be more unpleasant than usual, but he took no more thought about the matter until shortly afterwards he felt a sinking sensation passing over him. Becoming alarmed, he called his daughter, and on informing her of his condition and what he had done, she made an examination of the phial which Mr. Lindsay had used. It was found that instead of taking the paregoric phial, he had taken another bearing the label "Ess. Bouquet," but filled with a poisonous liniment for external use. Feeling himself becoming greatly worse, Mr. Lindsay and his daughter went off about midnight to the house of Dr. Wemyss, about half a mile off. When he was admitted by the doctor, Mr. Lindsay felt exhausted and very giddy, and stated that his hands and feet felt very dead. Dr. Wemyss at once gave emetics, and did everything he could to arrest the consequences of the poisoning. His efforts, however, were entirely fruitless, for Mr. Lindsay died in the doctor's house about half-past two o'clock.—*Edinburgh Courant.*

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[*] *Pharmaceutical Journal.*

[†] June 15, 1880.

[*] I have the *hybrid*, called *pubescens*, alluded to by this writer, growing near, with longer and larger pubescent leaves; but I doubt all hybrids as to permanent good qualities.

[†] *Ceylon Observer*, June 19th, 1880.

[‡] See my 'Quinology, of the East Indian Plantations.'

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[447]. Can any one inform me what change takes place when the following hypodermic injection deposits, and also how to prevent it? The ½ ounce supplied to the surgeon in a stopper bottle from which the syringe is filled deposits enough to block up the needle in three or four days, but the stock solution remains clear for two weeks:—

Injectio Morphiæ et Atropiæ.

℞	Morphiæ Acetatis	gr. 24.
	Atropiæ Sulphatis	gr. 1¼.
	Aquæ Destillatæ	℥j.

R. S. T.

[448]. Will any reader of the *Pharmaceutical Journal* kindly inform me the best way of dispensing the following?—

℞	Ext. Hæmatoxyli,		
	Cretæ Præp.	āā	ʒij.
	Tinct. Opii		fʒj.
	Aq. Cinnam.	ad	f℥viij.
M.	Ft. mist.		

JUNIOR.

[449].

℞	Liq. Hypophosph. Co.		℥j.
	„ Ferri Hypophosph.		℥ss.
	„ Strychniæ		ʒj.
	Aquam	ad	℥viij.
M.			

I had this prescription the other day, but could not find either the liq. hypophosph. co. or the liq. ferri hypophosph. in any of the pharmacopœias. R. E. H

[450]. The following appeared in the *British Medical Journal*, July 24, from one of our authorities on skin diseases, and was stated by him to be the "best" preparation for general loss of hair from ordinary circumstances:—

Vaseline and Castor Oil . . .	equal parts.
Red Oxide of Mercury . . .	5 grains.
Strong Liquid Ammonia . . .	½ drachm.

And a few drops of Oil of Rosemary.

At the request of a medical man I prepared the above, using ½ ounce of each vaseline and castor oil (no quantity being mentioned), but no matter in what manner they were mixed they would not combine and finally resolved themselves into their component parts, the mercury at the bottom and the vaseline as a cream on the top. As there are now so many varieties of vaseline, perhaps this may account for the difficulty. Perhaps some pharmacist will volunteer his assistance, for as it stands now nothing could be more inelegant.

W. K. G.

Notes and Queries.

[676]. PREVENTIVE FOR SEA-SICKNESS.

Ext. Cannabis Ind.	grs. ij.
Chloroformi Pur.	ʒj.

For adults, five drops on a lump of sugar on embarking, and repeated in two or three hours if required. For children, one or two drops.

In reply to your correspondent, Mr. J. J. Matthias, I send the above, which I have found very useful in cases of sea-sickness.

W. LEE.

Castle, Northwich.

[677]. MARKING INK.—I made some marking ink according to the form given by Mr. R. Roberts in the Journal of December 13, 1879, and obtained a greenish looking ink, the free acid in which destroyed the fabric. On neutralizing with carbonate of potash I got an ink which could not be removed with chloride of lime or caustic potash solution, but it was not at all a good black. Any reader giving information will oblige.

W. MILLER.

[677]. MARKING INK.—I prepared a marking ink from a recipe published in your Journal, viz., manganese phosph., 1 oz., acid hydrochlor., 2 ozs., anthracene, ½ oz., water, ½ oz., potassa chromate, ½ oz.; add gum water and shake. I found on mixing the above they form a thick syrupy liquid, not in any way suitable for marking linen. I added more water, but still the result is very unsatisfactory. Can you or any of your readers help me? The receipe was signed "R. Roberts."

ANTEROS.

Correspondence.

**** No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

PROFESSOR ATTFIELD AND THE FOUNDATION OF THE BRITISH PHARMACEUTICAL CONFERENCE.

Sir,—Professor Redwood's volume, 'The Progress of Pharmacy' (Ed. 1880), has just came under our notice. The record of the establishment of the British Pharmaceutical Conference, as given at p. 316, is strangely wanting in one essential particular, viz., the part taken by Professor Attfield in that work.

It is not unreasonable to regard *all* who took part in convening or attending the meeting held at Newcastle-upon-Tyne, on September 2, 1863, as founders of the Conference; but if the question of pedigree be pushed back a stage further we must state thus publicly (what we believe to be widely known already) that Professor Attfield was associated with us in the issue of the earliest circular on the subject, and we now add that each of us recognized Professor Attfield's adoption of the scheme as its one crucial point. We were convinced that if Professor Attfield took up the responsibilities of the office of Senior Honorary Secretary, the new organization would have secured the needful pivot which would be reliable for its movements in every direction. The testimonial just presented to Professor Attfield marks the sense of his fellow members of the fidelity, energy and ability with which his self-imposed duties have been performed during the long period of seventeen years.

RICHARD REYNOLDS.
HENRY B. BRADY.

THE FUTURE OF PHARMACY.

Sir,—If I mistake not, Mr. Chapman, in his able and sensible letter, invited the expression of the opinion or experience of his brethren in business on the question of reduction of prices, and although occupying perhaps only a humble position in the trade, I have ventured a few remarks on the subject. Being in the heart of the South Yorkshire coal district our circumstances and class of business differ very widely from those of Notting Hill, nevertheless the evil of which your correspondent complains affects us even here, to no small extent. Surrounded as we are by the large towns of Sheffield, Rotherham, Barnsley and Doncaster to which places the railway fare varies but from 4½*d.* to 9*d.*, and where 1*s.* 1½*d.* patents, etc., are sold at prices varying from 9½*d.* to 10½*d.* by generous grocers and "cutting," or, perhaps as they themselves would put it, "enterprising" druggists, we in this neighbourhood of course experience a considerable diminution in the sale of the various nostrums which formerly constituted an important item in our business.

When I state that out of my account with the principal wholesale drug firm with whom I deal, above one-third of the amount was for "patents" it will be seen that they alone constituted no inconsiderable portion of our returns. I ought perhaps to say, that within a radius of from two to three miles, which includes several populous villages, we number about eight registered chemists.

Notwithstanding the competition to which we are exposed from the towns I have named we have none of us as yet made any reduction in our prices. Speaking for myself, however, I frankly confess that my sales of patents have fallen off above one-third, but yet I am in a considerably better position than if I had reduced 1*s.* 1½*d.* articles even to 10½*d.* For example, on Saturday last I sold eight 1*s.* 1½*d.* patents, on which the profit amounted to 3*s.*, but had I reduced them to, say, 10½*d.* I should have had to sell no fewer than two dozen, and at 9½*d.* of course the sale would require to be increased to three dozen, in the day, ere the same amount of profit could have been obtained.

But is it reasonable to suppose that because pills are sold at, say, 1*d.* per box profit, that any person in his senses would think of taking a single pill more than he required, on this account? How often, I would ask, do druggists themselves patronize the contents of their own shop bottles, notwithstanding the fact that they may, if they be so disposed, revel in the luxury of drugs at cost price? Why the very supposition is fraught with absurdity! The difficulty in nine cases out of ten is to induce people to take even the necessary medicine they occasionally require, everybody, so far as my observation goes, being only too glad to echo Macbeth's cry, "Throw physic to the dogs, I'll none of it." Indeed the fact that people cannot be persuaded to swallow drugs if they do not require them is so self-evident that one almost feels ashamed at having to employ any arguments to prove the truth of the statement. And yet how many are there among our brethren in the trade who have imbibed the erroneous idea that by reducing prices they can increase consumption and so augment their returns, fondly imagining that this in turn necessarily leads to augmented profits.

As an example of this very common mistake I may instance the case of a young gentleman of my acquaintance at present managing (?) a drug business in this county, who, seized with the prevailing mania, thought by a *coup de main* to increase his employer's returns by offering customers three boxes of a 7½*d.* "patent" for 1*s.* 6*d.* On a friend pointing out to him that out of the eighteenpence thus obtained for three, he only reaped the same profit as he would have done had he sold one at its legitimate price of 7½*d.*, his reply was "Oh! but don't you see how much larger is the return we get?" It would almost appear from this, that the individual in question had acquired the belief that traders in general and druggists in particular live, not by their profits, but by their returns. The incident reminds one of the old woman who was at great pains to inform her customers that she had no profit whatever singly on her oranges, she only made her living by the quantity she sold! I think it would not be a bad thing if some further instruction in profit and loss and the value of "returns" as distinguished from "profits" were included in the curriculum of our various pharmaceutical schools so as to banish as far as may be from the minds of the next generation of pharmacists this *ignis fatuus* of "small profits and quick returns" as applied to the drug business. Your leading article in last week's Journal, however, deals so fully and ably with that subject that no more needs to be said about it here. I quite agree with you that a remedy for the present state of things has yet to be devised, although it seems to me that I can almost detect one in operation. However, I have not space or time to go into that question, but may say that I have in my own case endeavoured to obviate in some sort the evils in question, by slightly raising the prices of drugs proper, and advancing a little my prices for compounding recipes and prescriptions (which latter I am sorry to say in this locality are "few and far between"), as also my price for medicine, which in many cases I am asked to prescribe myself, though I do not cultivate counter prescribing. By such means I am glad to say I have been enabled to hold my own in the face of the depression in trade to which we have had to bow, so that although my returns may have diminished to three-fourths of what they were a few years ago, my profits remain about the same.

Mexborough, Yorkshire. R. J. SHIELDS.

ASSISTANTS IN THE SOUTH OF FRANCE.

Sir,—Mr. Boutell's letter in your issue of September 4, in spite of some vague declamation, only confirms the observations I made in your number for August 21. If it took Mr. Boutell six years to learn that situations in the South of France were uncomfortable, it would appear as if he had not found it so very hard. Since he is kind enough to refer to what he knows of my experience, I may say that I have had occasion to converse with every pharmacien on the littoral, and with nearly all the assistants, besides having previously made an interesting historical study of the gentlemen who had formerly been south, and the remarks I made were based upon the knowledge thus acquired, and upon personal experience.

Mr. Bathe's caution is very timely. Assistants ought to weigh well the disadvantage of losing many home comforts, and to consider the shortness of the season, if only engaged for that time. But if it does not pay I should almost say it is the assistant's fault, unless he goes as a junior.

Mr. Bathe correctly states that reasonable assistants are treated in England with gentlemanly respect; but that does not contradict my statement that they are so in France also. With regard to "liberty," Mr. Boutell with six years' experience could tell Mr. Bathe that they have "more liberty" in France than in England.

In conclusion, of those who have gone to the littoral, seriously wishing to do well, some have established themselves there, and are rapidly making their fortunes, others have come home and proved all the more successful for a short residence in the "sunny south."

Liége. GEORGE WEDDELL.

W. R. Cullen.—Your post card has been handed to the Secretary, to whom all notices as to the delivery of the Journal should be sent.

M. P. S.—We are not aware of the existance of such a school.

J. C.—We cannot undertake to answer your question, which is one that should rather be put to a solicitor.

W. Lincolne.—For the removal of chrysophanic acid stains, see vol. viii., p. 1018.

A Caution.—"*Pharmacist*" writes to caution chemists and druggists as to the inadvisability of assisting in the diffusion of American nostrums by providing travelling agents with information as to medical men in their neighbourhood.

C. W. P.—For method of preparing oleate of zinc, see vol. ix, p. 58, also p. 818. For suppositories having a gelatine base, see vol. ix, pp. 503 and 949.

W. R. Kermath.—Thanks for the cutting.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Smith, Mee, Draper, Barnes, Woodland, Squire, Chichester, Wootton, Gerrard, Oswald, Stringer, Allen, Plowman, Brady, Thresh, Grose, Thomas, Newsholme, Morgan, G. W., E. F. C., J. E. H., Socius, Reform, Volvox globator.

"THE MONTH."

The time of the "sere and yellow leaf" is rapidly approaching and the phenomena concerned in the fall of leaf or branch therefore form an appropriate subject at the present time. In the *Gardeners' Chronicle*, September 18, p. 361, the Rev. M. J. Berkeley,—the veteran observer whose eye nothing, however minute, seems to escape,—describes a curious case which recently came under his notice. A large number of branches of a luxuriant oak tree were found scattered on the ground, and on examination it was discovered that their disarticulation was owing to the same circumstance that causes the fall of the leaf, viz., the formation of a number of loose cells at a peculiar point. The cells in these branches formed across the centre of swellings in the branch, and at this point the branches gave way during a smart gale. The leaves of the oak appeared to be affected by a peculiar disease described some years ago in the same journal under the name of "cladoptosis."

In the various botanical gardens there are still a large number of plants in blossom, and those who are interested in the study of practical botany will find at Kew Gardens the following natural orders well represented:—Ranunculaceæ, Malvaceæ, Geraniaceæ, Rutaceæ, Oxalidaceæ, Boraginaceæ, Scrophulariaceæ, Polygonaceæ, and several others. In the Ranunculaceæ the *Nigella sativa* may be seen with its curious fruit, showing in conjunction with *N. damascena* and *N. orientalis* almost every stage between the distinct follicles of an apocarpous fruit and their union into a capsule or syncarpous fruit, which is of rare occurrence in this order. On some of these plants a twin capsule was observed as the result of a single flower, and on others there might be observed what seemed to the naked eye a development of the placenta with ovules outside the capsule.

In the Scrophulariaceæ a fine specimen of *Linaria vulgaris* may be seen in blossom, of which all the flowers have the peloria form, in which there are five spurs and five stamens and a five-parted corolla to each flower, the ovary, however, remaining only two-celled, as is normally the case in this order.

Among medicinal plants in flower may be noticed *Sarracenia purpurea*, *Peganum Harmala*, rue, camomile, wormwood, and *Asclepias incarnata*, while in the Economic House a fine specimen of *Zingiber Cassumunar* is in blossom. The root of this specimen was sent over from India by Dr. Dymock, in a living state, and was presented by the Pharmaceutical Society to Kew Gardens. There has been for a long time some confusion concerning the plants which yield zedoary, zerumbet and cassumunar roots, and it may be hoped that the flowering of the specimens sent by Dr. Dymock will enable the matter to be cleared up.

In the Compositæ bed a plant (*Ammobium elatum*) is now in blossom which offers a most remarkable example of decurrent leaves, the base of the leaves being prolonged downwards so as to form a winged stem, and close by may be seen a species of *Gnaphalium*, *G. fœtidum*, remarkable for the exceedingly offensive odour of its leaves, which clings to the hands for a considerable time, and which resembles the smell perceived when passing an old he-goat or a flock of sheep in the street. On the other hand an American species (*G. polycephalum*) which is used as an astringent for ulcerated mouths, etc., possesses a fragrant odour, so much so that one of its provincial names is "Indian posy." It is probably this plant that Oliver Wendell Holmes alludes to when he says, "Perhaps the herb everlasting, the fragrant immortelle of our autumn fields, has the most suggestive odour to me of all those that set me dreaming." The student may observe in the common *Gnaphalium uliginosum*, so prevalent in damp pastures in this country in the autumn, that the portion which is commonly called the flower is, as in all everlasting flowers, composed of dry chaffy bracts or phyllaries instead of petals, the true flowers being all tubular.

In the early part of this year Mr. T. L. Phipson communicated some curious observations made upon the leaves of the common acacia tree of our gardens, *Robinia pseudacacia*. He noticed that if the terminal leaflet was struck by the finger from ten to twenty times in the bright sunlight all the leaflets folded up and went to sleep as they do at night, closing one after another and commencing with those nearest to the terminal leaflet.

When the terminal leaflet of the sensitive plant, *Mimosa pudica* (which is now in flower in Regent's Park Botanic Garden), is sharply touched with the point of a lead pencil the same phenomenon may be observed; but when the leaflets at the base are touched only the one affected by the blow closes up if not allowed to touch the others, though as it underlies the one above it the upward movement causes it to touch the next leaflet and makes the rest close in regular order towards the top of the leaf. The greatest effect seems to be produced by bending downward the top of the rachis of the leaf and not, as might have been supposed, by irritating the swellings at the base of the leaf or leaflets.

Another remarkable little plant, *Salvinia natans*, may now be seen in fruit both here and at the Kew Gardens. Plants of the Marsileaceæ are so difficult to procure in this country, except in mountainous districts, that those who are studying cryptogamic botany may be glad of the opportunity of seeing this little plant. There is, moreover, no British plant of this genus. The hairs on the leaves are very beautiful. The spore cases are hidden from sight under the leaves and among the roots, and are as large as small peas; the spores, when mature, fall to the bottom of the water.

In the Hale Farm Nurseries, at Tottenham, *Gentiana Kurroo* is now in blossom, and in the Botanical Gardens at Dublin another Indian medicinal plant, *Cuscuta reflexa*, a kind of dodder, is growing in great luxuriance, being about 16 feet high, although planted only last May.

A step in the right direction is about to be taken in Germany. On October 15, next, a new pharmaceutical school will be opened in Brunswick, in which young men are to be specially educated for the wholesale trade. Particular attention will be given to pharmacognosy, the recognition of adulteration, microscopical investigations, and botany. The course will comprise two sessions and the fee for each session will be £7 10*s*. Adulterated drugs generally reach the retail trade through mistakes made by the wholesale buyer, and judging from the crude drugs imported from Germany into this country, some supervision is certainly required before they are exported as well as when they arrive in this country. An instance in point is the difficulty of getting genuine quebracho bark, a false kind being largely met with in Germany and having during the past month been offered in the London market.

Cinchona bark from Jamaica is already assuming a place in commerce. The fourth consignment, forwarded from the Government plantations in April last and sold in London on May 20, consisted of 122 bales, the bark of *C. officinalis* fetching 7*s.* 6*d.* per pound for stem and 7*s.* 9*d.* to 8*s.* 1*d.* for root bark. It is calculated that in eight or ten years the grey bark would realize at the rate of £500 per acre. An interesting point in connection with the drying of the bark has been so far decided by this consignment. There has been some discussion whether or no the bark is deteriorated by drying in sunlight. All the bark sent in April last from Jamaica was dried in the sun as rapidly as possible, and in competition with artificially dried and other barks obtained the highest prices.

During a recent severe hurricane in Jamaica, the *Cinchona succirubra*, owing to its large leaves, suffered considerably, having been uprooted and damaged to the extent, it is said, of 15 to 20 per cent. The loss will, however, be compensated for by the bark which the fallen trees will yield, although the time of the year is not very favourable to drying it. Singularly enough, the plants in the sheltered hollows suffered more than in the open clearings, a fact worth remembering by cultivators of the cinchona. Jalap has until lately been planted among the cinchonas, but was found to exhaust the soil, and therefore has been removed into new ground. The crops of jalap during the past year in Jamaica amounted to 14,924 pounds and sold in the fresh state for £62 3*s.* 8*d.*

The action of the *Carica papaya* on fibrin has of late attracted considerable attention. M. Bouchut has recently made some interesting experiments as to the action of the diluted juice of the plants on living animal tissue and finds that the effects produced are similar to those on dead tissue, adenomata and cancers being digested and converted into peptones. The solution used contained one-fifth of papaw juice. If this solvent action can be limited, it would seem as if papaw juice might become a valuable medicinal agent. The living plants are now obtainable in this country, and it may be hoped that the numerous investigations which have of late been made by various experimentalists may lead to some practical therapeutical result.

M. Bouchut has also extended his researches on the digestive principle of the papaw tree to the common fig, and the result of his preliminary experiments (*Comptes Rendus*, vol. xci., p. 67), carried out upon the milky juice collected from a fig tree in April last, seems to show that this juice contains a powerful ferment capable of digesting albumenoid matters. As much as 90 grams of fibrin, added in eight successive portions at intervals of one or two days to 5 grams of the milky juice, and kept at a temperature of 50° C., was for the greater part digested, leaving a small amount of a white homogeneous residue, and the solution having the odour of good broth.

The physiological action of cocaine, the active principle of coca leaves, has recently been investigated by Dr. von Ansep in the Physiological Institute at Wurzburg. He finds that in mammalia small doses accelerate the action of the heart and the peristaltic movements of the intestines and lessen the secretions of the several mucous membranes. Cocaine dilates the pupil of the eye, whether taken internally or applied externally.

In the *Practitioner* for August Dr. Murrell gives an account of the action of muscarine in the treatment of the night sweating of phthisis, and publishes a formula for a solution of picrotoxine which he uses in the same complaint. The solution is as follows:—Picrotoxine, 8 grains; glacial acetic acid, fl. ʒiv; distilled water, to fl. ℥iv; mix and filter. This solution being 1 in 240, 4 minims are equal to $\frac{1}{60}$ gr. Pills of picrotoxine containing $\frac{1}{60}$ gr. are made by rubbing with sugar of milk and adding glycerine and tragacanth. The average dose of $\frac{1}{60}$ gr. is usually given three times a day, the last dose being given at bedtime. He finds that muscarine acts in much the same way as picrotoxine and pilocarpine.

Dr. Mackesy of Cork records in the *British Medical Journal* for August 7, p. 208, the successful use of a subcutaneous injection of pilocarpine in the treatment of asthma.

It is not often that one hears of a case of poisoning by quassia, although it is known to possess narcotic properties. In the case recorded in the *Lancet*, August 14, p. 260, the poisoning arose from an overdose given at a hospital in the form of injection. As no antidote has been published, it may be desirable to place on record that the remedies found effectual in this case were powerful stimulants, such as ether, sal volatile and brandy, aided by the application of hot water to the feet. The pupils were strongly contracted, and the symptoms appeared to resemble somewhat those of poisoning by opium.

Dr. Ortega in *Le Practicien* states that he has found a solution of chloral, 1 part in 50, very effectual in the treatment of the distressing complaint known as perspiring feet. The solution was used in the form of a bath for the feet, and applied in the form of wet cloths, with the result that the odour disappeared in two days.

Dr. Thin also has published in the *British Medical Journal*, September 18, p. 463, his treatment for the same disease, which consists in the use of cork soles and changing the stockings twice daily, placing them after being used for some hours in a saturated solution of boracic acid. They are then dried and are fit to wear again if it be desired. By this means the bacteria (see *ante*, p. 110) are killed, and the use of the cork soles prevents the boots from becoming contaminated with bacteria, as they can be changed every day and treated in the same manner as the stockings.

The oil of eucalyptus has lately been attracting some attention as an antiseptic dressing for wounds and is claimed to possess not only the advantage over carbolic acid of being non-poisonous, but also of preventing the development of bacteria when it is present in the proportion of 1 in 666 of the dressing, while carbolic acid does not do so until the amount reaches 1 in 200. The eucalyptus oil is soluble in oil and pure paraffin as well as in alcohol. For spray and irrigation Professor Schulz recommends a mixture of the alcoholic solution with water. Dr. Siegen, according to a quotation in the *Lancet*, September 4, p. 387, finds that a 5 per cent. solution of eucalyptus may be employed without any drawback. For gauze bandages he dissolves 3 parts of the oil in 15 of alcohol and dilutes with 150 parts of water.

The discussion in the medical papers as to the efficacy of Chian turpentine in cancer still continues, and it may be well, therefore, to repeat that the genuine article has not a bitter taste when kept in the mouth for a few minutes, but that Chian turpentine adulterated with coniferous turpentines has a well marked bitter taste, not always immediately perceptible, but invariably so after a short time. There appears to be at the present time very little of the genuine drug in the market, while there is a considerable quantity that is not genuine and which must find its way into circulation. In the Museum of the Society there is a genuine sample that belonged to the late Dr. Pereira, as well as specimens presented by Dr. Clay, and these can easily be referred to for purposes of comparison on application to the Curator.

A new step in vaccination has been proposed by M. Bouley at the Paris Academy of Sciences. The *Bacillus anthracis*, which has been found to be the cause of the disease called charbon or splenic fever in cattle and of the woolsorters' disease in mankind, has been proved to be susceptible of dilution so as to be safely used to inocculate the disease in a mild form and prevent its occurrence in a more aggravated and fatal character. M. Bouley suggests that it may be possible to make generations refractory to the disease by inoculating the mothers during the last period of gestation.

M. Galtier has been studying the very fatal disease called glanders in horses, and finds that drying destroys the virulent activity of the poison. On the other hand it is communicable by the saliva, so that the drinking of a glandered animal at a trough would probably be sufficient to communicate the disease to healthy horses.

A writer in *Nature*, September 16, p. 463, states that the oil of American pennyroyal (*Hedeoma pulegioides*) rubbed on the skin will prevent the attacks of mosquitoes, and that a quantity of the leaves strewed about an apartment at night will keep them away. He suggests that the English oil of pennyroyal (*Mentha Pulegium*) might possibly have a similar effect.

According to the *Pharm. Zeitung*, the adulteration of insect powder seems to be on the increase. Some samples obtained from a respectable house were found to contain 1½ per cent. of chrome yellow and left 10·5 per cent. of ash on incineration.

A new and beautiful form of tannic acid is now being produced in Germany. It is made by allowing a syrupy ethereal solution of tannin to drop from a perforated vessel through a warm atmosphere, for a distance of about 16 feet, on to a rapidly revolving cylinder, from which it is removed in fine threads having a pseudo-crystalline appearance.

Herr A. Saalfield, in the *Archiv der Pharmacie*, xiii., p. 280, remarks concerning Palembang benzoin that it may be distinguished from the Sumatra kind by dropping the tincture into water, when instead of milkiness only a flocculent precipitate is produced, and that it should therefore not be used to make the tincture of benzoin. He remarks also that the tincture is of a paler colour. This kind of benzoin, he states, contains 10 per cent. of benzoic acid and no cinnamic acid. Samples met with in this country, however, are known to yield as much as 20 per cent. This kind of benzoin may generally be recognized by the glassy, translucent character of the fracture and the almost entire absence of distinct tears, also by the amount of moisture that it contains, which is sufficient to cause it to become mouldy if kept in a closed vessel.

In the *Pharm. Centralh.*, No. 22, Dr. C. Grote gives a test for the purity of balsam of Peru, which has been found to be adulterated in North Germany with rosin. As the addition of this substance reduces the specific gravity and renders the balsam thicker than usual, any specimen having a less specific gravity than 1·36 may be suspected of containing rosin. When 3 to 5 drops of the balsam are shaken with 2 to 3 cubic centimetres of water of ammonia in a test tube, a brownish-grey liquid is produced with a thin foam which soon collapses, the emulsion remaining fluid for days. If 20 to 25 per cent. of rosin be present, a dense bulky foam is produced and the emulsion gradually gelatinizes, so that after fifteen minutes the test tube may be inverted without spilling any of the liquid.

Dr. Muter has called attention (*Analyst*, August, p. 140) to a specimen of assafœtida that had been submitted to him by a pharmacist, which although outwardly presenting a good resemblance to the drug as met with in tears, and having the usual odour, contained in the centre of each tear a small stone. The stones were apparently specially prepared from magnesium limestone, and in the average of three tears of which the weight was taken amounted to over 78 per cent. It is conjectured that the "tears" were manufactured by dipping the stones into melted assafœtida until they had acquired a sufficient coating, since although the coating smelt fairly well it contained far below the proper quantity of essential oil. If the fraud is one so systematically carried out as the foregoing seems to indicate, it will be well for pharmacists to keep a sharp look out upon the assafœtida, especially if a sample should present a more than usually rounded appearance.

Dr. Hesse has been continuing his investigation of dita bark (*Alstonia scholaris*)* and has extended his research to the closely allied "cortex Alstoniæ" (*A. spectabilis*), or "poelé bark," from Java (*Annalen*, vol. cciii., p. 144). He now announces that he has separated from dita bark, besides ditamine which he had before partially described (*Pharm. Journ.*, [3], vi., 144), two other alkaloids, echitamine and echitenine. Echitamine and some of its salts have been obtained in a crystalline form, and there is a peculiarity about its water of crystallization. The air-dried crystals of the base contain four molecules of water. Of these, three are driven off at a temperature below 105° C., and one only after continued exposure to that temperature in a partial vacuum. But in losing the fourth molecule of water the alkaloid becomes much less strongly basic in its reaction, though this molecule is restored and the original form reproduced upon treating the dehydrated base with hydrochloric acid and decomposing the hydrochlorate. In consequence of this apparent difference in the relation of the last molecule of water, Dr. Hesse prefers to look upon the monohydrated base as the normal form, and from its behaviour has named it echitammoniumhydroxide. The bases at present found in dita bark are,—

Ditamine	$C_{18}H_{19}NO_2$
?	$C_{18}H_{28}NO_3$
Echitenine	$C_{20}H_{27}NO_4$
Echitammoniumhydroxide . . .	$C_{22}H_{30}N_2O_5$

All these three alkaloids were also obtained from poelé bark (*A. spectabilis*), together with a fourth, which Dr. Hesse proposes to name "alstonamine." But in this bark echitammoniumhydroxide is present in much larger quantity (0·808 per cent.), and as its physiological action has been found to resemble that of curare it will be useful to ascertain how far the reputed medicinal activity of these alstonia barks depends upon the proportion of this alkaloid which they contain.

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* For an abstract of the former paper, see *Pharm. Journ.* [3], vi., 142.

Another alkaloid that has recently been attracting some attention, namely aspidospermine, the alkaloid of quebracho blanco, has been the subject of an interesting communication from Dr. Wulfsburg, of Gottingen (*Pharm. Zeit.*, September 8). Dr. Wulfsburg considers aspidospermine to be identical with "paytine," an alkaloid discovered by Dr. Hesse, in 1870 (*Pharm. Journ.*, [3], i., 226, and iv., 772), in a white bark of unknown botanical origin imported from Payta, and considered by Professor Flückiger to agree in anatomical structure with the cinchona barks. Dr. Wulfsburg has had an opportunity of examining a specimen of this white Payta bark, given by Dr. Hesse to the late Professor Wiggers, and is of opinion that it is from a species of *Aspidosperma*, though possibly not from that known as "quebracho blanco." The reactions of the alkaloid (or alkaloids), as published by Hesse and Fraude respectively, agree, fairly well, as also do the analyses, if allowance be made for the possibility that Fraude, who avoided exposing his product to heat, analysed a substance containing a molecule of water that Hesse found to be driven off at 130° C. Hesse, however, found his alkaloid to be non-poisonous when administered to rabbits. It may be remarked that, although the confusion which a short time since prevailed between the quebracho blanco bark and quebracho colorado wood has to some extent disappeared, there still seems to be great uncertainty as to the former, for at the recent exhibition in connection with the meeting of the German Association at Breslau, bark was exhibited by two firms, labelled in both cases "quebracho blanco *ver.*," but which evidently did not all come from the same botanical source. It may be mentioned that figures of a longitudinal and a transverse section of the "cortex chinæ albæ de Payta" are given in Vogl's 'Commentar zur österreichischen Pharmacopœ' (3rd edit.), p. 223.

The probability of the presence of a second alkaloid in jaborandi has been mentioned by both physiologists and chemists; and Drs. Harnack and Meyer, of Strassburg, now announce (*Annalen*, cciv., 67) that they have detected the presence in many commercial specimens of pilocarpine of another strong base, to which they have given the name "jaborine." It is described as being distinguishable from pilocarpine by its difficult solubility in water and greater solubility in ether. In physiological action also it is said to differ, it corresponding exactly to atropine in this respect, whilst the action of philocarpine is analogous to that of nicotine. Jaborine is further said to be readily formed from pilocarpine by the action of acids, simple evaporation in acid solution being sufficient to produce a small quantity of it. The authors prepared jaborine also from some evaporated mother liquor left after the crystallization of pilocarpine in a manufacturing operation, but failed to obtain it sufficiently pure to enable them to publish a formula representing its composition. In fact the conclusions to be drawn from the paper itself are not quite definite. It is true that the easy formation of jaborine from pilocarpine points to a common origin, but the occurrence of pilocarpine and jaborine together in the same leaves is not necessarily demonstrated either by the presence of jaborine in commercial pilocarpine, concerning the manufacture of which nothing is known, or the fact that it was obtained from a residual liquor from a manufacturing operation in which it is expressly stated that the leaves of *Piper reticulatum* and other species were used together with those of *Pilocarpus pennatifolius*. Nevertheless it is important to know that pilocarpine is liable to be contaminated with another body differing considerably from it in physiological action.

Dr. Peckoldt, who appears to be indefatigable in the chemical investigation of the Brazilian vegetation, announces (*Zeits. oester. Apot.-Ver.*, Aug. 20, p. 369) that he has separated from the *Scybalium fungiforme*, Sch. et Endl.,—a Balanophoraceous plant popularly called in Brazil "esponja de raiz" (root sponge) and "cogumello de sangue" (blood fungus),—a bitter pungent alkaloid, crystallizing in small white transparent needles, a peculiar crystalline organic acid, and other bodies. He has named the alkaloid "scybaline" and the acid "scybalinic acid."

A considerable portion of the current number of the *Annales de Chimie et de Physique* is devoted to an exhaustive paper by M. Villars on the important subject of the etherification of the mineral acids. With respect to the comparative rapidity of their etherification the results of the author's experiments show that it varies considerably among the hydracids, hydriodic acid etherifying more rapidly than hydrobromic acid, and both of them more quickly than organic acids, such as acetic acid. Hydrochloric acid, on the contrary, etherifies very slowly, much less so than does acetic acid, and in the presence of most of the superior homologues of ethylic alcohol even this slow rate of etherification is in the case of hydrochloric acid retarded. Sulphuric acid etherifies almost immediately under ordinary conditions, the rapidity being, however, notably slackened by dilution as well as by the lowering of the temperature. Some very interesting conclusions are come to by the author as to the limits of etherification of these four acids, but these are too complex to allow of their being described in detail in "The Month."

The observation is recorded by M. Barnouvin (*Rep. Pharm.*, Aug., p. 350) that carbolic acid, when liquefied by heat and then left to cool remains liquid at a temperature much below its melting point (as low as + 15° C.), thus manifesting the phenomenon of superfusion. Solidification is, however, at once produced, with a rise of temperature, upon plunging into it a foreign body such as a glass rod. Thymol is known to act in a similar manner, and it will be remembered that it was recently pointed out (vol. x., p. 1036) by Herr Jahns that a mixture of carbolic acid and thymol remained in a liquid state at a temperature as low as − 20° C.

An accident that happened at Cannes some months since, during the preparation of oxygen for administration to the late Empress of Russia, presented some unusual features which induced M. Limousin to investigate them in the hope that they would throw some light upon the nature and cause of the explosions that every now and then occur during the preparation of the gas (*Journ. Pharm. Chim.*, August, p. 178). Under the direction of the physician, who thought thus to secure a purer product, only chlorate of potash had been placed in the retort, and the gas was being collected in a metallic gasometer of 80 or 90 litres capacity. Whilst the gas was being given off rather tumultuously, as is usual towards the close of such an operation, there occurred a violent explosion in the gasometer, which was burst and torn, whilst the retort in which the decomposition of the chlorate of potash was going on remained intact. The explanation suggested by M. Limousin is that under the influence of the temperature necessary for the decomposition of the chlorate incandescent particles of the undecomposed salt were carried over and ignited the inner surface of the vulcanized india-rubber tubing of the wash bottle, thus producing sufficient carburetted hydrogen to form when carried over together with the oxygen into the receiver a mixture that would explode upon coming into contact with a flame. This final condition, he thinks, might have been produced by the rush of gas carrying, even through the wash bottle, inflamed particles of sulphur or incandescent undecomposed chlorate. The lesson that M. Limousin draws from the accident is to enforce the necessity for always using permanganate of manganese with the chlorate of potash in such operations.

It may be mentioned, in connection with this subject, that the Rouen Industrial Society offers one silver gilt medal for the production of pure oxygen by an industrial process more economical than those known, and another for the economic production of oxygenated water. The same Society also offers gold medals for the production of ozone in a concentrated state and for an industrial process for the preparation of ozone. The memoirs have to be sent to the Director of the Society not later than the 1st of October.

Even to speak of hot ice seems paradoxical, but its production has actually been effected by Mr. Carnelly (*Chem. News*, Sept. 10, p. 130). Its existence is dependent upon the fact that in order to covert a solid into a liquid the pressure must be above a certain point (called by Mr. Carnelly the "critical pressure") otherwise no amount of heat will melt it. Mr. Carnelly states that experimenting in this direction he has obtained solid ice at temperatures so high that it was impossible to touch it without being burned, and that he has also by maintaining the superincumbent pressure below 4·6 millimetres of mercury (*i.e.*, the tension of aqueous vapour at the freezing point of water) kept ice for a considerable time at temperatures far above the ordinary boiling point, the ice eventually subliming away without previously melting. Other substances have been found to exhibit the same phenomena, and notably mercuric chloride.

To hear a shadow fall is another marvellous experience which has been reserved for this eventful year in the history of physics, and according to a communication to the *Times* of Wednesday last, Mr. Bell appears to have succeeded in fulfilling a prophecy made by himself two years ago that this would be made possible. In doing this the property possessed by selenium of offering more or less opposition to the passage of electricity according as it is acted upon or not by light has been utilized by Mr. Bell, who has thus succeeded in constructing a kind of microphone sensitive to the vibrations of light. The application of this success promises to mark a further advance in the art of communication between places distant from each other. A plane mirror of flexible material, such as silvered mica or microscopic glass, is employed to reflect sunlight or strong artificial light concentrated upon it by a lens. The speaker's voice is directed against the back of this mirror, which is thus thrown into vibrations in the same way as the diaphragm of a telephone and communicates these vibrations to the beam of light reflected from it. At the more or less distant station towards which it is reflected the light after passing through a lens is received upon a parabolic reflector, in the focus of which is placed a selenium cell in circuit with a local battery and telephone. At present the distance apart of the stations where the experiments have been made has not exceeded 230 yards, but Mr. Bell is said to believe that similar results may be obtained at whatever distance a beam of light can be flashed from one observatory to another.

Turning now to the "Dispensing Memoranda," it may be stated, in reply to J. J. (No. 435), that eserine sulphate may be incorporated with a basis such as vaseline or lard by freshly dissolving it, as recommended by W. J. B. and R. H. Parker, in a few drops of water, in which medium it is readily soluble.

A very good excipient for making the pulv. ext. coloc. co. or pulv. pil. coloc. co. into pills, required by No. 436, is the compound decoction of aloes. If these pill masses be made in accordance with the B.P. instructions they will not, on account of the soap, become so hard as to be insoluble in the secretions under the peristaltic action of the digestive canal. Care must of course be taken that no more excipient be used than is just sufficient to effect the union of the powders into a mass. "374" answers this question with the suggestion that oil of cloves and treacle be used as an excipient. Has it never occurred to the writer that an excipient should consist of a simple substance of no medicinal activity? Where is the authority for the addition of an excipient containing oil of cloves to compound extract of colocynth?

The ointment of prescription No. 437 should, if the ung. hyd. nitratis be slightly acid, be light yellow; on the contrary, if the ointment named be tolerably neutral, the combination will be of a slate colour. The colour of this ointment will merely depend on the condition of the ung. hyd. nitrat., and whatever colour the ointment might be when made it will speedily change and become a dark slate, due in fact to deoxidation of the mercury. It is not quite clear how the writer could have used the ung. zinci benz. in lieu of the oxide of zinc and benzoated lard of the prescription; the relative proportions of zinc and lard would not correspond. There are in the prescription 40 grs. of zinc oxide to 240 grs. of benzoated lard, whereas in the B.P. unguentum the proportion is 40 grs. of zinc and 218 and a fraction of lard, the difference being due to the troy weight of the prescription and the avoirdupois weight of the Pharmacopœia.

The objection to glycerine as an excipient for pepsine pills should be stated by "Nemo" in No. 438. Is it that the surface of the pills so made becomes moist, or that they do not retain their shape? The glycerine of tragacanth, about half the strength of that for which a formula was given in these columns some months ago, may be tried with advantage, and it is very likely that many other excipients may be used with very good results, but glycerine is one to which little objection has ever been raised. If the objection be that the glycerine by absorbing moisture from the atmosphere renders the mass damp, let the suggestion of "Pill Driver" be tried, or that of Mr. Heald; a few experiments would soon settle the point, and with advantage, probably, to many other dispensers.

"Nemo," in No. 439, should have given Chevallier's formula, from which he made the ung. emolliens. This ointment is usually considered to be represented by simple ointment, and one of the synonyms of the simple cerate of the London Pharmacopœia was ung. emolliens. The simple ointment of the British Pharmacopœia may very properly be used for the ung. emolliens of this prescription, and if properly prepared it should not be too hard for use. Some compounds are best made into an ointment suitable for use by first melting and then allowing the ingredients to cool; others, by keeping the ingredients stirred until cool. The melting process is more suitable when there is a fluid ingredient not easily miscible with lard. In the case in question the mortar with brisk treatment will effect a satisfactory result.

The mixture, No. 440, should be made by dissolving the ferri am. cit. in the smallest possible quantity of water and adding it with the other ingredients to the cod liver oil; an emulsion should not be attempted. Additions of this description are sometimes made to cod liver oil when it is never intended that they should form anything more than a temporary mixture after a brisk shake of the bottle. It seems to be a well founded opinion that cod liver oil is better retained and assimilated by the stomach when in a free state than when combined with mucilage or any similar substance, and in consequence many physicians do not require an emulsion.

The pills, No. 441, may be dispensed with soap and magnesia; there is sufficient room for a tolerable quantity of some suitable excipient without necessarily making the pills unusually large. The remarks on kindred combinations in former Journals may be studied with advantage.

The hyd. iod. viride of the British Pharmacopœia corresponds to the hydrarg. iodid., Ph. Lond. This preparation should therefore be used in making the ung. hydrarg. iodid. of prescription No. 442; a reference to the British Pharmacopœia should have settled this point to the satisfaction of "A Junior," and obviated the necessity of having recourse to the pages of the "Dispensing Memoranda."

In answer to question No. 443, the mixture of magnesia and tincture of assafœtida developed but a very slight green coloration, and only after standing for several days; probably it would vary in different samples of assafœtida. A similar reaction with lime is taken advantage of by M. Vigier (*Jahresbericht der Pharmacie*, 1870, p. 151) as a means of distinguishing various gum resins.

S. E. Clarke, in No. 444, does not say what process he has followed in making an emulsion of phosphorized cod liver oil, or what proportion of phosphorus the oil contained. Following the directions of Mr. Gilmour (in *Pharm. Journ.*, [3], vol. ix., p. 773) an excellent emulsion can be made with phosphorized oil containing $\frac{1}{160}$ or $\frac{1}{60}$ gr. per ʒj.

In reply to R. L. G., No. 445, chloroform is usually dispensed for chloroformyl, but of course dose, etc., must be taken into consideration.

No. 446, there is no difficulty in making suppositories of cocao butter and chloroform, taking care that the chloroform, previously dissolved in a little oil, be added while the butter is thickening.

Presuming the solution of morphia and atropia, in No. 447, to deposit the morphia, it is suggested that an addition of a small proportion of glycerine would obviate its recurrence.

The mixture, No. 448, can be dispensed by rubbing down the ext. hæmatox. to a fine powder, adding part of the water, and finally the creta præp. and tr. opii mixed with the remainder.

Probably the author of prescription No. 449 in writing liq. hypophosph. co. referred to a preparation suggested in the *British Medical Journal* by Dr. Churchill in the beginning of the present year, but reference to the prescriber would be advisable.

The prescription No. 450 may be made into a very presentable ointment by first rubbing the castor oil with the ammonia, and when a good emulsion has resulted gradually adding the vaseline and remainder of ingredients. This formula partakes of the character of a recipe rather than a prescription, and should a separation show itself the addition of a little more oil will render the ointment uniform. The vaseline used is the preparation which is usually advertised as such.

THE APPLICATION OF CHEMISTRY TO AGRICULTURE.*

BY J. H. GILBERT, PH.D., F.R.S., V.P.C.S., F.L.S.

(*Continued from page* 234.)

So far, I have endeavoured to convey some idea of the state of knowledge on the subject of the chemistry of agriculture prior to the appearance of Liebig's first two works bearing upon it, and also briefly to summarize the views he then enunciated in regard to some points of chief importance. Let us next try to ascertain something of the influence of his teaching.

Confining attention to agricultural research, it may be observed that about the year 1843, that is, very soon after the appearance of the works in question, there was established the Chemico-Agricultural Society of Scotland, which was, I believe, broken up after it had existed about five years, because its able chemist, the late Professor Johnston, was unable to find a remedy for the potato disease. Shortly after this, the Highland and Agricultural Society of Scotland appointed a consulting chemist; somewhat later the Royal Agricultural Society of England did the same; and later still followed the Chemico-Agricultural Society of Ulster. Lastly, the very numerous "Agricultural Experimental Stations" which have been established, not only in Germany, but in most Continental States, owe their origin directly to the writings, the teachings, and the influence of Liebig. The movement seems to have originated in Saxony, where Stöckhardt had already stimulated interest in the subject by his lectures and his writings. After some correspondence, in 1850-1, between the late Dr. Crucius and others on the one side, and the Government on the other, the first so-called Agricultural Experimental Station was established at Möchern, near Leipzig, in 1851-2. In 1877, the twenty-fifth anniversary of the foundation of that institution was celebrated at Leipzig, when an account (which has since been published) was given of the number of stations then existing, of the number of chemists engaged, and of the subjects which had been investigated. From that statistical statement we learn that in 1877 the number of stations was:—

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* Presidential Address delivered before the Chemical Section of the British Association, Swansea, 1880.

In the various German States	74
In Austria	16
In Italy	10
In Sweden	7
In Denmark	1
In Russia	3
In Belgium	3
In Holland	2
In France	2
In Switzerland	3
In Spain	1
Total	122

Besides these 122 stations on the Continent of Europe, the United States are credited with 1, and Scotland also with 1.

Each of these stations is under the direction of a chemist, frequently with one or more assistants. One special duty of most of them is what is called manure-or seed-or feeding stuff-control; that is to examine or analyse, and report upon such substances in the market, and it seems to have been found the interest of dealers in these commodities to submit their proceedings to a certain degree of supervision by the chemist of the station of their district.

But agricultural research has also been a characteristic feature of these institutions. It is stated that the investigation of soils has been the prominent object at sixteen of them; experiments with manures at twenty-four; vegetable physiology at twenty-eight; animal physiology and feeding experiments at twenty; vine culture and wine making at thirteen; forest culture at nine; and milk production at eleven. Others, according to their locality, have devoted special attention to fruit culture, olive culture, the cultivation of moor, bog, and peat land, the production of silk, the manufacture of spirit, and other products.

Nor does this enumeration of the institutions established as the direct result of Liebig's influence, and of the subjects investigated under their auspices, complete the list either of the workers engaged, or of the work accomplished in agricultural research. To say nothing of the labours of Boussingault, which commenced some years prior to the appearance of Liebig's first work, and which are fortunately still at the service of agriculture, important contributions have been made by the late Professors Johnston and Anderson in Scotland, and in this country both by Mr. Way and Dr. Voelcker, each alike in his private capacity, and in fulfilment of his duties as Chemist to the Royal Agricultural Society of England. Nor would it be fair to Mr. Lawes (who commenced experimenting first with plants in pots, and afterwards in the field, soon after entering into possession of his property in 1834, and with whom I have myself been associated since 1843), were I to omit in this place any mention of the investigations which have been so many years in progress at Rothamsted.

So much for the machinery; but what of the results achieved by all this activity in the application of chemistry to agriculture?

As I have already intimated, and as the foregoing brief statistical statement will have convinced you must be the case, it will be utterly impossible to give, on such an occasion as this, anything approaching to an adequate review of the progress achieved. Indeed, I have to confess that the more I have looked at the subject with the hope of treating it comprehensively, the more I have been impelled to substitute a very limited plan for the much more extended scheme which I had at first hoped to be able to fill up. I propose then to confine attention to a few special points, which have either some connection with one another, or to which recent results or discussions lend some special interest.

First as to the sources and the assimilation of the carbon, the hydrogen, and the oxygen of vegetation. From the point of view of the agricultural chemist, the hydrogen and the oxygen may be left out of view. For, if the cultivator provide to the plant the conditions for the accumulation of sufficient nitrogen and carbon, he may leave it to take care of itself in the matter of hydrogen and oxygen. That the hydrogen of the carbohydrates is exclusively obtained from water is, to say the least, probable; and whether part of their oxygen is derived from carbonic acid, and part from water, or the whole from either of these, will not affect his agricultural practice.

With regard to the carbon, the whole tendency of subsequent observations is to confirm the opinion put forward by De Saussure about the commencement of the century, and so forcibly insisted upon by Liebig forty years later—that the greater part, if not the whole of it, is derived from the carbonic acid of the atmosphere. Indeed, direct experiments are not wanting—those of Moll, for example—from which it has been concluded that plants do not even utilize the carbonic acid which they may take up from the soil by their roots. However this may be, we may safely conclude that practically the whole of the carbon which it is the object of the cultivator to force the plants he grows to take up is derived from the atmosphere, in which it exists in such extremely small proportion, but nevertheless large actual, and constantly renewed amount.

Judging from the more recent researches on the point, it would seem probable that the estimate of one part of carbon, as carbonic acid, in 10,000 of air, is more probably too high than too low as an estimate of the average quantity in the atmosphere of our globe. And, although this corresponds to several times more in the column of air resting over an acre of land than the vegetation of that area can annually take up, it represents an extremely small amount at any one time in contact with the growing plants, and could only suffice on the supposition of a very rapid renewal, accomplished as the result, on the one hand, of a constant return of carbonic acid to the atmosphere by combustion and the respiration of animals, and, on the other, of a constant interchange and equalization among the constituents of the atmosphere.

It will convey a more definite idea of what is accomplished by vegetation in the assimilation of carbon from the atmosphere if I give in round numbers the results of some direct experiments made at Rothamsted, instead of making general statements merely.

In a field which has now grown wheat for thirty-seven years in succession, there are some plots to which not an ounce of carbon has been returned during the whole of that period. Yet, with purely mineral manure, an average of about 1000 pounds of carbon is annually removed from the land; and where a given amount of nitrogenous manure is employed with the mineral manure, an average of about 1500 pounds per acre per annum more is obtained; in all an average of about 2500 pounds of carbon annually assimilated over an acre of land without any return of carbonaceous manure to it.

In a field in which barley has been grown for twenty-nine years in succession, quite accordant results have been obtained. There, smaller amounts of nitrogenous manure have been employed with the mineral manure than in the experiments with wheat above cited; but the increase in the assimilation of carbon for a given amount of nitrogen supplied in the manure is greater in the case of the barley than of the wheat.

With sugar-beet, again, larger amounts of carbon have been annually accumulated without the supply of any to the soil, but under the influence of a liberal provision of both nitrogenous and mineral manure, than by either wheat or barley.

Lastly, with grass, still larger amounts of carbon have been annually accumulated, without any supply of it by manure.

Many experiments have been made, in Germany and elsewhere, to determine the amount of the different constituents taken up at different periods of the growth of various plants. But we may refer to some made a

Rothamsted long ago to illustrate the rapidity with which the carbon of our crops may be withdrawn from the atmosphere.

In 1847, we carefully took samples from a growing wheat crop at different stages of its progress, commencing on June 21, and in these samples the dry matter, the mineral matter, the nitrogen, etc., were determined. On each occasion the produce of two separate eighths or sixteenths of an acre was cut and weighed, so that the data were provided to calculate the amounts of the several constituents which had been accumulated per acre at each period. The result was that, whilst during little more than five weeks from June 21, there was comparatively little increase in the amount of nitrogen accumulated over a given area, more than half the total carbon of the crop was accumulated during that period.

Numerous experiments of a somewhat similar kind, made in another season, 1856, concurred in showing that, whilst the carbon of the crop was more than doubled after the middle of June, its nitrogen increased in a much less degree over the same period.

Similar experiments were also made, in 1854 and in 1856, with beans. The general result was that a smaller proportion of both the total nitrogen and the total carbon was accumulated by the middle or end of June than in the case of the wheat, though the actual amount of nitrogen taken up by the beans was much greater, both before and after that date. The nitrogen of this leguminous crop increased in a much greater proportion during the subsequent stages of growth than did that of the gramineous crop; but the carbon increased in a larger proportion still, three-fourths or more of the total amount of it being accumulated after the middle of June.

I should say that determinations of carbon, made in samples of soil taken from the wheat field at different periods during recent years, indicate some decline in the percentage of carbon in the soils, but not such as to lead to the supposition that the soils have contributed to the carbon of the crops. Besides the amount of carbon annually removed, there will, of course, be a further accumulation in the stubble and roots of the crops; and the reduction in the total carbon of the soil, if such have really taken place, would show that the annual oxidation within the soil is greater than the annual gain by the residue of the crops.

Large as is the annual accumulation of carbon from the atmosphere over a given area in the cases cited, it is obvious that the quantity must vary exceedingly with variation of climatal conditions. It is, in fact, several times as great in the case of tropical vegetation—that of the sugar-cane, for example. And not only is the greater part of the assimilation accomplished within a comparatively small portion of the year (varying, of course, according to the region), but the action is limited to the hours of daylight, whilst during darkness there is rather loss than gain.

But it is remarkable that whilst the accumulation of carbon, the chief gain of solid material, takes place under the influence of light, cell-division, cell-multiplication, increase in the structure of the plant, in other words, what, as distinguished from assimilation, vegetable physiologists designate as *growth*, takes place, at any rate chiefly, during the night; and is accompanied, not with the taking up of carbonic acid and the yielding up of oxygen, but with the taking up of oxygen and the giving up of carbonic acid. This evolution of carbonic acid during darkness must obviously be extremely small, compared with the converse action during daylight, coincidentally with which practically the whole of the accumulation of solid substance is accomplished. But, as the product of the night action is the same as in the respiration of animals, this is distinguished by vegetable physiologists as the respiration of plants.

I suppose I shall be considered a heretic if I venture to suggest that it seems in a sense inappropriate to apply the term *growth* to that which is associated with actual loss of material, and that the term *respiration* should be applied to so secondary an action as that as the result of which carbonic acid is given off from the plant. It may, I think, be a question whether there is any advantage in thus attempting to establish a parallelism between animal and vegetable processes; rather would it seem advantageous to keep prominently in view their contrasted, or at any rate complementary characteristics, especially in the matter of the taking up of carbonic acid and the giving up of oxygen on the one hand, and the taking in of oxygen and the giving up of carbonic acid on the other.

But it is obvious that in latitudes where there is comparatively continuous daylight during the periods of vegetation, the two actions—designated respectively assimilation and growth—must go on much more simultaneously than where there is a more marked alternation of daylight and darkness. In parts of Norway and Sweden, for example, where, during the summer, there is almost continuous daylight, crops of barley are grown with only from six to eight weeks intervening from seed time to harvest. And Professor Schübeler, of Christiania, after making observations on the subject for nearly thirty years, has recently described the characteristics of the vegetation developed under the influence of short summers with almost continuous light He states that, after acclimatization, many garden flowers increase in size and depth of colour; that there is a prevailing tinge of red in the plants of the fields; that the aroma of fruits is increased, and their colour well developed, but that they are deficient in sweetness; and that the development of essential oils in certain plants is greater than in the same plants grown in other latitudes. Indeed, he considers it to be an established fact that light bears the same relation to aroma as heat does to sweetness.

(*To be continued.*)

PREPARATION OF SODA FROM THE SULPHATE BY MEANS OF LIME AND SULPHUR.*

BY F. GUTZKOW.

The author has patented a method of preparing caustic soda from sodium sulphate by treating the latter with calcium sulphite and introducing sulphurous acid gas into the mixture. Soluble calcium bisulphite is thus formed, which reacts with the sodium sulphate, forming calcium sulphate and sodium bisulphite. These are separated by filtration, and the gypsum washed out with hot water. The sodium bisulphite is then treated with milk of lime, whereby a solution of caustic soda is obtained, which contains a certain proportion of sodium sulphite and sulphate and also calcium sulphite. It is evaporated in the usual manner, and the calcium sulphite which is left after decantation is used in another operation. The following two questions presented themselves to the author in working out this method:—(1). To what extent can sodium sulphate be transformed into the sulphite by means of lime and sulphurous acid; and (2). To what extent can sodium sulphite be rendered caustic by lime? As regards the first question, the conversion of sodium sulphate into sulphite is very satisfactory, and might be regarded as complete, if it were not for the solubility of the calcium sulphate, which is greater in the solution than in pure water. In the subsequent treatment with lime, this has a tendency to reconvert part of the sodium sulphite into sulphate. The second question could not be solved in a satisfactory manner, although success depends in a great measure on the solution being sufficiently dilute, but even with 14 grains per litre only 87 per cent. was converted. The results obtained, however, were only approximate, and, therefore, could not be used as proper data for answering this question. It was found that sodium sulphite requires a greater dilution than the carbonate.

Details of the apparatus used and the mode of working are given.

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The Pharmaceutical Journal.

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THE POTABLE WATER CONTROVERSY.

The discussion as to what constitutes a potable water, which came so prominently before the Chemical Society last session, and to which reference was made in these columns in a recent number of this Journal, has at length extended beyond the limits of scientific societies and the pages of their journals and is now being carried on in the columns of the daily press and in the vestry rooms of the metropolis.

The circumstance which has given this latest fillip to the topic and brought it before a wider circle is to be found in the last return of the Registrar-General as to the births and deaths in London and other large towns. Dr. Frankland is there quoted as having reported that all the samples of Thames water supplied to the metropolis during August, although as a rule efficiently filtered, were of very bad quality and utterly unfit for dietetic purposes, owing to their pollution with organic impurity, and that the Lea water, which was also efficiently filtered, was not superior to the Thames water. On the other hand the deep well waters supplied by the Kent and Colne Valley Companies had been described as being of their usual excellent quality. As a justification of this condemnation, Dr. Frankland, taking the average amount of organic impurity in a given volume of the Kent Company's water in the nine years ending December, 1876, as unity, represents the amount of organic impurity found by him in the analyses of waters supplied by the various companies last month by the following figures:—Kent, 1·6; Colne Valley, 1·6; Tottenham, 1·6; New River, 3·1; Chelsea, 5·1; Grand Junction, 5·8; West Middlesex, 6·7; East London, 7·0; Southwark, 7·1, and Lambeth, 7·8.

The inference apparently intended to be drawn from these figures was attacked, in a letter to the *Standard*, by Dr. Dixon, who as Medical Officer of Health for Bermondsey might be supposed not to look with too lenient an eye upon any *laches* of the Southwark Company. Admitting that the Kent Company's water, after its filtration through miles of chalk, is almost as free from organic nitrogenous matter as carefully distilled water, he argues that this is not a fair standard by which to judge water drawn from the Thames at Hampton. He points out that the filtered river water, after all, contains less than one-third of a grain of organic carbon and organic nitrogen per gallon, and expresses an opinion that when properly filtered the softer river water is the most useful and economical for washing and cooking purposes and more wholesome to drink.

Dr. Dixon's opinion was subsequently supported in a letter from a member of the Institute of Civil Engineers, who expressed his wonder, if a fraction of what is said by scientific chemists on the subject of Thames water be true, that there are any left to tell the tale. He also quoted from a letter of the late Dr. Letheby, from which it appears that in the Registrar-General's returns for May 18, 1867, or just previous to the time at which Dr. Frankland's average for a standard of purity commences, the Kent water was spoken of as altogether the worst sample out of eight supplied by as many different companies to the metropolis at that time. That Mr. Wanklyn also should disapprove of the "exaggerated character" of Dr. Frankland's report goes almost without saying. It is more to the purpose to have his opinion, as the result of analyses of London water extending over many years, that "when the companies filter properly (which does "happen) the water supply is excellent."

On Monday last, Dr. Dixon returned to the charge, the opportunity being a meeting of the Bermondsey Vestry. The gist of his argument was that medical men have failed to observe any differences worth noting between the death rates in the districts where the water from the deep chalk wells is drunk and those in districts where the condemned river waters are used, any difference that has become perceptible being in fact in favour of the latter.

The statistics laid before the Bermondsey Vestry by Dr. Dixon, in support of his position, are somewhat interesting as a contribution to the discussion, and may be quoted for what they are worth. Thus, dealing first with current events, he shows that although during the last few weeks there has been an increase in the number of deaths from diarrhœa, these deaths have been quite as numerous, in proportion to the population, in the districts supplied by the Kent Water Company as in those supplied by the Southwark and Lambeth Companies. Next, in order to show that the organic matter in river water does not necessarily affect the public health unfavourably, he turns to the third quarter of last year, when the amount of organic elements in river water, as compared with that in the water from the chalk wells, was as 5·9 to 1, and the deaths from diarrhœa in London numbered 1184. But in the corresponding quarter of the previous year, whilst the proportional impurity of the river was only 3·4 to 1, the deaths from diarrhœa were 2932, or more than two and a half times as many. Again, in the first quarter of 1872, the Thames water was reported to be in this respect nine and a half times as "impure" as the chalk water, yet the number of deaths in London from diarrhœa, 132, was the lowest for that quarter during the nine years from 1871 to 1879, whilst the greatest number of deaths from diarrhœa in London in one quarter during the same nine years occurred in the third quarter of 1873, at a time when the river water was represented to be only two and a half times as impure as the chalk water, the deaths in that quarter numbering 3170.

Dr. Dixon admits that impure water is unquestionably a cause of diarrhœa and many other diseases, but these he attributes to the presence of decomposing animal matter or sewer gas and not to the minute quantities of vegetable and animal substances from which no natural water is found absolutely free. And his report closes with the expression of an opinion that the water of the Thames at Hampton, when efficiently filtered and properly stored, is in a practical, if not a chemical sense, a pure and wholesome water.

These statistics brought forward by Dr. Dixon require obviously to be considered with caution. Were they to be accepted as indicating the usual results following an increase or decrease in the organic impurities in Thames water it would follow that much of the sanitary work that has been accomplished during recent years in respect to the metropolitan river and the supply of water drawn from it for drinking purposes has been worse than useless. This would be an absurd position which it is not likely that Dr. Dixon intends to take. All that he wishes to point out, probably, is that a low death rate from diarrhœa and similar diseases is compatible with the consumption of a water containing a comparatively large amount of "organic impurity," and *vice versâ*. This would be only in accord with the opinion recently expressed in these columns that while the aid which analytical results offer in deciding the quality of a water should not by any means be rejected, it should be used with caution, and also with Mr. Ekin's condemnation of the custom of laying the chief stress on the mere amount of organic substance as misleading and fallacious. There can be no doubt that it is not the quantity so much as the nature and origin of the impurity which claims the first consideration, and anything in the history of a water which throws a light upon this is of prime importance as helping to form a sound conclusion as to its quality.

THE JURY LISTS.

As Sunday next will be the last Sunday upon which the lists of persons liable to serve on juries during the ensuing year will be exhibited at the doors of churches and chapels, it will perhaps be useful to remind all pharmaceutical chemists who wish to secure the exemption from such service provided by statute as to the advisability of examining the lists for their respective districts and ensuring that their names are not included therein. The necessity for such procedure is involved by the second section of the Juries Act, 1870 (33 and 34 Vict., c. 77), which provides that no person whose name shall be in the jury book as a juror shall be entitled to be excused from attendance on the ground of any disqualification or exemption, other than illness, not claimed by him at or before the revision of the list by the justices of the peace. If a person entitled to exemption finds his name included in the list he should attend before the justices in petty sessions on the day indicated in the notice on the list and apply to have it expunged, and in the case of a pharmaceutical chemist who is a member of the Pharmaceutical Society the production of a certificate from the Registrar as to such membership is accepted as evidence in support of the claim.

THE ALLEGED MISUSE OF PILOCARPINE.

The inquiry referred to in these columns last week as to the alleged death of a child in the Cork Fever Hospital, resulting from the injection of pilocarpine, was brought to a close on Saturday last. The committee has come to the conclusion that although the use of the drug was new in Cork it was in use in the United Kingdom, and Professor Jones had a special knowledge of it which warranted him in using it without consulting his colleagues; but the committee also found that there was want of care as to the time of performing the operation and an absence of interest in the case.

THE ABOLITION OF THE QUININE DUTY IN THE UNITED STATES.

From Ecuador it is reported that during last year there was a considerable decrease in the quantity of bark shipped to the United States, and a corresponding increase in the shipments to Great Britain. This is attributed to the late reduction in the high duties on sulphate of quinine imported into the United States, which has thrown that market open to European competition. The shipments of bark from Ecuador to England during 1879 amounted to 11,228 quintals.

DEATH OF AN ANNUITANT.

The Obituary column this week includes the name of Mr. Thomas Henley Eastes, one of the Annuitants on the Benevolent Fund, who died on the 15th inst., at the age of 84 years. Mr. Eastes was elected an Annuitant in 1875. He was formerly a member of the Pharmaceutical Society.

POISONOUS FLY PAPERS.

A case, recorded on another page, in which a child has been poisoned through swallowing a fly paper supposed to have been impregnated with an arsenical salt, will recall the letter addressed to this Journal on the subject in June, 1878, by Mr. S. Plowman, in which he called attention to the fact that several varieties of fly paper contained arsenic, and one to an extent equal to 6 grains of AsO_3 in each sheet.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(Continued from page 246.)

A PECULIAR KIND OF CINCHONA BARK.

Dr. **PAUL** called attention to a specimen of cinchona bark which he said was of interest as showing that it was no longer possible to arrive at even an approximate conclusion as to the value of a sample of cinchona bark from mere visual examination. The specimen shown was from a considerable parcel of bark that was imported into this country from South America in June, 1879. According to its outward appearance it was of little or no value, and it was ignored by both quinine manufacturers and makers of pharmaceutical preparations. But an analysis of the bark brought out its true character and showed that it yielded, in addition to mere traces of quinidine, cinchonidine and cinchonine, 2½ per cent. of quinine sulphate, so that for either pharmaceutical purposes or the manufacture of quinine it was an excellent bark.

In the discussion which followed, reference was made both to Mr. Howard's paper (see before, p. 244) and Dr. Paul's communication:—

The **PRESIDENT** asked if there were much of this bark in the market.

Dr. **PAUL** said there were some large samples.

Mr. **WELCOME** asked if Dr. Paul had been able to trace the source of the bark.

Dr. **PAUL** said not further than that it was from New Granada.

Mr. **GREENISH** remarked that the fracture was very short, which indicated parenchymatous rather than prosenchymatous tissue, and taking that only as an indication he should expect it to be rather rich in quinine, because it was in the parenchymatous tissue that the quinine resided.

Mr. **WELCOME** said this bark had been creating quite a sensation of late, as a curiosity, owing to its peculiar structure. Instead of being fibrous as other barks were it had a peculiar crystalline appearance, more like cherry bark. He once saw a specimen which came from Matagrossa, down the Maramont River; he also saw another specimen traced to somewhere in the vicinity, which was shown to him by Professor Flückiger, of Strassburg. It was tested by Dr. Hesse, and found to contain about 2 per cent. of quinine. There had been no similar bark ever brought to America. It had been traced as far as London, but this was the first he had heard of which came by way of Granada.

Dr. **PAUL** said the first sample was imported in June, 1879.

Mr. **UMNEY** said one deduction that might be drawn from Mr. Howard's paper was that, private enterprise being brought to bear so largely in the culture of cinchona, they might look forward in a few years to seeing the Government almost thwarted in their fine commercial speculation in the Neilgherries. That there would be very cheap importations into this country when these private plantations arrived at maturity there could be no doubt.

Dr. **SYMES** said that not only in this particular kind of bark, but in the ordinary quinine yielding barks, the remark of Dr. Paul was strictly correct, namely, that many of the old features were changing. He had been told by old buyers that formerly immediately they saw a bark they could tell by its fracture and appearance almost the exact value of it. Those days seemed to be passing away, and chemical analysis was now the only thing to be relied upon.

Dr. **PAUL** said it was almost invariably the case now that what was formerly considered the best bark, the yellow flat calisaya, was almost worthless, containing scarcely any quinine at all, and no alkaloid beyond a little cinchonine.

A vote of thanks was passed to Mr. Howard and Dr. Paul.

The last paper read at this sitting was entitled—

IPECACUANHA WINE.

BY J. B BARNES, F.C.S.

Upon looking over Dr. Dyce Duckworth's paper read at an evening meeting of the Pharmaceutical Society in March, 1872, entitled "Notes on the Pharmacy of Ipecacuanha," it occurred to me that the wine might be improved by a modification of the plan proposed by Mr. Carteighe for the preparation of the acetum and the oxymel of ipecacuanha.

His prescription for the preparation of the acetum is to macerate an ounce of bruised ipecacuanha root in a fluid ounce of acetic acid for twenty-four hours, pack in a percolator and pour distilled water over it until one pint of percolate has been obtained.

The modification consists in evaporating the acetum thus obtained over a water-bath to dryness, and subsequent maceration of the dry extract in a pint of sherry wine for forty-eight hours, and filtration. By this means a rich brown solution is obtained, which, although made eight months since, has not thrown down the unsightly muddy sediment so well known to be the case when ipecacuanha wine of the Pharmacopœia is kept beyond a few weeks.

A white crystallized deposit of cream of tartar, however, made its appearance in about a fortnight, and the crystallization has gone on slowly ever since, but it differs very much from the muddy mixture of ipecacuanhate of emetia and cream of tartar which continually goes on forming in the wine of the Pharmacopœia.

By this treatment the emetia is converted into the acetate, which from its superior solubility complete solution is insured.

It would, of course, be more rational to use an alcoholic solution of emetia, which Dr. Duckworth states has the same therapeutical effect as ipecacuanha, but similar effects would be obtained by the use of a liquid extract made by exhausting the acetic extract with water containing ten or fifteen per cent. of rectified spirit.

This new wine is slightly acid, but to so trifling an extent as to be not at all likely to interfere with the action of alkalies which may be prescribed with it.

A four fluid drachm dose proved an efficient emetic when given to an adult.

Mr. **GREENISH** said it was generally admitted that the ipecacuanha wine of the Pharmacopœia was not a satisfactory preparation. If the deposit which fell in the bottles were carefully examined it would be found to partake of the character of cells, so that no doubt it was due to a fermentation that went on in the wine. He apprehended that Mr. Barnes's paper was founded on Dr. Duckworth's, which was read before the Pharmaceutical Society some years ago, when an objection was taken to it. It was admitted that the acetic extract would be an excellent preparation of ipecacuanha, but it was contended that as carbonate of ammonia and other alkalies were so frequently dispensed with ipecacuanha there would be difficulty in using any acetic preparation. There would not be the same objection to Mr. Barnes's proposal, because he apprehended that the quantity of acetic acid left in the extract when evaporated would be very small. Still there would be a trace. The paper was a very suggestive one and well worthy of attention, and he had no doubt that in the next or some future Pharmacopœia a better or more definite preparation of ipecacuanha wine than the one it now contained would be adopted.

The Conference then adjourned, and in the course of the evening many of the members visited the Hafod Copper Smelting Works and Mills of Messrs. Vivian, and the London Tin Plate Works.

The Conference resumed its sittings on Wednesday morning, August 25, at half-past ten, when the first communication was the following:—

NOTES ON A JOURNEY EASTWARD.

BY HENRY B. BRADY, F.R.S.*

A few words of explanation if not of apology are due to the Conference for the remarks I propose to offer. It has been the custom of the Conference, almost, indeed, one of its unwritten laws, that communications presented to its meetings should be in the form of written papers—mere extempore addresses being too commonly deficient in the accuracy essential to scientific records to be regarded with favour: but until a few days ago I had no idea that my engagements would have allowed me to be present at this meeting and still less did I contemplate occupying any portion of the time devoted to its sittings. The position in which I find myself placed is due to some of those I see around me, who have urged that if a member absents himself from one of our annual gatherings for the sake of travelling the least he can do is to report himself on his return; and as their wish in such a matter is law to me, I have brought a few extracts from my note-book, hoping with their assistance to be able to interest you for the little interval that has been accorded to me.. It must be premised, however, that my late journey was not undertaken with any definite scientific object, at any rate with none bearing upon pharmacy; its aim was rather change and rest after a spell of hard work.

I have found it difficult to fix the precise points which I might best bring before you, there is so much on such a tour interesting from a pharmaceutical stand-point; but perhaps I can hardly be wrong in centering what I have to say in the island of Ceylon.

I left Marseilles early in February last year, in the M. M. Steamship, "Anadyr," bound for Colombo. There is nothing that need detain us in connection with Naples, Port Said or Aden, which were the only points at which we stopped *en route.* Passing to the south, the Island of Socotra appeared as a long low line of hills with here and there a higher peak, all as barren and desolate as Aden itself. The pharmaceutist associates little but what is bitter with Socotra and there is certainly nothing in the appearance of the island from the sea to dispel such an idea.

Colombo is about three-and-twenty days from Marseilles, and somewhat within that time we were at anchor outside the harbour. It would be out of place here to attempt to describe first impressions of tropical scenery, but as we are all more or less botanists, or are supposed to be, a few words on matters connected with the vegetation of the island may be of interest. One of my objects in stopping in Ceylon was to see cinchona trees and to learn something, by observation, of cinchona culture, and to do this it was necessary to visit the mountainous districts far inland. The first stage on an excursion into the interior is to Kandy, the old capital of the island, a distance of 72 miles by railway from Colombo. The line at one point reaches an elevation of 1600 to 1700 feet, and the scenery by the way is always beautiful, often grand. Endogenous trees, notably the cocoa-nut palm and the bamboo, and in cultivated patches the banana and other *Musaceæ*, form a striking feature in the landscape, whilst, with greater resemblance to our own forest trees, the bread-fruit and the jack-fruit, the various species of *Ficus*, and the *Poinsettia* with its scarlet leafy tufts, and in the gardens the lettuce-tree (*Pisonia*) with its yellow-green foliage, are amongst those that first arrest attention.

About four miles from Kandy are the Peradenya Gardens which have been so long and so ably superintended by the veteran botanist, Dr. Thwaites. The primary object of the gardens is botanical and economic, rather than merely horticultural. I had the advantage of the company of Dr. Thwaites during the long morning I spent there. Amongst the conspicuous medicinal and economic plants in the grounds are the pimento (*Eugenia pimenta*), a beautiful evergreen tree, which, though it grows freely enough, is not cultivated in Ceylon on a commercial scale; the black pepper (*Piper nigrum*), indigenous in the forests of south-western India, though probably not in Ceylon, which flourishes like a weed, its slender jointed stems, with large ovate leaves, climbing like ivy amongst the trees; the nutmeg (*Myristica officinalis*), a fine spreading tree some 40 feet high with beautiful evergreen foliage; the cinnamon (*Cinnamomum zeylanicum*) which, when allowed to grow unchecked, is a forest tree—concerning which I shall have more to say presently; *Ficus elastica*, one of the india-rubber trees, and the banyan (*Ficus indica*), with its wonderful aerial roots; the palm-oil tree (*Elais guineensis*); the jaggery-palm (*Caryota urens*); the sugar-palm (*Saguerus saccharifer*): the betel-nut (*Areca catechu*); and the talipot (*Corypha umbraculifera*), a fine specimen of which was in flower. By the river side are clumps of bamboos a hundred feet in height with stems thick enough to make buckets of. The mango (*Mangifera indica*), in size and appearance not unlike an apple-tree, was already in fruit; cocculus indicus (*Anamirta cocculus*), an indigenous, climbing, shrubby weed, was at home amongst the trunks and branches of its larger neighbours; and besides these there were a number of plants cultivated experimentally, vanilla, cardamom, cacao and the like, to which I must more specially advert.

As you well know, the island of Ceylon owes a considerable proportion of its wealth to the cultivation of coffee, and you may also know that for some years past the plantations have suffered from the spread of a leaf disease caused by a minute fungus, *Hemeleia vastatrix.* The ravages of this pest have increased to such an extent, that two years ago the loss to the island from injured crops was estimated at not less than two million pounds sterling per annum. The fact that the disease has been most prevalent and most destructive at elevations of about 3000 feet—that is in the regions which have been longest under coffee cultivation—seems to indicate that the gradual impoverishment of the soil and the consequent deficient vigour of the plants are probably at the bottom of the mischief. Be that as it may, of recent years the planters have directed their attention to other possible sources of income, and in this way the experimental culture of other plants used in medicine or for food has undergone a fair trial. Of these the most important to us are cinchona, vanilla, cardamoms, and ipecacuanha; but there are in addition tea, cacao and Liberian coffee, all of which have been introduced to a greater or less extent.

To see cinchonas under cultivation it is necessary to go much further into the mountainous district, and I determined to visit the Government nursery at Hakgala. The journey from Kandy to Nuwera Eliya, the great health resort of Europeans, is performed partly by rail, partly by a vehicle called in courtesy a stage-coach, and the remainder by any conveyance you can manage to hire. It is a difficult mountain road, reaching at one point an altitude of something like 6700 feet, and it lies through varied and beautiful scenery. One first sees *Cinchona succirubra* in this district at a height of 3000 feet. The trees are not very large and at a distance they bear considerable resemblance to small sycamores; they are planted chiefly near the roads, but sometimes distributed amongst the coffee shrubs. Much higher on the mountain slopes, that is at an altitude of 5000 feet, tea plantations are noticed, the Assam variety being that preferred for cultivation. It was dark ere I arrived at Nuwera Eliya and the mountain air was so keen, that a blazing fire on the hearthstone of the hotel was a welcome sight, though within a few degrees of the equator. In the morning I noticed that two fine specimens of *Eucalyptus globulus* in front of the hotel had their leaves shrivelled and brown from the frost of the previous evening. The eucalyptus has been largely introuced into the highlands of Ceylon and it appears to thrive down to about 2000 feet elevation. The two specimens alluded to I estimated as from 50 to 60 feet in height.

The Hakgala Gardens are about seven miles beyond

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* This was an extempore address and the report which we furnish has been revised and somewhat extended by the author.—ED. PHARM. JOURN.

Nuwera Eliya and have an elevation of a little over 6000 feet. They were established on the introduction of cinchona culture, just twenty years ago, by Dr. Thwaites, and are now under the superintendence of his brother. Mr. J. E. Howard, in the interesting paper which we heard yesterday, mentions the *Ceylon Observer* as the authority for some of his facts, and I should like to say here that it is to the editor of that journal, Mr. Ferguson, who is himself an experienced cinchona grower, and to Mr. Thwaites, that I am chiefly indebted for the information I obtained on the subject. Mr. Howard's paper has forestalled a good deal of what I might otherwise have said, but this is of the less consequence as his details are posted to a date much later than my visit. To speak with critical accuracy of the species of the genus *Cinchona* is quite beyond my power, and whilst there is so much difference of opinion amongst botanists who have given great attention to the subject—Weddell, Bentham, Hooker and others recognizing forty or fifty species, whilst Kunze admits but four—we may be content to leave the matter undiscussed. For our purpose the interest of the genus centres in the three species, *C. officinalis* (with its variety *Condaminea*), *C. Calisaya* (with its variety *Ledgeriana*), and *C. succirubra*.

In Ceylon the cultivation has hitherto been very much confined to *C. officinalis* and *C. succirubra*, the latter of which grows best at elevations from 2000 to 4500 feet, whilst the former seems equally at home up to 6000 feet. At Hakgala a plantation of these two species, fourteen years old, was cut down a year before my visit, and yielded an average of 3 lbs. of bark per tree, which sold in the London market at 5*s*. 6*d*. per lb. I measured some of the stumps of *C. succirubra*, and found them 7 inches in diameter, indicating a very slow rate of growth as compared with the South American plantations mentioned in Mr. Howard's paper. It is customary to plant *officinalis* about 3 feet apart, and *succirubra* about 4 feet apart.

There seems considerable doubt how far true *Calisaya* has been grown at all in Ceylon. Mr. Thwaites thinks that nearly all the plants grown under that name have been hybrids. Of their so-called *C. Calisaya Ledgeriana*, there appear to be at least three varieties of distinct habit and mode of growth. But Mr. Ledger's own seed has produced different results in Ceylon from those obtained from it in the Neilgherries, and the comparison of these with specimens grown in Java only increases the difficulty of determining the botanical characters of the species under cultivation. There has been a great demand for plants of *C. Calisaya*, and advertisements had appeared in the newspapers offering £12 per thousand for guaranteed *Ledgeriana*, whilst young plants of *officinalis* and *succirubra* could be bought for one-tenth of that price. *C. Calisaya* appears to grow better at low elevations than the other species, and at Batticaloa it has been cultivated down to the sea-level under cocoa-nut trees. At high elevations it assumes a shrubby habit; but it seems to die off at a certain age, and in common with *C. officinalis* is subject to canker, that is, the bark splits, swells, and peels off. This is probably owing, as suggested in Mr. Howard's paper yesterday, to want of sufficient depth of good well-drained soil. The process of "mossing," which has been so successfully practised elsewhere, does not seem to answer in Ceylon, the reason assigned being that the mossy covering serves as a harbour for ants.

With regard to the extent to which cinchona culture has been carried, the figures I obtained differ widely from those of Mr. Howard's correspondent, and as they represent the estimate of one who has exceptional facilities for ascertaining what is being done, they may be worth repeating, even though they are more than a year old. At the time of our interview, Mr. Ferguson thought that there were about 6000 acres of cinchonas under cultivation, and that in five years there would, at the present rate of increase, be about 5,000,000 cinchona trees of one species or other in the island: but without official returns it must be very difficult to arrive at even approximate numbers.

Next to cinchona growing, perhaps the most important recently introduced industry, from a medical stand-point, is the cultivation of the cardamom. The true Malabar cardamom (*Elettaria cardamomum*) is not indigenous to Ceylon, though an allied species, perhaps only a variety (*E. major*), grows wild in the forests. It is an endogenous, herbaceous plant, with long tapering leaves, not unlike those of an iris, but some eight or ten feet high. The bulbs are planted about eight feet apart, and begin to bear fruit at end of the third year. They give two good crops, and then a small one, after which they are taken up and a fresh lot planted. Advertisements appear in the newspapers offering the bulbs for sale at a price of about 40 rupees per thousand.

Vanilla (*Vanilla planifolia*) is now cultivated in many tropical countries, but has only recently been introduced into Ceylon. I saw but one experimental lot. This was in a moist shady place, and the plants were trained on slanting poles a foot or eighteen inches apart. It begins to yield fruit in about three years, and goes on bearing almost indefinitely. That its culture has been undertaken in earnest I gather from the fact that I heard of one planter who had a line of plants three miles in length.

Ipecacuanha (*Cephaëlis ipecacuanha*) has also been introduced, but I did not gather that its cultivation had been attempted on any great scale. It is a little shrubby plant about a foot in height, and could probably be grown without much difficulty; but Dr. Thwaites thinks that commercially it could only answer under pot culture at native houses, where women and children could attend to it.

Returning to the low lands my first desire was to see something of the cultivation of cinnamon on a commercial scale and the preparation of the bark for the market; so, furnished with suitable introductions, I took the steamboat from Colombo to Negumbo, a little fishing village about twenty miles up the coast. Thence a drive of three miles inland brought me to Kimbulapitia, an estate of about 400 acres, superintended by Mr. W. Carry, one of the most successful cinnamon growers in the island. The cinnamon (*Cinnamomum zeylanicum*) is a native of Ceylon. When allowed to grow it is an evergreen tree of considerable size, flourishing at every elevation up to 3000 feet, one variety to almost the highest points of the island. Its cultivation, however, is confined to the S.W. coast, from Negumbo to Matura, as the light sandy soil within a few miles of the sea is best suited for its growth. Under cultivation it is never permitted to assume its natural arborescent form; but is coppiced and becomes a bush like a hazel, with a thick woody stool and long straight shoots. For the first three years the plants produce nothing of marketable value and during the next three only here and there a stick, but after the sixth year the bushes are in full bearing, and go on for forty to sixty years. The shoots are cut when they are a year and a half or two years old, three to six feet long, or even more, and as thick as a walking stick. The beds are kept carefully weeded, the weeds burned and the ashes used as manure; the roots of the bushes are always kept well covered. My guide laid great stress on these apparently little matters. The finest quality bark is obtained from green stems, the cutting of which injures the plants more or less and it is said that such bark does not pay to produce under 4*s*. 6*d*. to 5*s*. per lb. Our excellent curator, Mr. Holmes, asked me, before I left home, to make some inquiry concerning one or two very distinct varieties of cinnamon which appear in commerce; but I found it difficult on the spot to obtain any satisfactory information. Mr. Carry stated that there were not less than fifteen varieties, sufficiently distinct in flavour to be easily recognized. The sticks, after being cut, are carried to the "wadia," or peeling shed. They are there trimmed, and the rusty cuticle which is the beginning of the corky layer of the bark is removed by scraping whilst the end of the stick is held down by the heel of the worker. The older the shoot of course the more scraping it requires. A curved knife, pointed at the end, is used for peeling. A longitudinal slit is made and the bark loosened by working the point of the knife underneath it, when it comes off in fragments from an inch to a foot in length. If the weather has been dry the peeling is facilitated by rubbing the stick all round with a smooth piece of hard wood. The strips of bark are laid longitudinally, the ends overlapping, till they make up lengths of between three and four feet, the smaller pieces being placed inside the larger to about an even thickness. In this condition the lengths are placed side by side in rows, on strings stretched overhead, and as they dry they gradually close up and form the long thin sticks we all know. They are inspected from time to time and any irregularity in closing up is corrected. This process occupies about three days, after which the drying is completed by exposure to the sun for some days longer. The produce of the Kimbulapitia estate is from 300 to 400 bales of 100 lbs. each, per annum. A uniform price of 4½*d*. per lb. on the weight of finished bark is paid for labour.

I subsequently visited a neighbouring property where cinnamon oil was distilled. The appearance of the plantations was in strong contrast with those I had just left—the beds were weedy and ill kept, and the bushes in poor condition. The still-house was an open shed: the stills were of copper, apparently of about 50 gallons capacity, and of the most primitive construction. The spent bark was employed in part for firing. About 40 lbs. of cinnamon chips were used for each charge, and they were macerated some hours before being put into the still. It has been stated that sea-water is employed for this purpose, but such was not the case in this instance. The distillation occupied six hours, and two charges to each still were worked per diem. About three ounces of oil resulted from each operation. The distillate was collected in a series of cylindrical cans, each with a spout inserted in its side, about one-third the way up. These were arranged on steps one below the other, to act as separators, the heavy oil being deposited in the bottom of the cans. The total produce was stated at about 120 bottles of oil per annum.

At the present time, however, the cultivation of cocoa-nuts in the low lands near the sea pays better than either cinnamon bark or cinnamon oil, and through the kindness of the gentleman already named, I was enabled to see something of the way in which this is conducted on a commercial scale. There is a very common belief that the cocoa-nut palm will only grow near human habitations, and this is so far true that in country districts wherever you find a clump of cocoa-nut trees you may assume there is a village, even though you cannot at the moment see it. Various explanations, more or less plausible, have been offered of the fact, if it be one. Mr. Carry attributed it chiefly to the smoke from the dwellings favouring the growth of the palm. His own plantations were kept very clear of other vegetation; all dead leaves were carefully collected, thrown into pits, thoroughly wet and then slowly burned, so that the largest possible amount of smoke might be produced under the trees. About 80 palms are planted to each acre, the trees being 21 or 22 feet apart; and each of these yields about 50 cocoa-nuts per annum, that is about 4000 nuts per acre. The cocoa-nuts sell at 60*s*. per thousand, and as the cost of cultivation is only about 40*s*. per acre, a large margin of profit is left.

There are several cocoa-nut oil mills at Colombo, and I paid a visit to that owned by Messrs. Leechman and Co., which perhaps is the most extensive of them. The process adopted is a very simple one. The white portion or pulp of the cocoa-nut is dried, roughly powdered, and then pressed by means of machinery similar to that employed in this country for rape or linseed The dried pulp yields about 60 per cent. of its weight of colourless limpid oil. A native can hardly be made to believe that this oil, which he knows only as a thin fluid, is a white solid fat when it arrives in England. I recollect well when travelling in the interior of Morocco, the look of pitying incredulity with which I was met by certain Moors of more than common intelligence, when I told them that in my country, in winter, the water was hard and solid, and that you could sometimes even walk across the rivers. But possibly we may sometimes take home, even to ourselves, the saying of an old Spanish chronicler, when commending for acceptance a story making heavy demands on the credence of his readers, "None but light and inconsiderate minds hastily reject the marvellous—to the thinking mind the whole world is enveloped in mystery."

I must not linger over Ceylon; indeed, I have already occupied more of your time than I intended; nor shall I detain you with my visit to Singapore, though the botanical gardens contain much of interest and the fruit market has many products that are novelties to a European. In the Straits Settlements, as in Ceylon, the cultivation of Liberian coffee is exciting much attention, and their seedling plants, seventeen months old, were already beginning to bear fruit when I was there.

I would gladly enlarge somewhat on my stay in China did time permit, for the country, or, at any rate, its people, afford rich material for study in whatever aspect they are approached. The language is of course the great obstacle to obtaining information. I had the pleasure of visiting some of the drug shops of the native town in Shanghai, in company with Mr. Fryer, an accomplished Chinese scholar,—the translator of many European scientific works into their difficult language. Here we found an assortment of wonderful remedies, of which Tertiary fossils were not the least important. The bones of extinct species of *Rhinoceros* and *Elephas* and the fossil teeth of several carnivorous animals, under the names of "dragon's bones" and "dragon's teeth," are amongst the most highly prized articles of Chinese materia medica. Dragon's teeth are said in their old books to cure heart-ache and stomach-ache, to drive away ghosts, to cure colds and dysentery, fainting in children and nocturnal alarms, and to increase the general health. Who would not like to possess a dragon's tooth? We are told that they are only genuine when they adhere to the tongue.

I would willingly also linger over Japan, but must perforce confine my remarks to one or two subjects. At Kobé the air was redolent of the familiar scent of camphor from a pile of tubs of the crude drug waiting on the quay for shipment. At Osaka I was hospitably entertained by an old member of the Conference, Mr. W. Gowland, who for several years has held a high position in the Imperial Mint, and is in fact responsible for the coinage of the country, which now holds an excellent character in the East.

At Tokio, my friend, Dr. R. W. Atkinson, the Professor of Chemistry in the University, drew my attention to a pretty little earthenware distilling apparatus, in use amongst the Japanese, which I have much pleasure in introducing to your notice.

The accompanying sketches will, I think, be readily understood. It consists of four pieces: a boiler, *a*, on to which fits a short cylinder, with a perforated bottom, *b*, and over this a condenser, *c*, with a cover, *d*. The cover being removed, a stream of cold water can be kept running into the condenser by means of a bamboo, and the overflow carried off by the spout at its base. Round the base of the inner side of the middle cylinder runs a ledge which forms a channel opening into an exit spout. The materials for distillation are put into the boiler and the whole is placed on the ordinary *hibatchi*, or domestic fire-box. The vapour passes through the perforated bottom of the cylinder, collects in drops on the dome-shaped inner surface of the condenser, runs down into the channel before described, and is collected at its exit from the spout. This little contrivance is known by the Japanese under the name of *lambik* or *rambiki*, which is doubtless some corruption, through the Dutch, of the word alembic. In the country districts peppermint is largely used as a corrective for water rendered muddy and otherwise unsuitable for drinking by rains, as well as for other domestic purposes, and this apparatus is one of the means employed for its distillation. Whether it may afford any hints of which advantage may be taken in our laboratories I must leave you to determine.

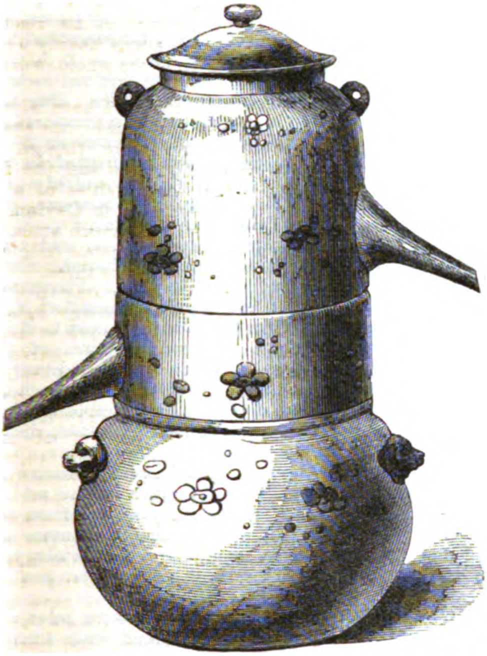

Fig. 1

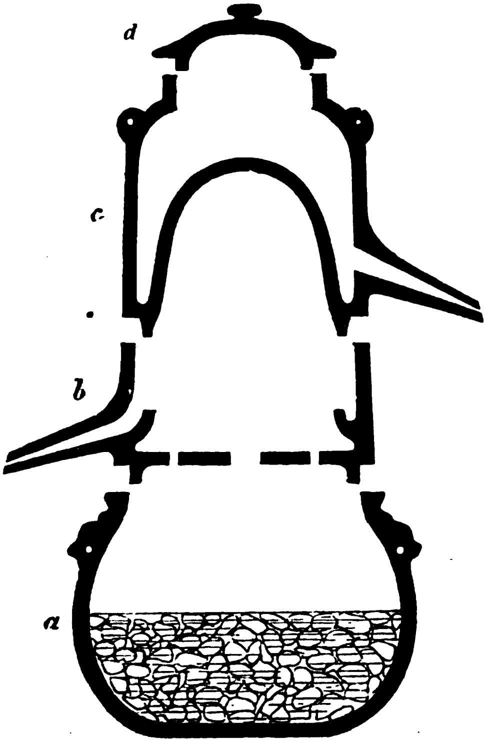

Fig. 2.—Section.

The **President** said the Conference were much indebted to Mr. Brady for the extremely interesting account he had given of his journey. The subject of cinchona cultivation itself was one which was almost unknown to the world in general, and it was only those who, like themselves, had connection with it had any conception of its magnitude.

Mr. **Schacht** drew attention to a fine collection of photographs which Mr. Brady had brought with him and which were open to inspection.

Mr. **White** thought it would not have been inappropriate if Mr. Brady had pointed out what a lucrative culture the cinnamon was. It was once said that the most lucrative culture in the world was early spring radishes in the neighbourhood of London, as they gave a larger return per acre than any other product, but after what they had heard about cinnamon he was led to believe that perhaps it produced a larger amount of profit when cultivated than any other known article. He had been told that as much as £1000 per acre had been acquired from the cultivation of this tree in Ceylon, and if this fact were pointed out it would be an incentive to increase the culture, which of course would tend to lower the price and confer great benefits on mankind.

Mr. **Brady**, in reply to Mr. White's observations, said that it was altogether too soon to attempt to determine the eventual profits to be derived from cinchona culture. At the present time, of course, those who had bark to sell were in an enviable position, but it was a question of supply and demand, and if the state of things foreshadowed in Mr. Howard's paper should ever come about, the bark from our eastern plantations could not possibly continue to realize its present value.

Mr. **Greenish** said he was glad to hear Mr. Brady's remarks with respect to the coffee plantations being injured by the exhaustion of the soil. Six years ago he was in Portugal during the time of the vintage, when he was asked by a Portuguese gentleman if he could in any way account for the fungoid disease on the fruit and the phylloxera on the root. Just in front of the house was a vineyard which was very productive, and at that time they were gathering the crop. He made a calculation, and pointed out that every year they were taking away so many tons of grapes from the vineyard, and not even the leaves that fell from the trees were allowed to remain on the ground. It was, therefore, simply a question of time when they would cease to have any grapes at all.

Mr. **Wootton** said no doubt Mr. Brady when in Japan heard of the complaints against the Japanese Government with reference to drugs from England, many of the English wholesale druggists having complained very bitterly. He had heard of it from a gentleman who had lived for many years in Yokohama, who said the matter was now before the British Foreign Office. The complaint was that the Government analysts condemned English exports of drugs to a very great extent, but not until they had allowed the duty to be paid for them. It sometimes happened that, after they were condemned and not allowed to be sold, certain persons would go to the owner of the property and offer him a small price, which he was glad to take rather than ship them back to England. Of course only one side of the question was heard here, and he had no means of knowing what the views of the Japanese Government were. They seem to have acted pretty fairly to a great extent, for although they appointed native analysts in each of the ports to which English goods were sent, they appointed an European superintendent. He believed in Yokohama this superintendent was a Dutchman, because Dutch imports were the smallest, and it was thought that his judgment would be less biased than an Englishman's or a Frenchman's. He did not know whether Mr. Brady could give any opinion on the matter.

Mr. **Brady**, in reply to Mr. Wootton's question as to the grievances complained of in connection with the importation of drugs into Japan, said the matter had scarcely begun to attract public attention when he was at Yokohama, and he had heard little about it. That the Japanese had a faculty for devising both import and export duties on every conceivable thing on which it was possible to raise money was a fact well and widely recognized. The appointment of a Dutchman to the superintendence of this department of the revenue should not, he thought, be attributed to any preference for the representative of a country doing only a small trade, but rather to the old standing commercial relations of the Japanese with Holland, dating back to a period long anterior to their commerce with this country.

Mr. **Umney** said when he heard Mr. Brady speak of a Newcastle engineer at the cocoa nut oil factory he could not help wishing that some enterprising cinnamon grower had sent here for a manufacturing pharmacist to conduct the distillation of his cinnamon oil. He could safely say there was no product which came into the London market which pharmacists were bound to use (for 95 per cent. of the cinnamon oil was imported) which was so unsatisfactory, and required so much care in selection. Cinnamon leaf was distilled, and of course its distillate came into the market as a distinct product, but he believed sometimes cinnamon leaves found their way into the still, and that very much deteriorated the quality of the oil. At any rate, that some inferior qualities of bark found their way into the still with the superior qualities there could be no question. Again, referring to the primitive way in which the distillation was carried on, they could now well understand how different cinnamon oils varied so much. Chemists knew that cinnamon oil was made up of two products, the one a light and the other a heavy oil. The bulk of it was a heavy oil, and he should like to ask Mr. Brady whether he had observed if there was a light and heavy essential oil separator at the stills. He should say that to distil cinnamon 40 or 50 pounds at a time was about the worst way of going to work economically that could possibly be devised, unless the water was returned again and again to the still for redistillation with fresh portions of cinnamon.

A vote of thanks was then passed to Mr. Brady.

The next paper read was a—

Note on Indian Henbane.

BY THOMAS GREENISH, F.C.S., F.R.M.S.

Among the samples of interesting drugs which reach the Museum of the Pharmaceutical Society, either through its honorary and corresponding members, or other scientific men, the products of India, our own colonies, or those of other countries, there is an ample field for scientific research, and one in which the youth of our profession may serve the cause of pharmacy, and at the same time earn distinction for themselves.

It is, from every point of view, desirable that the numerous vegetable products of tropical and other countries, introduced as remedial agents, should, as early as may be convenient, be thoroughly examined, and if there be present in any one of them an active proximate principle or residual agent, that it may be recognized as an aid to therapeutic science or, on the contrary, if possessing only some astringent or other less valuable constituent, it may be relegated to its proper place as an addition to a class of bodies of which we at present possess so ample a store.

It is sometimes difficult to determine whether it be a loss to therapeutics or a gain to true pharmacy, but, nevertheless, there is the fact, and it is daily exemplified, that the more plentiful supply of the raw material sends a large number of new therapeutic agents into the list of forgotten or neglected remedies.

The official biennial henbane leaf has of late years become very scarce in this country, and it was with considerable interest, that, at the request of Mr. Holmes, I undertook the examination of a small sample of henbane leaf sent from India. It arrived in a tin box without any particulars as to its being the produce of the annual or biennial plant, place of growth, character of soil, the result of cultivation, or otherwise. The quantity at my disposal was only 3½ drachms. On removal from the tin the leaves had a clammy feel; they possessed an intense odour, on the hand very persistent, and generally stronger than that of any henbane that had previously come under my notice.

With so small a quantity of leaf the tincture seemed the most suitable official preparation to make. For this purpose it was placed in a drying closet at a temperature of about 80° F., and with a loss of 14 grams or 7 per cent., was reduced to a coarse powder as directed in the Pharmacopœia. It was remarked how quickly and almost entirely the peculiar odour of the henbane, just referred to, passed off in the process of drying.

The tincture was prepared by maceration, and after standing the usual time, pressed off and filtered. Compared with the official tincture of the British Pharmacopœia, made with biennial henbane, by transmitted light it was brown olive, whereas the official tincture is olive-green, and the colour more intense. A little of the tincture of Indian henbane added to water produced no opalescence, and gave only a tinge of colour; the official tincture, on the contrary, produced considerable opacity, which, on the addition of a little liquor potassæ, disappeared.

In the general structure of the leaf I could perceive no very material difference, but a section of the midrib showed much more vascular structure than one from the same part of indigenous biennial henbane; but more extended observation will be required on the histology of the two plants before any definite conclusion can be arrived at as to their identity.

Extracts made from the two tinctures were relatively 3·43 for the Indian henbane, as compared with 4·20 for the British Pharmacopœia; but on this point also further experiment, and with larger quantities, is desirable.

As regards the difference in colour it is probable that under a tropical sun one of the elements of the chlorophyll of the Indian henbane had been in part decomposed, and hence the brown of that tincture as compared with the green of the official. The two samples also were respectively viewed in the spectroscope, when the Indian tincture showed an absorption band in the red, smaller, and not so clearly defined as that of the tincture from the indigenous biennial. This would also indicate a loss of chlorophyll as just referred to. The relative difference in the yield of extract of the two tinctures may receive its solution in the greater vascular development of the Indian as compared with the indigenous leaf. The quantity of tincture was too small for reliable conclusions as to any difference in the therapeutic value of the two tinctures. That question must be left to a larger supply of material for its solution.

Pereira, quoting Mr. Houlter, states, in reference to indigenous biennial henbane that, "when fresh it has a strong, unpleasant and narcotic odour, a mucilaginous, slightly acid taste, and a clammy feel, and that by drying it almost wholly loses these properties." Reference has already been made to the more intense odour of the Indian henbane, and it may therefore be worth while to determine on a small quantity of a given sample the amount of loss suffered in the process of drying, and allowing for that loss to make a tincture with the leaf without previously drying it, so that the strong odour which is probably due to some volatile principle, and also the acridity, may together be retained, and probably increase the therapeutic value of the product.

It is to be wished that a larger supply of this henbane leaf, with full particulars on those points of its history previously referred to, may reach this country for the institution of more exact experiments to determine the relative value of the two henbanes; but these references may serve to turn attention to another probable sourc for an official plant now, and for some years past, very scarce in this country.

I am inclined to think that the Indian henbane, from its very intense odour, probably the result of climatic influences, may supply a therapeutic agent more volatile than any one of the official preparations from indigenous henbane.

The President said the thanks of the Conference were due to Mr. Greenish for an interesting paper on a practical subject. The pith of it really lay in the few last words. He did not know whether any quantity had been hitherto imported.

Mr. Reynolds said the subject of henbane was likely not to diminish but to increase in interest. Some few years ago it was under a cloud, and people spoke of it very disparagingly, some medical writers regarding it as one of those tinctures which could be given in any quantity up to an ounce without doing either good or harm. The introduction of hyoscyamine in a state of greater or less purity, for which they were chiefly indebted to M. Merck, of Darmstadt, had led to a change of opinion, and it had been used to a considerable extent lately in the leading asylums, and originally in the West Riding Asylum, by Dr. Robert Lawson, who, in the 'Medical Reports' of the institution, vol. vi., called the attention of the profession to it, and it was now recognized as one of the most valuable remedies for controlling the excitement of mania. The only case in which Merck's extractive hyoscyamine had been disappointing to those who had used it, as far as he was aware, was where it had been made from the root of the plant. Usually, Merck used leaves, and the greenish colour had been regarded by medical men as one of the tests of a reliable hyoscyamine. There could be no question that any new source for hyoscyamine would be scarcely less interesting to pharmacists than a new source for morphia, or any of the drugs in most constant use.

Dr. Symes said the Conference was much indebted to Mr. Greenish for explaining this new source for replacing a diminished supply, and he was pleased to hear that notwithstanding Mr. Greenish's criticism on what he said the previous day in defence of new remedies he thought it very necessary that attention should be given to new drugs when they were brought to this country. It occurred to him from the facts stated that the tincture from Indian henbane did not become opalescent when mixed with water, that it was a characteristic of English henbane made from annual leaves that it did not become opalescent, and had been shown to be very nearly harmless, whilst that made from biennial leaves did become opalescent. He had recently had very good evidence that hyoscyamine was gradually growing purer than originally. There was certainly a difference in two samples supplied by the same manufacturing chemist. A medical man was prescribing it in one-twentieth of a grain doses; it had been dispensed twice; but when it was dispensed with a new supply the first dose produced almost blindness and intoxication, so much so that the patient's employers thought he had better go home and recover himself before continuing his duties. The dose was precisely the same, and he could only attribute the intoxication to the greater activity in the hyoscyamine.

Mr. Mason asked if Mr. Greenish had examined German henbane comparatively.

Mr. Greenish replied in the negative.

Mr. Umney thought the first important point to decide was whether the biennial henbane was the only active kind, and whether the annual kind was inert. He was pretty confident that the henbane from India was a plant that grew, flowered and died annually. The German henbane also, he believed, was an annual variety; from this there could be little doubt that Merck prepared his hyoscyamine. He was of opinion that what they heard of the greater activity of the biennial henbane was to a great extent moonshine. The scarcity referred to would continue so long as they drew it solely from home supplies, and did not use that from the Continent, India and other countries. The cultivation of biennial henbane was already becoming almost a monopoly in two or three hands, and they would probably see it get dearer year by year until someone undertook a properly experimental investigation of the medicinal properties of the two varieties, and the manufacture of hyoscyamine from the annual variety.

Mr. Gerrard said on the breaking up of the Indian Museum and the distribution of the specimens a number of them fell into his hands, and among them was a specimen of an Indian grown henbane. It was very interesting, and had just the description given by Mr. Greenish. He took a few hundred grains of the leaf and submitted it to extraction by alcohol. The extract was treated with water, filtered, and that solution was treated with Meyer's solution. The precipitate was weighed, and a parallel experiment being carried on with biennial henbane, a quantity of the weighed precipitate from each approximated so closely that there could not be said to be any difference in the amount. Judging by that observation it would appear that the yield of alkaloid matter from this Indian henbane would be nearly the same as from the English grown plant. He should like to know whether this Indian henbane was a commercial article. He feared it was not, but he should like to get a large quantity of it; he could then get the necessary therapeutical experiments made. There had recently been brought into the London market an extract of hyoscyamus which was offered as Japanese. It was the colour which might be expected in old extracts, not a green, but a brown extract, in which apparently a great deal of heat had been used carelessly in evaporation. He thought it not at all impossible that if it were offered in the market it might be made use of and offered as English by the admixture of a little chlorophyll. This was submitted to the same examination he had already described, and the yield of alkaloid matter as compared with the English was certainly greater; but he did not isolate the alkaloid absolutely as hyoscyamine, the quantity in his hands not being sufficient. When they considered that the percentage of hyoscyamine was stated by Hanbury and Flückiger to be 0·05 per cent. it was evident that an ounce of extract would hardly yield enough to form a good judgment of its value.

Mr. Greenish said that when there was a demand for a new supply of anything of this kind it was ample justification for calling attention to it. With regard to the trade supply, Mr. Holmes was in communication with Dr. Dymock on that point, and he had little doubt that by-and-by any quantity could be supplied. There was another important point, and that was that a tincture of the root of henbane was now being used, and he requested Mr. Holmes to try and get some of the root from Dr. Dymock so that experiments might be made on that. He believed the tincture made from the root from India would be stronger than that made from the root grown in this country.

Mr. Brady thought it probable there might in the future be exported from Japan a number of such preparations as extract of hyoscyamus, and even of things more purely chemical. There was a great ambition on the part of the Japanese to rival European manufacturers, especially in matters requiring education and skilled labour. They were now attempting to make quinine on a considerable scale, and at some of the government hospitals they would scarcely allow preparations not of home manufacture to be used, even although they had to pay many times the price for them. There was a rapidly rising body of educated men in Japan capable of holding their own with Europeans in these as in other matters.

A vote of thanks was passed to Mr. Greenish for his paper.

The next paper was entitled—

FURTHER NOTES ON PETROLEUM SPIRIT AND ANALOGOUS LIQUIDS.

BY ALFRED H. ALLEN, F.I.C., F.C.S.

At the Sheffield meeting, I laid before the Pharmaceutical Conference the results of my experiments on certain tests for distinguishing commercial petroleum spirit or "benzoline" from coal tar naphtha, the true benzol or benzene.

Additional experience has fully confirmed the opinion I then expressed as to the value of these tests, but it has also shown that the subject was by no means exhausted.

The great competitor with petroleum spirit, in a commercial sense, is the highly volatile and inflammable liquid obtained as a secondary product in the manufacture of paraffin wax and burning oil from the bituminous shale of the south of Scotland. This liquid, which may be conveniently called "shale naphtha," is commonly described as consisting essentially of a mixture of hydrocarbons of the marsh gas or paraffin series. As in physical properties the shale naphtha presents the closest resemblance to petroleum spirit, both liquids being, in fact, known in commerce as "benzoline," and as they are usually stated to be identical in chemical composition, I supposed that the reactions which I found characteristic of petroleum spirit would be equally applicable to shale naphtha. Experiment has shown, however, that this is not true in all cases. In fact, the observed differences in the behaviour of the two liquids with certain reagents point to a much wider divergence in their chemical composition than is commonly suspected to exist.

The tests which I have found most serviceable for distinguishing petroleum spirit from shale naphtha, and both of these from coal-tar benzol, are the following:—

1. The solvent action of the sample on coal-tar pitch.
2. The behaviour of the sample with anhydrous carbolic acid (Calvert's No. 2).
3. The reaction of the sample with nitric acid.
4. The behaviour of the sample with bromide.

The following table exhibits in a convenient form the behaviour of the liquids in question with the two first named tests, the reactions with nitric acid and bromine requiring separate and more detailed consideration.

To facilitate comparison, I also give the specific gravities and boiling points of the samples examined. They were ordinary commercial specimens, not purified in any way.

Mode of Treatment.	Petroleum Spirit.	Shale Naphtha.	Coal Tar Benzol.
a. Sp. gr. of sample	·690	·718	·876
b. Boiling point of sample	65° C.	66° C.	80° C.
c. Solvent action on coal-tar pitch	Very slight solvent action on pitch; liquid but slightly coloured even after prolonged contact.	Behaves similarly to petroleum spirit.	Readily dissolves pitch, forming a deep brown solution.
d. Behaviour of the sample when three measures of it are shaken with one measure of fused crystals of absolute carbolic acid.	No apparent solution. The liquids are not miscible. For the real nature of this reaction, see 'Year-Book of Pharmacy, 1878, page 578.	The liquids form a homogeneous mixture.	The liquids form a homogeneous mixture.

From the above table it appears that while shale naphtha presents the closest resemblance to petroleum spirit as regards its specific gravity, boiling point, and solvent action on pitch, it is sharply distinguished from it by its behaviour with carbolic acid, in which respect it resembles coal-tar naphtha or benzol. The carbolic acid test is not available for examining a mixture of petroleum with shale or coal-tar naphtha, as in such cases the phenol passes readily into complete solution.

In its limited solubility in spirit of wine shale naphtha behaves like petroleum spirit, and differs from benzol.

As the carbolic acid test had shown a sharp distinction between the more volatile products from petroleum and those from bituminous shale, it appeared interesting to compare the reactions with it yielded by burning oils from different sources. The samples of burning oil compared were a specimen of refined American petroleum, or "kerosene," of ·800 specific gravity, boiling at 166° C., and one of shale oil, or "photogene," of ·801 specific gravity, boiling at 170° C. Both samples required sixteen or seventeen volumes of methylated spirit for complete solution, and gave with coal-tar pitch light yellow liquids having a greenish fluorescence.

Carbolic acid, employed in the proportion indicated above, was found not to be miscible with either kind of burning oil, but the petroleum product caused it gradually to assume a dark purple and ultimately a black colour. This reaction was repeatedly obtained, but I am unable to say whether it is peculiar to the few specimens hitherto examined, or whether it is a test which might be generally applied to distinguish petroleum kerosene from the similar product from shale.

I produce tubes showing the reactions with pitch and carbolic acid yielded by petroleum spirit and burning oil, shale naphtha and burning oil, and coal-tar benzene.

In my previous paper I described a method of applying nitric acid to the discrimination of petroleum spirit and benzol in such a manner as to allow of rough quantitative results being obtained. I may say, however, that my observation that the volume of petroleum spirit remains unchanged when treated with nitric acid under the conditions prescribed in my former paper, is not true of all samples. Some specimens of petroleum spirit lose 10 or 12 per cent. by measure when treated with nitric acid, and the portion which apparently remains unaltered contains a sensible proportion of nitro-compounds.

Correspondence with a friend engaged in the distillation of shale, and who desires to remain anonymous, has given me a further insight into the constitution of petroleum spirit, and the action of nitric acid upon it. I have therefore continued my experiments in this direction and extended them to shale naphtha and the burning oils from shale and petroleum. My researches are still too incomplete for detailed publication, but I believe I have definitely verified the following facts, some of which were pointed out to me by the correspondent already mentioned.

While petroleum spirit is but little affected by the action, for a few minutes, of 4 volumes of fuming nitric acid of 1·45 sp. gr., shale naphtha is violently attacked with considerable rise of temperature. After the completion of the reaction, two distinct layers of liquid are found floating on the acid. In one of the most reliable experiments, these layers measured 20 per cent. and 31 per cent. (by volume) respectively of the original shale naphtha taken. The layers were then separately treated with concentrated sulphuric acid, first of the ordinary strength, and then fuming. The lower of the two layers was by this means almost totally dissolved and got rid of, while the lighter layer still measured 14 per cent. of the original naphtha. Petroleum spirit treated in a similar manner, never yields a second layer of oil floating on the acid, and after treatment with sulphuric acid and soda the residual oil still measures at least 75 per cent. of the original quantity operated on, and appears to consist of the true paraffins (C_nH_{2n+2}) of the petroleum spirit.

As to the nature of the liquid which disappears on successive treatment with nitric acid and ordinary fuming sulphuric acids, it appears certain that it consists essentially of hydrocarbons of the olefine series having the general formula C_nH_{2n}. This conclusion is borne out by the fact that those products which are most readily acted on by nitric acid also have the greatest capacity for decolorizing bromine water, and I am attempting to base a method of determining the olefines on this principle. The results already obtained in this manner are very remarkable and conclusively prove the predominance of olefines in shale products, these readily decolorizing many times the volume of bromine which can be caused to combine with petroleum naphtha or burning oil.

In petroleum spirit, I have repeatedly found traces of benzene and its homologues, as indicated by the production of aniline. Shale products, however, appear to be wholly destitute of this series of hydrocarbons. I am informed that while chrysene is produced largely by the distillation of shale, anthracene is met with in but very insignificant quantity, and naphthalene appears to be entirely absent. The lubricating oils produced from shale consist almost wholly of olefines, the paraffins of high boiling point being solid at ordinary temperatures, and hence are separated in the form of paraffin wax.

The following table shows roughly the differences existing in chemical constitution between petroleum products and the bodies of similar physical characters obtained by the distillation of shale:—

	Petroleum.	Shale.
Naphtha.	At least 75 per cent. of heptane, C_7H_{16}, and other hydrocarbons of the marsh gas or paraffin series, C_nH_{2n+2}. The remainder apparently olefines, C_nH_{2n}, with distinct traces of benzene, C_6H_6, and its homologues.	At least 60 or 70 per cent of heptylene, C_7H_{14}, and other hydrocarbons of the olefiant gas or ethylene series, C_nH_{2n}. The remainder paraffins, C_nH_{2n}. No trace of benzene or its homologues.
Photogene or burning oil.	55 to 80 per cent. of higher members of paraffin series, C_nH_{2n+2}. The remainder chiefly olefines.	60 to 65 per cent. of higher members of olefine series, C_nH_{2n}. The remainder paraffins, C_nH_{2n+2}.
Lubricating oil.	?	Almost wholly higher olefines, the paraffins of similar high boiling point being solid. No naphthalene.
Wax.	Solid paraffins, C_nH_{2n+2}	Solid paraffins, C_nH_{2n+2}

From these, and many other observations, it is clear that the naphthas from petroleum and shale are not chemically identical. It is probable that while petroleum spirit consists chiefly of heptane, C_7H_{16}, and other members of the marsh gas or paraffin series of hydrocarbons, shale naphtha contains a very large proportion of hydrocarbons of the olefine or ethylene series, heptylene, C_7H_{14}, being one of the leading constituents.

The burning oil from shale, when treated similarly with nitric acid, gives no second layer of oil, the only layer measuring some 86 to 90 per cent. of the original sample. On treating this with sulphuric acid, great heat is developed, and the residual oil, after washing with alkali, etc., measures pretty constantly 35 to 37 per cent. of that originally operated on. This is a much smaller proportion than is left by petroleum burning oil when similarly treated. In fact, the process may be employed for discriminating between petroleum and shale photogenes.

The oily layer which survives the successive treatment with fuming nitric acid of 1·45 specific gravity, ordinary sulphuric acid (1·85 specific gravity), fuming sulphuric acid, and soda may safely be considered to consist of members of the paraffin series, having the general formula C_nH_{2n+2}.

I have to thank Mr. W. L. Gunn for his assistance in carrying out many of the experiments made in connection with the research.

Professor **Attfield** asked if Mr. Allen thought there was any good chance of his reagent enabling these things to be separated from one another when they were mixed. Not that they were very likely to be mixed, perhaps, but one knew that when some things got cheaper than others mixtures were the result. With regard to the name photogene, which Mr. Allen thought should be applied, it was a good name, no doubt, and well expressed the article and its use, but he questioned whether those who made or used this oil would adopt it. For it was the one originally used some twenty-five years ago by those who worked on the subject, and if it was not adopted then, being the first name almost that was employed, it was not likely to be adopted now. He himself advocated it fifteen years ago, but it had not the slightest effect. He hoped Mr. Allen would work out further the reaction with carbolic acid.

Mr. **Reynolds** said Mr. Allen spoke of using No. 2 Calvert's carbolic acid. He should like to know whether he thought absolute phenol would be a suitable thing.

Dr. **Paul** said Mr. Allen's idea with regard to the name was, he feared, not a practical one, as manufacturers were very fond of names chosen by themselves.

Mr. **White** (Carmarthen) said there was no doubt a considerable difference in these oils. The coal-tar naphtha was the only one which would properly dissolve india rubber or gutta percha. Petroleum spirit left a greasy stain.

Mr. **Allen** said with reference to the possibility of separating these oils if they were mixed, it must be remembered that they were mixtures to begin with. If he were asked if he could separate petroleum spirit from shale spirit or shale naphtha, he could only say they were very much alike, except that one contained an excess of one constituent and the other more of another. But if he were asked if he could separate paraffins and olefines, he said yes; he could obtain the paraffins separate, but he was not sure he could obtain the olefines. The method he had described, the action of nitric acid, destroyed the olefines but left the paraffins intact. He saw no chance of obtaining a separation of the two naphthas from petroleum and shale, nor did he think it possible to detect the admixture of one with the other unless the proportion of each was considerable. But he had shown that the products from the two sources could be readily discriminated when separate. As a matter of fact, commercially the price of the shale burning oil and shale naphtha was regulated by the price of petroleum, and when the latter went up so did the shale products. Shale naphtha was largely used as a substitute for turpentine. It was said that petroleum spirit left a nasty greasy mark, but that must be because it was badly prepared. Manufacturers wanted to have a market for everything, and what would not go into the burning oils passed as naphtha. And since burning oil had to have a high boiling point and a high flashing point, no doubt a good deal went into the naphtha which had better be left out. If it were redistilled and the last portions rejected, a perfectly volatile petroleum spirit would be obtained, which would leave no trace of any stain. He had been asked whether he knew the action on petroleum spirit of absolute phenol as distinguished from Calvert's No. 2 carbolic acid, but the two were the same thing. No. 1 and 2 carbolic acid presented no difference except that one was intended for internal use. As he understood, the main difference was that it was put in a smaller bottle and sold at a higher price. Anhydrous phenol, or anhydrous carbolic acid, was in the form of crystals, which when pure, as he pointed out to the Conference two years since, boiled at 182° and melted at 41° C. If a little water were added to it the melting point was greatly lowered. He mentioned that it was necessary to use anhydrous phenol for the test, and the sample must be melted and boiled in order to drive off any water. The liquid form of carbolic acid should not be used, because that consisted chiefly of cresylic acid, which was miscible with petroleum naphtha at all temperatures.

A vote of thanks was passed to Mr. Allen for his paper.

(*To be continued.*)

Parliamentary and Law Proceedings.

POISONING BY A FLY PAPER.

On Monday last, Mr. Clarke Aspinall, Liverpool city coroner, held an inquest on the body of Robert Leask, nineteen months old, the son of Robert Leask, seamen, who died from poisoning under singular circumstances. Mrs. Leask, the mother of the child, stated that on Friday afternoon last she left deceased in the cradle asleep. On a table there was a plate with some water and a piece of paper in it, called a "flycatcher," and it had printed upon it, "Dillon's fly-killing paper" and "Caution—this sheet must be kept out of the reach of children." She went into the room where the child was a few minutes afterwards and found him standing on a chair, with the plate on which the "flycatcher" had been to his mouth, drinking the water. The paper was not there, and the water had been turned brown by it. She took the child at once to a chemist's, and deceased there vomited what appeared to be the "flycatcher." She next took him to the Royal Southern Hospital, where a doctor prescribed medicine. The child was afterwards seen at home by another doctor, but continued very ill all the evening, and died at half-past ten o'clock the same night. Witness said she had put the paper and plate on the mantelpiece out of the way, and had taken it down to put some water in it, and had forgot to put it up again. Dr. Branagan who had been called to the child, said that death had resulted from an irritant poison, he believed arsenic. The jury returned a verdict of "Accidentally poisoned."—*Liverpool Evening Express.*

Obituary.

Notice has been received of the death of the following:—

On the 2nd of March, 1880, Mr. William Worrin, Chemist and Druggist, Brentwood. Aged 64 years.

On the 10th of August, 1880, Mr. John Goldsmith, Chemist and Druggist, Abingdon. Aged 62 years.

On the 14th of August, 1880, Mr. William Dickinson, Chemist and Druggist, Manchester Road, Southport. Aged 32 years.

On the 15th of August, 1880, Mr. George Lockyer, Pharmaceutical Chemist, Deptford High Street, Kent. Aged 60 years. Mr. Lockyer had been a Member of the Pharmaceutical Society since 1846.

On the 15th of August, 1880, Mr. Thomas Fowler Prior, Harper Street, Bedford. Aged 71 years.

On the 20th of August, 1880, Mr. Thomas Beastall, Chemist and Druggist, Hereford Street, Sheffield. Aged 40 years.

On the 4th of September, 1880, Mr. Charles Thomas Stott, Chemist and Druggist, Sowerby Bridge, Yorkshire. Aged 23 years. Mr. Stott had been connected with the Pharmaceutical Society since 1871.

On the 7th of September, 1880, Mr. John Powell, Pharmaceutical Chemist, Shaftesbury. Aged 66 years. Mr. Powell had been a Member of the Pharmaceutical Society since 1842, and was the Local Secretary for Shaftesbury.

On the 12th of September, 1880, Mr. James Cliff, Chemist and Druggist, Kirkgate, Wakefield. Aged 26 years.

On the 15th of September, 1880, Mr. Thomas Henley Eastes, Chemist and Druggist, Dover. Aged 84 years.

On the 16th of September, 1880, Mr. William Henry Collings, Chemist and Druggist, Royal Promenade, Clifton, Bristol. Aged 53 years.

On the 20th of September, 1880, Mr. William Floyd, Chemist and Druggist, Smith Street, Liverpool. Aged 46 years.

Correspondence.

PURE SUGAR FOR SYRUPS.

Sir,—The last number reports a conversation at Swansea upon a very familiar subject, the necessity of having pure cane sugar for syrups, and the difficulty of procuring it. Will you allow me to make a practical suggestion, viz., that the wholesale drug houses should add pure sugar to their lists?

Of course, many already have sachar. alb. pulv.; but what is required is guaranteed cane sugar for syrups. In many towns it is difficult to procure sugar of undoubted character, and, as stated in the discussion, even large crystals cannot now be depended on. No doubt many chemists would willingly give a rather higher price to secure a guaranteed sugar from a drug house.

Barnstaple. W. SYMONS.

SYRUP OF IODIDE OF IRON.

Sir,—My memory was at fault in attributing the article upon "Syrup of Iodide of Iron" (to which I alluded in the course of the discussion on Mr. Groves's paper at Swansea) to Mr. Creuse. I find, by reference, that the author was P. L. Hammer. It appeared in *The Pharmacist* (Chicago) for April, 1876, and is reprinted in the *Pharmaceutical Journal*, [3], vol. vi., p. 907. The paper is exceedingly practical, and, to anyone interested in the subject, will well repay perusal.

73, Highbury Hill, N. FRED. W. FLETCHER.

P. Wells.—We thank you for the communication and recommend you to communicate to the Registrar any evidence you may possess of a breach of the Pharmacy Act having been committed by the person referred to.

H. Boutell.—We do not think any further advantage can result from a continuance of the correspondence.

J. Leach.—*Achillea Millefolium.*

H. C. H.—*Alchemilla arvensis.*

T. G. P. S. is requested to comply with the rule as to anonymous communications and also to send any letter intended for the Editor to the Journal Department, 17, Bloomsbury Square.

S. Hardwick.—Special cases are not provided for the binding of the *Pharmaceutical Journal.*

N.—Ferreira's 'Hydrologie Générale,' a copy of which is in the Society's Library.

L. P. S. I.—The answer would depend upon the locality. In some parts of the States and Canada there are no laws regulating pharmacy, in others probably such a certificate would be received in lieu of an examination; in others, on the other hand, it would not.

R. W. C.—Professor Tichborne's formula for the preparation of lin. iod. potass. c. sapone with oleic acid will be found in the *Pharm. Journ.* for Sept. 5, 1874 (vol. v.), p. 1852.

C. W. Price.—The reference should have been to vol. x., pp. 58 and 848, not vol. ix.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Hutton, Smith, Lawrence, Symes, Kermath, Kimber, Pratt, Carlton, Crown Perfumery Company, K., N., Beta, Unguent, Potass. Iodid.

ASPIDOSPERMINE AND PAYTINE.[*]

BY DR. N. WULFSBERG,

Assistant in the Pharmacological Institute in Gottingen.

In a previous communication upon aspidosperma and quebracho, published in the *Pharmaceutische Zeitung*, the author expressed an opinion that probably in other species of *Aspidosperma* the same alkaloid might be detected. More rapidly than was at that time expected, this conjecture has become a certainty. Not, however, that a new chemical investigation of an aspidosperma bark has opened up a fresh source of aspidospermine. The fact is far more surprising, and the author hopes in the following communication to make it probable that aspidospermine is an old acquaintance, and identical with the paytine described by Hesse in 1870.[†]

The author was led to this opinion upon observing, in the recently published third edition of Vogl's 'Commentar zur oesterreichischen Pharmacopoe,' p. 223, fig. 101, a very fine drawing of a longitudinal and a transverse section of an *Aspidosperma* bark, which bears the title—"Cortex chinæ albæ de Payta."

A bark having this name was, in 1870, given by Jobst, of Stuttgart, to Hesse to examine. Hesse was unable to ascertain the source of the bark, but he demonstrated by the chemical examination that it could not have been derived from any species of cinchona. He found in it, on the contrary, the new alkaloid "paytine," and he described the obtaining and properties of this body with his customary thoroughness.[‡]

Two years afterwards Flückiger had an opportunity of examining the bark, and drawing up an exact pharmacognostic description of it.[§] He came to the conclusion that it could be neither a cinchona bark, nor probably a rubiaceous one.[||]

According to Fluckiger, the bark consisted of layers of bast, about 5 centimetres long, 6 centimetres broad, and 5 to 8 millimetres thick. Its yellowish-white colour is due to very numerous yellow bast fibres imbedded in the whitish parenchyma. The bast fibres are spindleform, united, or at least approximating in small groups, distributed equally throughout the parenchyma without definite arrangement. They are so completely converted into wood, that no interspace, or only a small chink, is left between them. They are soft and do not, as in the *Cinchona Calisaya*, penetrate to the surface. They are strongly attacked by boiling solution of potash and coloured pale green. Each bast fibre is accompanied by parenchymatous tissue containing crystals. Round about it, for instance, lie small bast parenchyma cells, strongly pressed against and firmly adhering to it, each cell enclosing a crystal of oxalate of lime. If after boiling with potash the bast fibres be isolated, they exhibit abundantly the imprints of the crystal cells, often in the form of curious prominences.

The medullary rays are very small, and consist of one or two rows of cells.

Those cells of the bast parenchyma which do not contain crystals are filled with starch granules. These granules are small, either approaching a spherical or an irregularly tetrahedral form, simple or compound. If a thin slice of the bark be moistened with very dilute ferric chloride, the parenchyma assumes a blue to a violet colour, which passes to a green from the yellow colour of ferric chloride if this be added in larger quantity. The reaction is very faint and indicates only a small quantity of tannin.

The above description corresponds exactly with the drawing of Vogl. If now the description and the figure be examined, together with the later figures and descriptions of *Aspidosperma Quebracho-blanco*, Schlechtendal, by Jos. Moeller and Ad. Hansen, the great similarity becomes equally striking. For comparison, the description of Moeller may be chosen, on account of its brevity; and of this, only the portion which corresponds need be cited, as his description of the corky layer presents no interest for this purpose.

"Inner bark about 8 centimetres [? millimetres] thick. Medullary rays consisting of one to three rows, separated by thin-walled parenchyma. In the latter occur groups of sclerenchyma and stone cells. The bast fibres are 1 to 1·5 millimetre long, 0·06 millimetre broad, spindle-shaped, obtuse at the end, and covered all over with crystals, so that in macerated preparations the fibre walls seldom come into view. The thickening is very considerable. Ferric chloride preparations give an almost black precipitate."

The author, in his former communication upon quebracho, showed that these crystalline sheaths of the bast fibres, already observed by Fluckiger in 1872, and the development of which in the white quebracho bark has been lately pointed out by Dr. Hansen, are characteristic of species of *Aspidosperma*. It was therefore of great interest to him to find in the pharmacognostic collection at Gottingen a specimen of the cortex chinæ albæ de Payta, which the late Professor Wiggers had received from Hesse. This agreed completely with the description of Flückiger and the figure of Vogl, and appeared, upon comparison with the bark of *Aspidosperma Quebracho-blanco*, Schlecht., with that of *A. febrifuga*, Fenzl, and with barks referred by Grundherr and Hertel to quebracho, to be a true *Aspidosperma*. As to the species, however, this bark differs; it is most like the quebracho blanco, but is distinguished from that with certainty through the finely-pointed sclerenchyma fibres of the bast, and through the absence of short sclerenchyma cells from the inner bark. In elegance of the crystalline sheath, a section cut from it equals the most beautiful microscopic preparations of *Aspidosperma*. The reaction with dilute solution of ferric chloride is in all these barks exactly the same. The parenchyma becomes coloured, whilst the sclerenchyma retains the light yellow colour.

What species of *Aspidosperma* may occur in Peru is at present unknown to the author. That the mother plant of the white Payta bark is of a different species from those hitherto known pharmacognostically may be assumed with certainty, partly on account of the anomalous character of the bark, partly because the numerous South American species of this genus have each only a limited distribution. So long as the allied Apocynaceæ of that continent remain imperfectly known as to their anatomical structure, the author would look upon even the reference to the genus as being doubtful, if even a more weighty argument could not be raised.

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[*] From the *Pharmaceutische Zeitung*, Sept. 8, p. 546.

[†] *Pharm. Journ.*, [3], vol. i., p. 226, and vol. iv., 772.

[‡] *Annalen d. Chemie u. Pharmacie*, vol. cliv., p. 287.

[§] *N. Jahrbuch f. Pharmacie*, vol. xxxv., p. 291.

[||] The actual words of Professor Flückiger are :—"Sollte sich meine Vermuthung bestatigen, dass sie einer Cinchonee aber nicht einer Cinchona angehort," etc.—ED, PH. J.

As before mentioned, ten years ago Hesse prepared the alkaloid paytine from the white Payta bark. If, therefore, the author's opinion be correct, it becomes a question in what relation paytine and aspidospermine stand to one another. A comparison of the descriptions of the two alkaloids shows that they very nearly correspond. Of both isolated observations have been made, which the author was unable from insufficient materials to use in the comparison, especially a number of colour reactions; but the general result of these goes to show that in the colour reactions both alkaloids exercise a reducing action. The corresponding characters are in the following table placed opposite to each other:—

Paytine.	*Aspidospermine.*
According to **Hesse** (*Lieb. Annalen*, vol. cliv., p. 287).	*According to* **Fraude** (*Berichte*, vol. xi., p. 2189; vol. xii., p. 1560).
Colourless prisms.	White prismatic crystals, with simple shining facets.
Tastes bitter.	Tastes bitter.
Dissolves readily in alcohol and ether.	Dissolves in 48 parts of 99 per cent. alcohol at +14° C. Dissolves in 106 parts of ether at +14° C.
Slightly soluble in water.	Slightly soluble in water (1 in 6000).
Melts at +156° C.	Melts at +205° to 206° C.
Heated above the melting point it yields an oily liquid distillate and a residue of carbon.	Heated above the melting point it is partially decomposed and evolves a vapour provocative of sneezing and having a smell remotely resembling acrolein.
Hydrochlorate, hydriodate and nitrate of paytine obtained crystalline; but the sulphate, oxalate, chromate and nitropicrate not so.	Crystalline salts could not be obtained.
Hydrochlorate of paytine dissolves at +15° C. in 16·6 parts of water.	The hydrochlorate dissolves freely in water.
Corrosive sublimate produces in a solution of hydrochlorate of paytine a yellowish amorphous precipitate.	The hydrochlorate is precipitated by corrosive sublimate in white flocks.
Picrate of paytine forms beautiful yellow amorphous flocks.	Aspidospermine gives with picric acid a yellow precipitate.
Chromate of paytine is a yellow amorphous precipitate.	From tolerably reduced solutions yellow salts are precipitated both by the red and the yellow chromate of potash.
A solution of hydrochlorate of paytine gives with platinic chloride a dark yellow precipitate, which upon heating in hydrochloric acid dissolves with a brown-red colour that immediately passes to blue, with the separation of an indigo blue precipitate.	From hydrochlorate solution platinic chloride throws down a yellow flocculent precipitate. This, dissolved and boiled with excess of platinic chloride, is coloured deep violet.

The formulæ have not here been set out, because at the first glance they appear to be very different. The author considers, however, that a closer examination shows that they support his view most powerfully of all. Fraude states that in the preparation of aspidospermine a high temperature is to be avoided as much as possible. Hesse, on the other hand, has found with respect to paytine that, when dried at from 130° to 140° C., it gives off a molecule of water of crystallization. He has crystallized the substance from different solvents—alcohol, ether, benzine, petroleum spirit, and chloroform—and found that in the preparations so obtained the water of crystallization behaves very differently. For instance, the crystals from ether do not undergo the least loss in the exsiccator, and even at 120° C. they give off the water with extreme difficulty. Hesse's analyses were all made with the substance dried at from 130° to 140° C. The author thinks, therefore, it may be well assumed that Fraude, who carefully protected his alkaloid from a high temperature, analysed it containing the water of crystallization. If the figures found in his analyses be compared with the formula of Hesse, adding to it H_2O, this formula agrees better with the analyses than either of the two calculated by Fraude. Taking first Hesse's analysis of paytine:—

	Found. I.	Found. II.	Mean.	Calculated for the formula $C_{21}H_{24}N_2O$.
C . .	78·53	78·70	78·61	78·75
H . .	7·33	7·68	7·51	7·75
N . .	8·80	—	8·80	8·75
O . .	—	—	5·08	5·00

The formula for the undried substance is—

$$C_{21}H_{24}N_2O + H_2O = C_{21}H_{26}N_2O_2.$$

In the following table are shown the percentages found by Fraude in his analyses of aspidospermine; also the figures calculated from his formulæ, and those of the undried paytine:—

	Found.					Mean.	Fraude's first formula $C_{21}H_{24}N_2O$ requires	Fraude's latest formula $C_{22}H_{30}N_2O_2$ requires	Undried paytine $C_{21}H_{26}N_2O_2$ reauires
C	74·99	74·92	74·20	74·28	74·25	74·37	75·00	74·75	74·56
H	8·50	8·30	—	8·45	8·60	8·46	7·96	8·47	7·69
N	8·23	8·30	—	—	—	8·26	7·96	7·90	8·28
O	—	—	—	—	—	8·71	9·08	9·06	9·47

As is evident from this table, the numbers correspond better with the formula of undehydrated paytine than with either of the formulæ given by Fraude. Especially the amount of nitrogen corresponds very well with the paytine formula.

Both analysts attempted the analysis of the platinochloride, but on account of the reducing action of the alkaloid they did not succeed in obtaining a crystalline or well defined compound. The numbers obtained, therefore, do not correspond very exactly. Hesse found, Pt 18·73 per cent.; Fraude, 17·44, 17·45 and 17·48. The formula $(C_{21}H_{25}N_2O)_2{\cdot}PtCl_6$ requires 18·82.

The neighbouring geissospermine of Hesse, with which, according to Dragendorff,* Arata would associate aspidospermine, is distinguished both from it and from paytine by its slight solubility in ether and by the purple-red colour which it gives when dissolved in concentrated nitric acid. It does not reduce platinic chloride, and is represented by the chemical formula $C_{19}H_{24}N_2O_2H_2O$.

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* 'Jahresbericht,' 1878, p. 122.

The author hopes that by the foregoing he has demonstrated with great probability that the so-called "white Payta bark" is an *Aspidosperma* bark and that the alkaloid obtained from white quebracho bark is paytine. The deductions that would follow are easily drawn. Instead of "cortex chinæ de Payta albæ" the bark must be named "cortex aspidospermatis de Payta albus." The plant from which it is derived belongs to a Peruvian species of *Aspidosperma*. Although the remark of the late Professor Wiggers* that Hesse had not quite suitably named the alkaloid found by him "paytine" was certainly correct, this name must be retained as being the older by a year, and the name "aspidospermine" abandoned. That this is at present finally established the author does not venture to affirm, but he hopes that his investigation may stir up those chemists who may be in possession of trustworthy materials to carry the comparison further.

It should also be mentioned that Hesse at that time experimented with paytine upon rabbits, without observing the slightest symptoms of poisoning. Probably the dose was too small or the manner of administration was incorrect. With a galenical preparation of quebracho bark Penzoldt† saw a physiological action upon frogs, which he verified in subsequent physiological experiments.

If a thorough experimental investigation of aspidospermine should not give the desired light upon the activity of the mother drug, it is of greater importance that Hesse, besides paytine, found in the bark analysed by him a second alkaloid not yet named or further followed up. The chemical investigation of the *Aspidosperma* barks still remains, at any rate, a promising task.

Hesse further makes the remark that the Payta bark, on account of its richness in starch, and the absence of disturbing volatile compounds, is suitable for the manufacture of brandy. Should this advice be verified in practice it would be the first example of the use of a bark in this way.

CHIAN TURPENTINE.

BY WILLIAM MARTINDALE.

Since I published some notes on the above drug,‡—which still is much in request, and until lately not to be had in the market, although some of the genuine article is now offered at a high price,—I have received the following account of it, and the probable supply this season, from M. D. Spadavo, French Consul at Chio. The account tallies pretty well with that which I published before, and the supply, although not large this year, could, if required, be much increased.

"I am happy to give you the information you require relating to Chian turpentine. This drug has not been collected in our island for many years, and I believe the greatest quantities of Chian turpentine sold as such in England were mere falsifications or another kind substituted for it. Chio may possess about 1000 turpentine trees, some exceedingly old,—up to eight hundred or nine hundred years,—and varying from ½ yard to 10 and 12 yards in circumference. These trees when well cultivated may give from 2 to 3 kilograms of turpentine (a year?).

"The turpentine is collected by incisions made in the trunk of the tree about April, which are renewed every year.

"The fruit of this tree when ripe is collected and pressed in the same way as the olives; it gives a magnificent oil, very much liked by the inhabitants and often employed instead of butter. As soon as the fruit begins to get ripe the flow of the turpentine ceases. This happens about the middle of August.

"This year the inhabitants have been surprised to receive orders for the collection of turpentine, as it has been asked for in England and bought at the rate of 6*s.* the oke (or 1600 grams). The island has not produced over 700 or 800 kilograms this year, as many have not been informed in time to incise the tree. Owing to its cheapness the possessors of these trees do not give themselves too much trouble in collecting it clear, and they let it flow on the sand, which is taken with it. We have not the means to get it cleared and are obliged to send it as it is collected."

The above is dated, "Chio, 18th September, 1880."

CHEMICAL EXAMINATION OF DAMIANA.*

BY HENRY B. PARSONS.

In the report of the U. S. Department of Agriculture for 1878, pp. 130 and 131, is given a brief summary of results obtained in an examination of true damiana—the *Turnera aphrodisiaca* of Ward and Vasey. Some additional notes may here be of interest, and may to some extent supplement the accurate botanical descriptions given by J. U. and C. G. Lloyd in *New Remedies*, August, 1880, pp. 228—230. The analysis, as reported, is as follows:—

Proximate Analysis of Turnera Aphrodisiaca.

Moisture, at 115-125° C.	9·06
Ash, by combustion	8·37
Chlorophyll, soft resin, volatile oil	8·06
Hard, brown resin	6·39
Sugar, colour and extractive matter	6·42
Tannin	3·46
Bitter substance	7·08
Gum	13·50
Starch isomers	6·15
Acid and alkali extracts	10·02
Albuminoids	14·88
Cellulose	5·03
	98·42

Since the publication of this analysis I have duplicated many of the results, and am satisfied of their approximate accuracy.

It seems probable that the medicinal effects of damiana are principally dependent upon (*a*) the volatile oil, (*b*) the soft resin, (*c*) the hard, brown resin, (*d*) the bitter substance, (*e*) the gum, (*f*) possibly the tannin-like acid. This being true, a description of each substance may tend to throw some light on the therapeutic action of different preparations from this drug.

The volatile oil is present in moderate amount, but apparently not exceeding 0·2 per cent. It was impossible to separate enough for extended examination. It seems, however, to have an odour and other properties much resembling the terebinthinate oils. Doubtless, so far as it goes, its medicinal properties are similar to those of minute doses of turpentine oil.

The soft resin seems to be rather an oleo-resin in consistence, but it does not allow of further division by solvents. It is, when freed from chlorophyll, a brown, semi-solid substance, has a very acrid, terebinthinate taste, and is freely soluble in alcohol of 80 and 90 per cent., in chloroform, ether, carbon disulphide, benzole and petroleum naphtha. It is not removed from these solutions by animal charcoal. It does not readily dissolve in dilute ammonic or potassic hydrates. It seems very probable that to this soft resin may be attributed many of the unpleasant irritant effects following the administration of alcoholic extracts of damiana.

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* *Jahresbericht*, 1870, p. 141.

† *Berlin Kl. Wochenschr.*, vol. xvi., p. 269.

‡ *Pharm. Journ.*, [3], vol. x., p. 854.

* From *New Remedies*, September, 1880.

The hard, brown resin is dissolved by none of the above solvents of the soft resin except alcohol, in which it is freely soluble. This resin is nearly tasteless, melts at about 85° C., and forms soluble soaps when treated with dilute ammonic and potassic hydrates. It seems probable that there may be *two* resins here included, as well as a little brown colouring matter, from the fact that fractional precipitation of its ammoniacal solutions fails to recover the whole of the crude resin originally employed. The portion first precipitated by acid is much darker coloured than the original resin, while the still remaining neutralized solution forms a light brown lead soap when treated with lead acetate.

It seems rather doubtful whether this resin is medicinally active.

The bitter substance is an amorphous, light brown, uncrystallizable solid, containing no nitrogen, and apparently not a glucoside. Its bitterness is not unpleasant nor very persistent.

Water and alcohol freely dissolve this bitter extractive, but it is insoluble in ether, chloroform, benzole, petroleum naphtha, and carbon disulphide. Repeated experiments failed to separate this substance in a crystalline form, and thorough treatment with animal charcoal did not deprive it of colour; it is not precipitated by acetate or basic acetate of lead, or by any other of the ordinary reagents.

As the result of very careful experimentation, I believe that this bitter substance is a true tonic of especial value to dyspeptic patients. For their use it should not be administered as fluid extract or tincture (both of which contain the objectionable irritant resins), but rather as an infusion or decoction. In several cases the patients have prepared a "tea" by simply pouring a teacupful of hot water over a teaspoonful of the dried leaves, the liquid being allowed to cool until it could be drunk. As thus made, the "tea" is not at all unpleasant, but is rather the reverse; it contains the volatile oil, which gives it an aromatic taste, the bitter extractive, a little tannin, and most of the mucilage of the leaves.

I have seen very marked good effects in three cases where the persons experimented upon were constantly troubled with disordered stomach and attendant sick headaches; in each of these cases the faithful use of damiana "tea" twice a day has resulted in apparent cure, after about one to two months' experimentation.

The amount of gum in damiana is quite large. When separated by precipitating a prepared aqueous extract of the leaves with alcohol, this gum is perfectly white, but even short contact with the air causes it to become inky black.

As above stated, this gum is present in aqueous extracts with the bitter extractive. It may have emollient or demulcent properties, but of these nothing seems yet to be known.

The "tannic acid" is one of those so-called "tannins" present in nearly all plants; it gives, with ferric salts, a greenish-brown colour, but it possesses no marked astringency. It is hardly probable that it has much to do with the medicinal activity of the leaves.

There seem also to be minute quantities of volatile and non-volatile organic acids, and of a substance which gives with ferric salts a purplish colour, somewhat similar to that produced by salicylic acid. These substances are not included in the above analysis.

From what has been stated it seems probable that *alcoholic preparations may be irritating in many cases, because they contain the soft resin, and that aqueous extracts are probably tonic because they contain the bitter extractive.* At the same time, the alcoholic extracts may possibly be more useful where they can be borne by the stomach. Possibly, also, the reputed aphrodisiac virtues of damiana may be due to the single or conjoined action of the soft (and probably irritating) resin, and of the bitter extractive.

These therapeutic speculations are those of a chemist rather than those of a physician; if they shall merely throw some light upon the very discordant results reported by medical practitioners they may prove not altogether useless.

SELENIUM AND THE PHOTOPHONE.*

BY PROFESSOR A. GRAHAM BELL.

In bringing before you some discoveries made by Mr. Sumner Tainter and myself, which have resulted in the construction of apparatus for the production and reproduction of sound by means of light, it is necessary to explain the state of knowledge which formed the starting point of our experiments. I shall first describe the remarkable substance selenium, and the manipulations devised by various experiments; but the final result of our researches has evidenced the class of substances sensitive to light vibrations, until we can propound the fact of sensitiveness being a general property of all matter. We have found this property in gold, silver, platinum, iron, steel, brass, copper, zinc, lead, antimony, German silver, Jenkin's metal, Babbitt's metal, ivory, celluloid, gutta percha, hard rubber, soft vulcanized rubber, paper, parchment, wood, mica, and silvered glass; and the only substances from which we have not obtained results are carbon and thin microscopic glass. We find that when a vibratory beam of light falls upon these substances they emit sounds—the pitch of which depends upon the frequency of the vibratory change in the light. We find further that, when we control the form or character of the light vibration on selenium, and probably on the other substances, we control the quality of the sound and obtain all varieties of articulate speech. We can thus, without a conducting wire as in electric telephony, speak from station to station, wherever we can project a beam of light. We have not had opportunity of testing the limit to which this photophonic influence can be extended, but we have spoken to and from points 213 metres apart; and there seems no reason to doubt that the results will be obtained at whatever distance a beam of light can be flashed from one observatory to another. The necessary privacy of our experiments hitherto has alone prevented any attempts at determining the extreme distance at which this new method of vocal communication will be available. I shall now speak of selenium.

In the year 1817 Berzelius and Gottlieb Gahn made an examination of the method of preparing sulphuric acid in use at Gripsholm. During the course of this examination, they observed in the acid a sediment of a partly reddish, partly clear brown colour, which under the action of the blowpipe gave out a peculiar odour, like that attributed by Klaproth to tellurium. As tellurium was a substance of extreme rarity, Berzelius attempted its production from this deposit; but he was unable, after many experiments, to obtain further indications of its presence. He found plentiful signs of sulphur mixed with mercury, copper, zinc, iron, arsenic and lead, but no trace of tellurium. It was not in the nature of Berzelius to be disheartened by this result.

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* Lecture delivered at the Boston meeting of the American Association by Professor A. Graham Bell. From *Nature*, September 23, 1880.

In science every failure advances the boundary of knowledge as well as every success, and Berzelius felt that if the characteristic odour that had been observed did not proceed from tellurium, it might possibly indicate the presence of some substance then unknown to the chemist. Urged on by this hope he returned with renewed ardour to his work. He collected a great quantity of the material, and submitted the whole mass to various chemical processes. He succeeded in separating successively the sulphur, the mercury, the copper, the tin, and the other known substances whose presence had been indicated by his tests; and, after all these had been eliminated, there still remained a residue which proved upon examination to be what he had been in search of—a new elementary substance. The chemical properties of this new element were found to resemble those of tellurium in so remarkable a degree, that Berzelius gave to the substance the name of "Selenium," from the Greek word *selene*, the moon ("tellurium," as is well known, being derived from *tellus*, the earth).

Although tellurium and selenium are alike in many respects, they differ in their electrical properties, tellurium being a good conductor of electricity, and selenium, as Berzelius showed, a non-conductor. Knox discovered in 1837, that selenium became a conductor when fused; and Hittorff, in 1852, showed that it conducted, at ordinary temperatures, when in one of its allotropic forms. When selenium is rapidly cooled from a fused condition it is a non-conductor. In this its vitreous form it is of a dark brown colour, almost black by reflected light, having an exceedingly brilliant surface. In thin films it is transparent, and appears of a beautiful ruby red by transmitted light. When selenium is cooled from a fused condition with extreme slowness it presents an entirely different appearance, being of a dull lead colour, and having throughout a granulated or crystalline structure, and looking like a metal. In this form it is perfectly opaque to light, even in very thin films. This variety of selenium has long been known as "granular" or "crystalline" selenium, or, as Regnault called it, "metallic" selenium. It was selenium of this kind that Hittorff found to be a conductor of electricity at ordinary temperatures. He also found that its resistance to the passage of an electrical current diminished continuously by heating up to the point of fusion, and that the resistance suddenly increased in passing from the solid to the liquid condition. It was early discovered that exposure to sunlight hastens the change of selenium from one allotropic form to another; and this observation is significant in the light of recent discoveries.

Although selenium has been known for the last sixty years, it has not yet been utilized to any extent in the arts, and it is still considered simply as a chemical curiosity. It is usually supplied in the form of cylindrical bars. These bars are sometimes found to be in the metallic condition; but more usually they are in the vitreous or non-conducting form. It occurred to Willoughby Smith that, on account of the high resistance of crystalline selenium, it might be usefully employed at the shore end of a submarine cable, in his system of testing and signalling during the process of submersion. Upon experiment, the selenium was found to have all the resistance required—some of the bars employed measuring as much as 1400 megohms—a resistance equivalent to that which would be offered by a telegraph wire long enough to reach from the earth to the sun! But the resistance was found to be extremely variable. Experiments were made to ascertain the cause of this variability. Mr. May, Mr. Willoughby Smith's assistant, discovered that the resistance was less when the selenium was exposed to light than when it was in the dark.

In order to be certain that temperature had nothing to do with the effect, the selenium was placed in a vessel of water, so that the light had to pass through from 1 inch to 2 inches of water in order to reach the selenium. The approach of a lighted candle was found to be sufficient to cause a marked deflection of the needle of the galvanometer connected with the selenium, and the lighting of a piece of magnesium wire caused the selenium to measure less than half the resistance it did the moment before.

These results were naturally at first received by scientific men with some incredulity, but they were verified by Sale, Draper, Moss, and others. When selenium is exposed to the action of the solar spectrum, the maximum effect is produced, according to Sale, just outside the red end of the spectrum, in a point nearly coincident with the maximum of the heat rays; but, according to Adams, the maximum effect is produced in the greenish-yellow or most luminous part of the spectrum. Lord Rosse exposed selenium to the action of non-luminous radiations from hot bodies, but could produce no effect; whereas a thermopile under similar circumstances gave abundant indications of a current. He also cut off the heat rays from luminous bodies by the interposition of liquid solutions, such as alum, between the selenium and the source of light, without affecting the power of the light to reduce the resistance of the selenium; whereas the interposition of these same substances almost completely neutralized the effect upon the thermopile. Adams found that selenium was sensitive to the cold light of the moon, and Werner Siemens discovered that, in certain extremely sensitive varieties of selenium, heat and light produced opposite effects. In Siemens's experiments, special arrangements were made for the purpose of reducing the resistance of the selenium employed. Two fine platinum wires were coiled together in the shape of a double flat spiral in the zig-zag shape, and were laid upon a plate of mica so that the disks did not touch one another. A drop of melted selenium was then placed upon the platinum wire arrangement, and a second sheet of mica was pressed upon the selenium, so as to cause it to spread out and fill the spaces between the wires. Each cell was about the size of a silver dime. The selenium cells were then placed in a paraffin bath, and exposed for some hours to a temperature of 210° C., after which they were allowed to cool with extreme slowness. The results obtained with these cells were very extraordinary; in some cases the resistance of the cells, when exposed to light, was only one-fifteenth of their resistance in the dark.

Without dwelling farther upon the researches of others, I may say that the chief information concerning the effect of light upon the conductivity of selenium will be found under the names of Willoughby Smith, Lieutenant Sale, Draper and Moss, Professor W. G. Adams, Lord Rosse, Day, Sabini, Dr. Werner Siemens, and Dr. C. W. Siemens. All observations by these various authors had been made by means of galvanometers; but it occurred to me that the telephone, from its extreme sensitiveness to electrical influences, might be substituted with advantage. Upon consideration of the subject, however, I saw that the experiments could not be conducted in the ordinary way for the following reason:—The law of audibility of the telephone is precisely analogous to the law of electric induction. No effect is produced during the passage of a continuous and steady current. It is only at the moment of change from a stronger to a weaker state, or *vice versâ*, that any audible effect is proposed, and the amount of effect is exactly proportional to the amount of variation in the current. It was, therefore, evident that the telephone could only respond to the effect produced in selenium at the moment of change from light to darkness, or *vice versâ*, and that it would be advisable to intermit the light with great rapidity, so as to produce a succession of changes in the conductivity of the selenium, corresponding in frequency to musical vibrations within the limits of the sense of hearing. For I had often noticed that currents of electricity, so feeble as to produce scarcely any audible effects from a telephone when the circuit was simply open or closed, caused very perceptible musical sounds when the circuit was rapidly interrupted, and that the higher the pitch of sound the more audible was the effect. I was much struck by the idea of producing sound by the action of light in this way. Upon farther consideration it appeared to me that all the audible effects obtained from varieties of electricity could also be produced by variations of light acting upon selenium. I saw that the effect could be produced at the extreme distance at which selenium would respond to the action of a luminous body, but that this distance could be indefinitely increased by the use of a parallel beam of light, so that we could telephone from one place to another without the necessity of a conducting wire between the transmitter and receiver. It was evidently necessary, in order to reduce this idea to practice, to devise an apparatus to be operated by the voice of a speaker, by which variations could be produced in a parallel beam of light, corresponding to the variations in the air produced by the voice.

I proposed to pass light through a large number of small orifices, which might be of any convenient shape, but were preferably in the form of slits. Two similarly perforated plates were to be employed. One was to be fixed and the other attached to the centre of a diaphragm actuated by the voice, so that the vibration of the diaphragm would cause the movable plate to slide to and fro over the surface of the fixed plate, thus alternately enlarging and contracting the free orifices for the passage of light. In this way the voice of a speaker could control the amount of light passed through the perforated plates without completely obstructing its passage. This apparatus was to be placed in the path of a parallel beam of light, and the undulatory beam emerging from the apparatus could be received at some distant place upon a lens, or other apparatus, by means of which it could be condensed upon a sensitive piece of selenium placed in a local circuit with a telephone and galvanic battery. The variations in the light produced by the voice of the speaker should cause corresponding variations in the electrical resistance of the selenium employed; and the telephone in circuit with it should reproduce audibly the tones and articulations of the speaker's voice. I obtained some selenium for the purpose of producing the apparatus shown, but found that its resistance was almost infinitely greater than that of any telephone that had been constructed, and I was unable to obtain any audible effects by the action of light. I believed, however, that the obstacle could be overcome by devising mechanical arrangements for reducing the resistance of the selenium, and by constructing special telephones for the purpose. I felt so much confidence in this that, in a lecture delivered before the Royal Institute of Great Britain, upon May 17, 1878, I announced the possibility of hearing a shadow by interrupting the action of light upon selenium. A few days afterwards my ideas upon this subject received a fresh impetus by the announcement made by Mr. Willoughby Smith before the Society of Telegraph Engineers that he had heard the action of a ray of light falling upon a bar of crystalline selenium, by listening to a telephone in circuit with it.

It is not unlikely that the publicity given to the speaking telephone during the last few years may have suggested to many minds in different parts of the world somewhat similar ideas to my own.

Although the idea of producing and reproducing sound by the action of light, as described above, was an entirely original and independent conception of my own, I recognize the fact that the knowledge necessary for its conception has been disseminated throughout the civilized world, and that the idea may therefore have occurred to many other minds. The fundamental idea, on which rests the possibility of producing speech by the action of light, is the conception of what may be termed an undulatory beam of light in contradistinction to a merely intermittent one. By an undulatory beam of light, I mean a beam that shines continuously upon the selenium receiver, but the intensity of which upon that receiver is subject to rapid changes, corresponding to the changes in the vibratory movement of a particle of air during the transmission of a sound of definite quality through the atmosphere. The curve that would graphically represent the changes of light would be similar in shape to that representing the movement of the air. I do not know whether this conception had been clearly realized by "J. F. W.," of Kew, or by Mr. Sargent, of Philadelphia; but to Mr. David Brown, of London, is undoubtedly due the honour of having distinctly and independently formulated the conception, and of having devised apparatus—though of a crude nature—for carrying it into execution. It is greatly due to the genius and perseverance of my friend, Mr. Sumner Tainter, of Watertown, Mass., that the problem of producing and reproducing sound by the agency of light has at last been successfully solved. The first point to which we devoted our attention was the reduction of the resistance of crystalline selenium within manageable limits. The resistance of selenium cells employed by former experimenters was measured in millions of ohms, and we do not know of any record of a selenium cell measuring less than 250,000 ohms in the dark. We have succeeded in producing sensitive selenium cells measuring only 300 ohms in the dark, and 155 ohms in the light. All former experimenters seem to have used platinum for the conducting part of their selenium cells, excepting Werner Siemens, who found that iron and copper might be employed. We have also discovered that brass, although chemically acted upon by selenium, forms an excellent and convenient material; indeed, we are inclined to believe that the chemical action between the brass and selenium has contributed to the low resistance of our cells by forming an intimate bond of union between the selenium and brass. We have observed that melted selenium behaves to the other substances as water to a greasy surface, and we are inclined to think that when selenium is used in connection with metals not chemically acted upon by it, the points of contact between selenium and the metal offer a considerable amount of resistance to the passage of a galvanic current. By using brass we have been enabled to construct a large number of selenium cells of different forms. The mode of applying the selenium is as follows:—The cell is heated, and, when hot enough, a stick of selenium is rubbed over the surface. In order to acquire conductivity and sensitiveness, the selenium must next undergo a process of annealing.

We simply heat the selenium over a gas stove and observe its appearance. When the selenium attains a certain temperature, the beautiful reflecting surface becomes dimmed. A cloudiness gradually extends over it, somewhat like the film of moisture produced by breathing upon a mirror. This appearance gradually increases, and the whole surface is soon seen to be in the metallic, granular, or crystalline condition. The cell may then be taken off the stove, and cooled in any suitable way. When the heating process is carried too far, the crystalline selenium is seen to melt. Our best results have been obtained by heating the selenium until it crystallizes, and continuing the heating until signs of melting appear, when the gas is immediately put out. The portions that had melted instantly recrystallize, and the selenium is found upon cooling to be a conductor, and to be sensitive to light. The whole operation occupies only a few minutes. This method has not only the advantage of being expeditious, but it proves that many of the accepted theories on this subject are fallacious. Our new method shows that fusion is unnecessary, that conductivity and sensitiveness can be produced without long heating and slow cooling; and that crystallization takes place during the heating process. We have found that on removing the source of heat immediately on the appearance of the cloudiness, distinct and separate crystals can be observed under the microscope, which appear like leaden snowflakes on a ground of ruby red.

Upon removing the heat, when crystallization is further advanced, we perceive under the microscope masses of these crystals arranged like basaltic columns standing detached from one another, and at a still higher point of heating the distinct columns are no longer traceable, but the whole mass resembles metallic pudding-stone, with here and there a separate snowflake, like a fossil, on the surface. Selenium crystals formed during slow cooling after fusion present an entirely different appearance, showing distinct facets.

We have devised about fifty forms of apparatus for varying a beam of light in the manner required, but only a few typical varieties need be shown. The source of light may be controlled, or a steady beam may be modified at any point in its path. The beam may be controlled in many ways. For instance, it may be polarized, and then affected by electrical or magnetic influences in the manner discovered by Faraday and Dr. Kerr. The beam of polarized light, instead of being passed through a liquid, may be reflected from the polished pole of an electro-magnet. Another method of affecting a beam of light is to pass it through a lens of variable focus. I observe that a lens of this kind has been invented in France by Dr. Cusco, and is fully described in a recent paper in *La Nature*; but Mr. Tainter and I have used such a lens in our experiments for months past. The best and simplest form of apparatus for producing the effect remains to be described. This consists of a plane mirror of flexible material—such as silvered mica or microscope glass. Against the back of this mirror the speaker's voice is directed. The light reflected from this mirror is thus thrown into vibrations corresponding to those of the diaphragm itself.

In arranging the apparatus for the purpose of reproducing sound at a distance any powerful source of light may be used, but we have experimented chiefly with sunlight. For this purpose a large beam is concentrated by means of a lens upon the diaphragm mirror, and, after reflection, is again rendered parallel by means of another lens. The beam is received at a distant station upon a parabolic reflector, in the focus of which is placed a sensitive selenium cell, connected in a local circuit with a battery and telephone. A large number of trials of this apparatus have been made with the transmitting and receiving instruments so far apart that sounds could not be heard directly through the air. In illustration I shall describe one of the most recent of these experiments. Mr. Tainter operated the transmitting instrument, which was placed on the top of the Franklin schoolhouse in Washington, and the sensitive receiver was arranged in one of the windows of my laboratory, 1325, L. Street, at a distance of 213 metres. Upon placing the telephone to my ear I heard distinctly from the illuminated receiver the words: "Mr. Bell, if you hear what I say come to the window and wave your hat." In laboratory experiments the transmitting and receiving instruments are necessarily within earshot of one another, and we have, therefore, been accustomed to pooling the electric circuit connected with the selenium receiver, so as to place the telephones in another room. By such experiments we have found that articulate speech can be reproduced by the oxyhydrogen light, and even by the light of a kerosene lamp. The loudest effects obtained from light are produced by rapidly interrupting the beam by the perforated disk. The great advantage of this form of apparatus for experimental work is the noiselessness of its rotation, admitting the close approach of the receiver without interfering with the audibility of the effect heard from the latter; for it will be understood that musical tones are emitted from the receiver when no sound is made at the transmitter. A silent motion thus produces a sound. In this way musical tones have been heard even from the light of a candle. When distant effects are sought another apparatus is used. By placing an opaque screen near the rotating disk the beam can be entirely cut off by a slight motion of the hand, and musical signals, like the dots and dashes of the Morse telegraph code, can thus be produced at the distant receiving station.

We have made experiments, with the object of ascertaining the nature of the rays that affect selenium. For this purpose we have placed in the path of an intermittent beam various absorbing substances. Professor Cross has been kind enough to give me his assistance in conducting these experiments. When a solution of alum or bisulphide of carbon is employed, the loudness of the sound produced by the intermittent beam is very slightly diminished; but a solution of iodine in bisulphide of carbon cuts off most, but not all, of the audible effect. Even an apparently opaque sheet of hard rubber does not entirely do this. When the sheet of hard rubber was held near the disk interrupter the rotation of the disk interrupted what was then an invisible beam, which passed over a space of about twelve feet before it reached the lens, which finally concentrated it upon the selenium cell. A faint but perfectly perceptible musical tone was heard from the telephone connected with the selenium. This could be interrupted at will by placing the hand in the path of the invisible beam. It would be premature, without further experiments, to speculate too much concerning the nature of these invisible rays; but it is difficult to believe that they can be bent rays, as the effect is produced through two sheets of hard rubber containing between them a saturated solution of alum. Although effects are produced as above shown by forms of radiant energy which are invisible, we have named the apparatus for the production and reproduction of sound in this way "the photophone," because an ordinary beam of light contains the rays which are operative.

It is a well-known fact that the molecular disturbance produced in a mass of iron by the magnetizing influence of intermittent electrical current can be observed as sound by placing the ear in close contact with the iron. It occurred to us that the molecular disturbance produced in crystalline selenium by the action of an intermittent beam of light should be audible in a similar manner without the aid of a telephone or battery. Many experiments were made to verify this theory without definite results. The anomalous behaviour of the hard rubber screen suggested the thought of listening to it also. This experiment was tried with extraordinary success. I held the sheet in close contact with my ear, while a beam of intermittent light was focussed upon it by a lens. A distinct musical note was immediately heard. We found the effect intensified by arranging the sheet of hard rubber as a diaphragm, and listening through a hearing-tube. We then tried the crystalline selenium in the form of a thin disk, and obtained a similar, but less intense effect. The other substances which I enumerated at the beginning of my address were now successively tried in the form of thin disks, and sounds were obtained from all but carbon and thin glass. We found hard rubber to produce a louder sound than any other substance we tried, excepting antimony, and paper and mica to produce the weakest sounds. On the whole we feel warranted in announcing as our conclusion that sounds can be produced by the action of a variable light from substances of all kinds, when in the form of thin diaphragms. We have heard from interrupted sunlight very perceptible musical tones through tubes of ordinary vulcanized rubber, of brass, and of wood. These were all the materials at hand in tubular form, and we have had no opportunity since of extending these observations to other substances.

I am extremely glad that I have the opportunity of making the first publication of these researches before a scientific society, for it is from scientific men that my work of the last six years has received its earliest and kindest recognition. I gratefully remember the encouragement which I received from the late Professor Henry at a time when the speaking telephone existed only in theory. Indeed, it is greatly due to the stimulus of his appreciation that the telephone became an accomplished fact. I cannot state too highly also the advantage I received in preliminary experiments on sound vibrations in this building from Professor Cross, and near here from my valued friend Dr. Clarence J. Blake. When the public were incredulous of the possibility of electrical speech, the American Academy of Arts and Sciences, the Philosophical Society of Washington, and the Essex Institute of Salem, recognized the reality of the results and honoured me by their congratulations. The public interest, I think, was first awakened by the judgment of the very eminent scientific men before whom the telephone was exhibited in Philadelphia, and by the address of Sir William Thomson before the British Association for the Advancement of Science.

At a later period, when even practical telegraphists considered the telephone as a mere scientific toy, Professor John Peirce, Professor Eli W. Blake, Dr. Channing, Mr. Clarke, and Mr. Jones, of Providence, Rhode Island, devoted themselves to a series of experiments for the purpose of assisting me in making the telephone of practical utility; and they communicated to me from time to time the result of their experiments with a kindness and generosity I can never forget. It is not only pleasant to remember these things, and to speak of them, but it is a duty to repeat them, as they give a practical refutation to the often repeated stories of the blindness of scientific men to unaccredited novelties, and of their jealousy of unknown inventors who dare to enter the charmed circle of science. I trust that the scientific favour which was so readily accorded to the telephone may be extended by you to this new claimant—the photophone.

FLOWERS AND THE WEATHER.*

The vegetable kingdom opens up a curious field of investigation, in which the meteorologist will learn much regarding the mutual interdependence of all departments of creation. If light and electricity be, as well known, influential in exciting the movements of animals breathing the vital air, plants are equally subject to the same potent agencies, and testify to their influence so visibly as to attract the notice alike of the scientific botanist and of the illiterate rustic. In some parts of England the peasants mark the blooming of the large water lily, and think that the number of its blossoms on a stem indicate the price of wheat per bushel for the ensuing year—each blossom being equivalent to a shilling. We smile at this as superstitious folly; but even philosophers have not deigned to despise the weather indications afforded by the shutting of the flowers of certain plants.

Lord Bacon, for example, who was remarkably attentive to all the appearances and changes of natural objects, is the author of some of the observations which follow:—

The pimpernel (*Anagallis arvensis*).—"When the flower of this plant," says Bacon, "expands bodily and fully, no rain will happen for four hours or upward; if it continues in that open state, no rain will disturb the summer's day; when it half conceals its miniature flower, the day is generally showery; but if it entirely shuts up or veils the flower with its green mantle, let the traveller put on his great-coat, and the plowman, with his beasts of draught, expect rest from his labour." This little plant, from its peculiar susceptibility, has long been known as the "poor man's weather glass."

"The Siberian sow thistle (*Sonchus*).—If the flowers of this plant keep open all night, rain will certainly fall the next day."

"The African marigold (*Tagetes erecta*).—If this plant opens not its flowers in the morning about seven o'clock, you may be sure it will rain that day unless it thunders."

"The trefoil (*Hedysarum*).—The different species of trefoil always contract their leaves at the approach of a storm; hence these plants have been termed the 'husbandman's barometer.'"

"White thorns and dog-rose bushes.—Wet summers are generally attended with an uncommon quantity of seeds on these shrubs, whence their unusual fruitfulness is a sign of severe winter."

Besides the above there are several plants, especially those with compound yellow flowers, which nod, and during the whole day turn their flowers towards the sun. Such flowers are designated as "heliotropes," and the movement which they thus exhibit is called their "nutation." This is particularly observable in the common sow thistle (*Sonchus arvensis*); and it is a well known fact that a great part of the plants in a serene sky expand their flowers, but before rain they shut them up, as the tulip, for instance. The flowers of chick-wintergreen (*Trientalis Americana*) droop in the night, lest rain or moisture should injure the fertilizing pollen. One species of wood sorrel (*Oxalis*) shuts up or doubles its leaves before storms and tempests, but in a serene sky expands or unfolds them, so that husbandmen can foretell tempests from it. It is also well known that the sensitive plants and other species of *Cassia* observe the same rule. The flowers of the bindweed (*Convolvulus arvensis*), the wood anemone, and the common daisy (*Bellis*), even if already open, will shut up on the approach of rain. The last named flower appears to have derived its name—day's eye—from its sensitiveness to light. Such phenomena as these are probably determined by the action of light; and the flowers of such plants being shut at ten or eleven o'clock in the morning tell of colds and gloom, and so predict rain.

Besides affording prognostics, many plants also fold themselves up at particular hours, with such regularity as to have acquired particular names from this property. Linnæus has enumerated forty-six flowers which possess this kind of sensibility. From an arrangement of such flowers it has been ingeniously proposed to form a floral timepiece. The flowers of the goat's beard (*Tragopogon*) open in the morning at the approach of the sun, and, regardless of the weather, shut up about noon, and hence its common name of "go-to-bed-at-noon." The star of Bethlehem expands its flowers about eleven, and closes them at three in the afternoon. The evening primrose (*Œnothera*) is well known from its remarkable properties of regularly shutting with a loud popping noise about sunrise and opening at sunset. After six o'clock, these flowers regularly report the approach of night. The flowers of the garden lettuce open at seven o'clock and shut at ten.

That light is the chief agent of these changes seems to be proved by the experiments of De Candolle, made at the Jardin des Plantes, in an underground cellar, illuminated by lamps giving a light equal to fifty-four ordinary wax candles. By lighting these he could cause the flowers of the star of Bethelem to open at pleasure, and also those of the sea camomile, which keeps its flowers closely shut during the night; but he could produce no artificial effect with the strongest light upon several species of wood sorrel, whose flowers and leaves are both folded up at night. With the sensitive plant he succeeded in so completely changing the hour of closure that on the third day from being placed in the light cellar it began to fold its leaves in the morning and open them in the evening.

One of the most singular cases of the action of light on plants is that of the *Lotus* of the Euphrates, as described by Theophrastus, and which he represents as rearing and expanding its blossom by day, closing and sinking beneath the surface of the water by night, so as to be beyond the grasp of the hand, and again rising up in the morning to present its expanded blossom to the sun. The same phenomenon is also related by Pliny.

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The Pharmaceutical Journal.

SATURDAY, OCTOBER 2, 1880.

THE OPENING OF A NEW SESSION.

During the coming week most of the schools of medicine and the allied sciences in the metropolis will recommence their operations, and the students will gather to hear the words of advice and encouragement that will fall from the lips of the Mentors appointed to deliver the respective "Introductories." It may be fairly presumed, however, that none of these orations will present so much of attraction to the readers of this Journal as that which is to be delivered on Wednesday, by Dr. J. Langdon Down, to the students who have entered for the Thirty-ninth Session of the School of Pharmacy carried on in the Phamaceutical Society's premises, in Bloomsbury Square. The occasion is one of peculiar interest and importance. Dr. Down was himself one of the earlier pupils and prizemen in the School and has long been one of the Honorary Members of the Pharmaceutical Society, and the fact that, although eventually choosing a medical career, he has never ceased to manifest a kindly feeling towards those who practise pharmacy will add to the weight of what he may say. Moreover, although such addresses are primarily addressed to students, there is usually in them a second reading intended for those of older growth, and pharmacists will be sure to note with attention what is said by so eminent a medical man concerning the practice of pharmacy at so critical a period in the history of the calling. Those who are able to be present at the meeting may have the additional pleasure of sharing the sympathy and enthusiasm which the distribution of the prizes won by students of a former session always evokes.

The occasion is also notable in another sense, since it marks the commencement of a session in which what may prove to be important modifications in the tutorial arrangements of the School will be effected. These we shall at present only indicate without further comment. The first alteration is, that with a view of connecting the lecture teaching of the Professor of Chemistry and Pharmacy with the instruction given to the practical class in the laboratory, and to allow of the number of experimental illustrations being increased, the Demonstrator of Practical Chemistry will assist at the lectures and examinations. The second, but not less important alteration is, that in connection with the class of Chemistry and Pharmacy, instruction in practical dispensing will be provided for those students who need it.

It may be well also to remind our readers that the meeting next week will be the first of another series of Evening Meetings, and that these will depend principally for their value upon those who having made observations of interest to pharmacists are at the trouble of making them known by the reading of a paper. Such communications should, however, be submitted to the Evening Meetings Committee at least one week before the date of the meeting at which they are intended to be read.

ACCLIMATIZATION EXPERIMENTS IN JAMAICA.

Although one of the most favoured spots in the earth in respect to the richness and variety of its vegetation,—even its name being derived from a native one meaning the land of wood and water,—Jamaica, as is well known, has not been so prosperous in recent years as might have been hoped. The waning of the sugar and coffee industries, and other circumstances, some of which were political and social, have had a very blighting effect, and appear to have paralysed the energy that is usually expected from British colonists. It is therefore gratifying to learn, from a recent supplement to the *Jamaica Gazette*, that systematic efforts are now being made to utilize the natural advantages of the island and to find in its well watered soil, differences of elevation, and consequent wide range of temperature, a home for some of the economic plants of other lands. A few of these that have been already introduced with a promise of success are of considerable interest to pharmacists.

Chief among these introductions stands the cinchona. This cultivation has been carried on for some years past, but apparently only in a very perfunctory manner. It was commenced as far back as the year 1866, under the direction of Mr. Robert Thomson, at a place called Cold Spring, and barks from this locality were favourably reported upon by Mr. Howard in 1872 and by Dr. De Vrij in 1873. But it is only comparatively recently that any considerable quantity of Jamaica cinchona bark has come into the market. The prices obtained for this, however, have, as mentioned last week (before, p. 250), been sufficiently high to warrant the hope that they will prove an encouragement and stimulus to the increased attention which is being given to the cultivation of cinchona in the island.

The species of *Cinchona* which has hitherto been principally cultivated in Jamaica appears to be *C. succirubra*, and this, it has been found, can be grown in the island at all elevations above 2000 feet, the bark, it is claimed, being equal to the best red bark produced either in South America or the East Indian plantations.

An idea of the rate at which this species grows may be gathered from the fact that the average height of one hundred eleven-year-old trees which were cut down in February last was 22 feet 1 inch, whilst the entire yield of bark from them weighed 1660 lbs. when green and 515 lbs. after being sun-dried. The largest of these trees measured 35 feet in height, with a circumference close to the ground of 25 inches, and at five feet from the ground of 20 inches. It yielded 11 lbs. of dry trunk bark and 3 lbs. of branch bark, which, calculated at the rate obtained this year for a similar bark,—namely, 4*s.* per lb. for the former and 2*s.* for the latter,—would be worth £2 10*s.* This, however, was an exceptionally fine tree.

The principal disadvantage attending the cultivation of *C. succirubra* in Jamaica is that it appears to suffer, especially in exposed situations, from a local disease which is thought to be due to fungoid growth setting up in the fissures and wounds caused by the straining of the bark or the breaking off of a branch during windy weather. This condition is, of course, favoured by the succulent habit of the species.

But a species that probably has a more important future before it in Jamaica is the *Cinchona officinalis*, which, although not attaining so great a size as the *C. succirubra*, yields in the "grey" or "Loxa" bark a product of considerably higher value. Moreover, this species does not suffer so much from the fungoid disease referred to. Unfortunately the *C. officinalis* was until recently in disrepute in Jamaica, the reports of Mr. Howard and Dr. De Vrij on the specimens of bark from this species submitted to them not having been very favourable, Dr. De Vrij only obtaining 0·46 per cent. of quinine. These samples were, however, taken from plants grown at comparatively low elevations, whilst the best results are obtained at Ootacamund at an elevation of 8000 feet, and both observers suggested that a higher elevation might yield better results. This has now been confirmed, and the *C. officinalis* is found to flourish and yield a good bark, as shown by the prices quoted last week, at elevations of from 4500 to 6000 feet, even in exposed situations, and this height is attained and exceeded in many places in the Blue Mountain and St. Andrew's ranges.

The yellow bark from Jamaica, the produce of trees that have hitherto passed in the plantations as *C. Calisaya*, although it brought good prices, is now thought not to be the true yellow bark of commerce, the plant yielding it being probably hybrid between *C. officinalis* and *C. succirubra*. This variety will be retained in cultivation for the present, but efforts will be made to introduce the true Calisaya from India and Java.

As has been the case at Ootacamund, jalap has been grown in the neighbourhood of, or in fact in this case among the cinchonas, but the experiment has been temporarily interfered with through the necessity for removing the plants because of the injury they did to the cinchonas. A separate plantation of jalap extending over about two acres has, however, now been formed.

Amongst other economic plants reported to be cultivated in the Botanical Gardens of the island for distribution are the nutmeg, clove, cinnamon, vanilla, Liberian coffee, camphor, and gambege. Nutmeg trees six years old have been found to yield from 2500 to 3000 nutmegs, or about 40 to 50 lbs. per tree per annum.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(Continued from page 268.)

The next paper was on—

A Sample of Cayenne.

BY THOMAS GREENISH, F.C.S.

[The publication of this paper and the discussion upon it is deferred for the present at the request of the author.]

The International Pharmaceutical Congress.

The **President** said he believed Mr. Greenish wished to say a word or two about the International Pharmaceutical Congress, which was to be held in England next year. The delegates to Vienna and St. Petersburg were very well received and they should all do something on their part to return the compliment. What was suggested was small subscriptions but numerous ones.

Mr. **Greenish** said no doubt most of the gentlemen present were interested in this subject, in fact their very presence there showed their interest in pharmacy, and they would be aware that it was proposed to hold an International Medical Congress in 1881 in London, and he believed from the active steps now being taken that that congress would be a very great success. About six years ago he was appointed a delegate to the International Pharmaceutical Congress in St. Petersburg, when he gave the delegates there an invitation to meet next in London. Five years was the usual interval between the meetings, but the war between Russia and Turkey and various other things rendered it inadvisable to meet at the usual time in London, and, therefore, it was postponed. But they now thought it very desirable that in 1881 this International Pharmaceutical Congress should be held in London. Its first meeting was in Brunswick many years ago, the second in Paris, the third in Vienna, and the fourth in St. Petersburg; and it was with considerable delight, more than he could express, that those who were present at St. Petersburg received the invitation which was again sent from the Pharmaceutical Society on the return of the delegates. Many points of interest would come before this International Congress, one being that much misunderstood question, the International Pharmacopœia. In Germany there were he did not know how many pharmacopœias at one time, but now there was only one; in Switzerland there were a large number, but now there was only one; and, therefore, he did not think there would be much difficulty in forming such an International Pharmacopœia as was shadowed forth at St. Petersburg, namely, one in which the active preparations of opium, strychnine, and such substances should be the same in the several countries. In this question some of the pharmacists and medical men abroad took much more interest than even the pharmacists of this country, and the presence of those medical men and pharmacists in England at that particular time and the discussions probably that would take place would, he hoped, tend to impress on the Medical Council how very desirable it was for pharmacy to have a certain number of chosen pharmacists take part in the preparation of the Pharmacopœia.

The Conference then adjourned for luncheon.

Upon reassembling, the first paper read was—

Notes upon the Green Extracts of the Pharmacopœia.

BY W. A. H. NAYLOR, F.C.S.

The first official announcement of the use of preparations made from green plants which the most nearly resemble our extracts, dates as far back as 1746, when the leaves of rue and savin were made to yield a semi-solid product by the successive operations of decoction, filtration and evaporation. Twenty years later produced the veritable prototype of our green extract in the umbelliferous plant, the hemlock, under the designation of an inspissated juice, and it was ordered to be prepared by taking the whole plant, bruising it, expressing the juice and evaporating it with care. The lapse of another twenty years sufficed to bestow upon the inspissated juice of the hemlock and other products similarly prepared the generic appellation by which they continue to be known, that of extracts. And when it is remembered how important a position this class of preparations occupies in the domain of therapeutics, and how the remedial value of the extracts may be affected by variations in their mode of production, it is not surprising that so much attention should have been devoted to the subject of their manufacture. To record such observations in regard to the manufacture of the green extracts as have been furnished by the experiences of a laboratory constitutes the design of this paper. Belladonna may be taken in illustration of the following remarks:—

The plant having been obtained, no time should be lost in working it; but while in the fresh condition it should be stripped of its leaves and flowering tops. Prompt attention to what may seem so trifling a circumstance is, however, of the first importance, for the perfection of the product will greatly depend upon the degree to which fermentation has been prevented, or if induced, the degree to which it has been checked. If several plants have been tied in a bundle, as is generally the case, and the several bundles be crowded together, it is obvious that under such conditions they will soon become heated and ferment. It will be wise, therefore, to untie any bundles and apportion so much room to the several plants, so that at least they may not be more than in loose contact. Should it happen that the plants come to hand so late in the day as to render inevitable the postponement of operations until the next morning, their stems may with advantage be put into a little water for the night. It will be remembered that the Pharmacopœia directs that the flowering tops as well as the leaves of the several plants be employed for making their respective extracts, while the old London Pharmacopœia restricts the use of parts to the leaves alone. The main advantage secured by this addition was the production of an extract which was less prone to change. At the same time there was obtained an increased yield of extract of not inferior quality. The suggestion that flowering tops should be employed was due to Mr. Squire. By experiment it was found that the product obtained from the combined use of leaves, flowers and their peduncles was less liable to undergo change and present that unsightly appearance known as mould, a condition which the leaf extract could rarely be held guiltless of assuming.

In a paper read at an Evening Meeting of the Pharmaceutical Society now nearly twenty years ago, Mr. Squire discussed the question "Whether medicinal extracts from green herbs are best prepared from leaves only or from all the soft parts of the plant taken together." From the same plant, belladonna, the author prepared two extracts, the one being the product of the leaves alone, the other the combined product of the young stalks and flowers. The leaf extract became mouldy in ten days, the other remained unimpaired. These experiments of Mr. Squire were confirmed by others who had had large experience of these particular preparations. And to-day it is a matter of common knowledge amongst experienced manufacturers of medicinal extracts that when these preparations are made with the leaves only they invariably become mouldy, "whereas when made with the soft parts of the whole plant they keep perfectly well and remain of a good consistence from one season to another."

If it be asked to what proximate principle may be assigned the preservative properties apparently resident in the peduncle or young stems, one has little hesitation in affirming it to be due mainly to the gummy matter invariably present in these parts of the plant. In addition to gummy matter, however, there exists in the young stems inorganic salts, which are known to exercise an antiseptic influence over putrescible substances, and I would suggest whether the keeping properties of an extract in which the young stems have been employed may not be in part attributable to mixed chlorides of sodium and potassium. Here I would remark that the addition of but a very small proportion of gum to an extract—while in the fresh condition and which is known readily to mould—will materially retard the period of decay. This fact is mentioned because it harmonizes with the opinion just expressed; but it must not be supposed that I recommend such an addition in making the Pharmacopœia extracts,—an addition, moreover, for which there should be no necessity.

The next part of the process consists in bruising the plucked "leaves and flowering tops." This operation, in kind, is one so well known to the practised pharmacist as in general terms to require no comment. On the small scale this object will be best accomplished by vigorously beating the selected parts in a bell-metal mortar, or a stone mortar, as recommended officially. If the stouter stems have been rejected, little difficulty will be experienced in effecting a fairly successful destruction of the texture of the leaves, etc. This operation is more easily and efficiently performed by stone runners, as in a grinding mill, where direct pressure and a tearing action are simultaneously brought into play. In this manner the bruising operation is conducted by wholesale manufacturers.

When the leaves, etc., have been disintegrated to the necessary degree, they should be enclosed in a hair cloth, and submitted to pressure. For this purpose a good press is essential. But while much depends upon the power of the press much also depends upon the mode in which pressure is applied. For instance, if young stalks have been imperfectly comminuted, the disintegrated mass under the influence of pressure will spring, the several particles will not be acted upon equally; as a result, little spaces will form here and there, throughout the mass, and so render extremely difficult the successful extraction of the juice. Under such circumstances, a powerful press would in a great measure compensate for the low results obtained by a smaller one. If, however, the leaf texture has been uniformly and completely broken up, as it would be under stone runners, the pressure will be equal throughout the mass and no spaces will be formed. In this case the pressure should at first be applied very gradually and increased as the proportion of juice in the mass decreases. By thus graduating the force as it is applied the marc is prevented from being forced through its cloth and the maximum amount of juice is obtained. A hydraulic press is the one generally employed for this and similar purposes on the large scale. It is, I suppose, hardly necessary to remark that caution is required in the pressure of such a plant as belladonna, otherwise a little of the juice is apt to be squirted into the eye, a circumstance which might be attended with more than temporary inconvenience. Before passing from this part of the process I desire to record one or two observations upon the juice itself. And I would note that from the general appearance of the juice the practised eye can presage the quality and to some extent the yield of the final product. Neither the watery juice of a bright green colour nor the deeply brown in which the chlorophyll readily subsides will produce an extract of good quality. The reason of this is to be found in the fact that these characters belong respectively to plants which have not arrived at maturity and those which have advanced beyond this stage. That juice which is intermediate in quality between these two, where the bright green of the one by blending with the other is tempered into a dull green, will invariably yield a product possessing in the highest degree the characters of a good extract. The specific gravity of belladonna juice ranges from 1015 to 1035, the average may be taken at 1020, and in an ordinary season a ton of the leaves and young stems would give 130 gallons of juice. These numbers must be regarded as approximate only, since the juice of plants, and consequently the extracts made therefrom, are greatly influenced by variations of season.

I now come to speak of that part of the process which directs the strained liquor to be heated to 130° F., and the chlorophyll which separates to be removed by filtration through calico. The strained liquor is then to be heated to 200° F. to coagulate the albumen, and again filtered. Regarding both these operations they are in themselves simple and similar and require no comment. I would merely add that it will be found of great advantage to remove the scum which rises to the surface during the heating of the liquor to the temperature at which the chlorophyll separates out. With reference to the rejection of the albumen, I would make the following observations:—

First. That vegetable albumen in an uncoagulated or imperfectly coagulated condition is much more active in promoting decomposition than when coagulation has been completely effected. Therefore that system of making extracts in which the juice is at once evaporated at a temperature too low to ensure complete coagulation of the albumen appears to me an objectionable one.

Secondly. There is a tendency for some portion of the vegetable albumen to be thrown out of solution when the temperature has reached 130° F., *i.e.* when the chlorophyll separates. This tendency towards separation at low temperatures appears to be less as the percentage of alkaline chlorides is great, a fact which possibly accounts in some measure for the moulding of extracts when made from the juice of the leaves alone. For the leaves contain more albumen and chlorophyll than any other part of the plant and proportionately less chlorides, and in my experience I have found that some portion of the albumen which is removed along with the chlorophyll is subsequently returned in company with the green colouring matter.

Thirdly. For all practical purposes the albumen may be completely thrown out of solution by raising the juice to the boiling temperature. This, of course, necessitates the simultaneous removal of the chlorophyll.

Lastly. So far as the keeping properties of the extract are concerned they are not interfered with to a perceptible extent from one season to another by the retention of coagulated albumen, provided the juice of the young stalks of the stem has contributed to the final product.

Some of the objections which have been raised against the retention of the albumen are to the effect that being an inert substance it dilutes the extract, increases the yield, and adds to the remuneration of the manufacturer. In reply to these objections it may be stated that as far as is known there is no conclusive evidence to show that the albumen, even in the condition in which it would exist in the green extracts, is devoid of physiological action, or, supposing it to possess no specific remedial properties, may it not be one of those substances which exercises a modifying or controlling influence, so that in rejecting what seems superfluous we may be losing a valuable ingredient? The increase of yield to the extract by the incorporation of the albumen would be in the ratio of about 1 oz. of moist albumen to the pound of finished product. One is therefore led to conclude that so comparatively insignificant an increase of remuneration to the manufacturer is quite inadequate to account for the reasons which, under certain circumstances, induced him to retain this ingredient.

An argument which has been adduced in favour of retaining the albumen is based upon the disturbing influence which its withdrawal occasions, causing the nicely balanced affinities by which the several constituents of the plant are held together to be thrown out uilibrium. Without doubt there is some force in this argument, but it loses much of its weight when it is remembered that those who advance it are themselves also in favour of coagulating, removing, though subsequently returning, the albumen. With the main drift of this argument I cordially agree and could refer to modes of treatment in relation to certain drugs in which its facts are borne out by the experiences of medical men, but its application in this particular instance seems to me less warrantable.

I have now to remark upon the last part of the process, which directs the strained liquor from which the albumen and chlorophyll has been removed to be evaporated by a *water-bath* to the consistence of a thin syrup, the green colouring matter is then to be added, the whole assiduously stirred, and evaporation continued at a temperature not exceeding 140° F. until the extract is of a suitable consistence for forming pills. It will be noted that in these directions there is no mention of the kind of apparatus to be employed for the evaporation of the liquid. It may be presumed therefore that a wide shallow vessel such as is ordinarily used for purposes of this description was intended by the compilers of the process. In the absence, too, of any particulars respecting the manner in which evaporation is to be conducted we may safely infer that up to a given point no other precaution is necessary than that the substance to be heated be subjected to a temperature near to, not necessarily below, but not exceeding 212° F. Now I am well aware that in conducting so ordinary an operation in so simple a manner and with such apparatus as is to be found in every well appointed pharmacy, the fullest opportunity and advantage is secured to the pharmacist for making his own extract. I am also willing to admit that not a few of the objections urged against evaporation by exposure to air assisted by heat, have not as yet been substantiated by proofs of a convincing character. Without, however, recounting these objections I will at once declare myself in favour of what is termed evaporation *in vacuo*, and for the following reasons:—

First. When the liquor of an extract is evaporated at a temperature little exceeding 212° F., with a current of air over its surface into which the vapour diffuses, after the liquor has attained a certain degree of concentration it will be noted that the resinous and gummy bodies have undergone a change, probably from the absorption of oxygen from the air. And this change will be indicated by the opalescent appearance of the liquor, to be succeeded by a deposition of matter which in no subsequent part of the process will again pass into solution. This tendency to premature and distinct separation during concentration is largely decreased if not entirely prevented by evaporation *in vacuo*. Whether the change referred to impairs the medicinal quality of the extract I am quite unable to say.

Secondly. By resorting to a temperature at which evaporation would be conducted in a vacuum pan we are the better able to retain the volatile constituents of the plant, a fact the importance of which cannot fail to be appreciated when it is remembered that the activity of one official green extract is due to a volatile alkaloid. And here I would remark that those who have given any attention to the evaporation of the hemlock juice have recommended its exposure in thin layers to a continuous current of dry air. I confess I should like to see some such modification adopted by the compilers of the next Pharmacopœia, at least so far as hemlock extract is concerned.

Thirdly. The most potent argument to be advanced in favour of evaporation *in vacuo* is based upon the observation that one or more soluble constituents of certain plants present a marked difference in their taste according to the manner in which evaporation has been conducted. I would note especially the extract of taraxacum. This extract when made as the Pharmacopœia directs by evaporating the strained juice over a water-bath has a sickly sweetish taste, whereas, when evaporated *in vacuo* it is found to have retained, apparently unimpaired, its bitter properties. This argument in its application to dandelion extract is overruled by those manufacturers who contend that the evaporation of the juice in open pans at low temperatures produces no such conversion of bitter principle into sweet, *provided* the root be gathered not earlier than February. But since the prevailing opinion amongst pharmacists is in favour of collecting the root before it is attacked by frost and hence, of necessity, usually before February, it follows that with the majority this objection can have no weight in invalidating the argument. I may say that evaporation in a vacuum pan is carried on at a temperature of about 115° F., and if the piston of the air pump has been well packed it may fall between 90° to 100° F.

The rate at which fluids evaporate in the vacuum pan varies greatly with the nature of the liquid operated upon. The juices of plants are amongst the slowest and the most capricious owing to the propensity they manifest for frothing, a condition which most prevails at the commencement of the evaporation and greatly retards its progress. It is therefore somewhat difficult to fix definitely the rate of evaporation, but we may regard four gallons per hour, in the case of belladonna juice with a vacuum pan, comfortably working twelve gallons at a time, as a close approximation to fact.

In recommending the addition of the chlorophyll to the liquor when it has reached that degree of concentration represented by a *thin syrup*, it may be presumed the object aimed at was the perfect incorporation of the green colouring matter with the other constituents of the extract and that too, in as little altered a condition as circumstances could command. I think this object is the better attained by evaporating the liquor to a *thick syrup*, a consistence it would have on leaving the vacuum pan, and then stirring in the chlorophyll, it having been previously passed through a moderately fine hair sieve. This modification obviates the necessity of heating the extract over a water-bath at a temperature at which evaporation proceeds at a very slow rate, and at a time when the extract is gradually aquiring a consistence in which it will more readily retain its heat, and will in consequence be more likely to be acted upon injuriously. In addition to improving the appearance of the extract the retention of the green colouring matter possesses the advantage of preventing the extract from absorbing moisture and becoming inconveniently soft. Regarding the term pilular consistence as defining the degree of concentration of the final product, it appears to me sufficiently explicit, and I take it to mean that the extract so far as possible may unite the properties of plasticity and firmness to such a degree as that it can be moulded without adhering to the fingers, and when divided will retain its globular shape. The yield of extract from the belladonna plant varies within wide limits, and is greatly influenced by seasons, but we may regard 80 to 90 pounds per ton as an average result.

Mr. **Plowman** said he had had very little experience in making green extracts, and, therefore, was not in a position to criticise the paper, but he would like to ask a question or two. He had been struck with the very practical nature of the paper, and one thing which seemed more particularly to affect the final character of the product was rubbing the chlorophyll through a moderately fine hair sieve. If that was not done the chlorophyll got into little pellets and it was almost impossible to get a smooth final product. It was stated that gummy matter materially retarded the extract turning mouldy, and he should like to know whether gum was actually added in practice. The next point was that the albumen had a tendency to come out with the chlorophyll at 130°, or before. He should be glad to know if Mr. Naylor had actually instituted any experiments to prove the existence or non-existence of albumen in the chlorophyll which first separated at that temperature. It seemed somewhat doubtful whether the presence or absence of albumen modified the action of the extract. He should like to know if when the albumen separated any experiments had been made to determine whether any alkaloid or active principle adhered to the albumen, either when it was washed or when it was not washed. Probably there would be something adhering to it if not washed, but after washing he should venture to predict that the albumen would not contain anything active.

Mr. **Hughes** was much pleased at the suggestion made in this able paper that extracts should be made of such a consistency that they could be easily dispensed in pills. A great difficulty he had was that the extracts he got from wholesale houses were so thin that it was necessary to add gum arabic or magnesia, which gave a pill greater in size than that intended by the prescriber. He hoped that wholesale houses would bear that in mind and not send out extracts which would increase the size of the pill.

Mr. **Plowman** thought 1 ounce of moist albumen to 1 pound of finished extract was a very material addition, being over 6 per cent., and would leave a large extra margin of profit.

Mr. **Greenish** was very glad to hear Mr. Naylor pay a well deserved compliment in the early part of his paper to a man they all respected, Mr. Squire. It really was Mr. Squire who taught the pharmacists of Great Britain the value of an extract, and how to make it properly. Mr. Naylor spoke of the gummy property as tending to keep the extract when the soft portions of the plant beyond the leaf were used. He would ask if it were not due to the fact that when using the leaf he had a much larger quantity of vegetable albumen, a product which ran more readily into decomposition, than he would have if he used the soft portions of the plant containing in fact the vascular bundles. He thought it was a mistake to use a hydraulic press; it might be necessary in commerce, but in so doing one was apt to press out not only the juice of the plant, but the smaller particles, which worked up into the extract. The juice by itself made a nice transparent extract, very hygroscopic, perhaps a little more difficult to manage, and the yield much smaller, but it seemed to him much more satisfactory.

Professor **Attfield** said Mr. Naylor assigned to the inorganic chlorides an important function in the keeping of the extracts, and referred to chloride of sodium as well as chloride of potassium. He had examined very many organic residues of the combustion of extracts, and had almost always found chloride of potassium present to the exclusion of chloride of sodium. He should like to know how often chloride of sodium had been found, and in what quantity.

Mr. **Naylor**, in reply to Mr. Plowman, said there was some little difficulty in ascertaining whether gum had really been added to an extract, or whether the gummy matter, which was sometimes present in much larger quantities than in others, was a natural product. That albumen separated along with the chlorophyll could be shown by dissolving out the chlorophyll, and then using a suitable solvent for the albumen. Sometimes very little albumen went down with the chlorophyll, and at other times a fair quantity. It was not unreasonable to suppose that some albumen did separate at the temperature named, considering its extremely complex character. With reference to alkaloids being thrown down along with the albumen, his experiments on that point were not complete, and therefore he had not mentioned them; but as far as conium was concerned, he was unable to detect the presence of any alkaloid in the albumen when washed. He agreed with Mr. Greenish that the leaf contained more albumen and chlorophyll than any other part of the plant, but the fact that when gum was added to the leaf product it would keep it, and that gummy matter was contained in the stalks, gave reasonable ground to suppose that it exercised an antiseptic or, at any rate, conservative influence over the extracts. With reference to hydraulic pressure sometimes squeezing out the cellular tissue, that of course would be removed when the extract was strained. Chlorine was generally present as chloride of potassium, and he had found only traces of chloride of sodium.

Mr. **Greenish** said he recollected in the earlier days of the Pharmaceutical Society a suggestion being made at one of the evening meetings that a small addition of gum arabic to an extract had a remarkably preservative property.

The **President** said he did not remember that, and was not aware that it had ever been suggested as an addition to green extracts.

A vote of thanks was then passed to Mr. Naylor for his paper.

The following two papers were then read:—

Note on the Presence of Arsenic in the Tincture and Solution of Perchloride of Iron.

BY F. W. FLETCHER, F.C.S.

The presence of arsenic as an impurity in many well known pharmaceutical preparations has formed the subject of numerous papers by various investigators. The evidence in the celebrated Smethurst trial seems to have first aroused attention to its presence in subnitrate of bismuth.[*] Since then it has been noted by Reynolds in sulphide of antimony,[†] by Rademaker in phosphoric acid,[‡] by Bussy in sulphate of potash,[§] and by Giles and Randall[||] in Parrish's syrup. To this list I have the melancholy satisfaction of contributing an addition. Some time since, having occasion to examine a number of samples of hydrochloric acid, many of which had been sold as pure, and finding abundant indication of the presence of arsenic in all, it occurred to me that possibly a considerable portion of the liquor ferri perchlor. of pharmacy might be prepared with similar acid, and if so would doubtless contain arsenic. I therefore procured specimens both of the tincture and solution from five very eminent dispensing establishments, each of which when examined by Marsh's test yielded dense mirrors of arsenicum. Samples obtained from various other sources yielded like results. As it appeared that it would be a matter of interest to determine the actual amount of arsenic present, the five samples of strong solution above referred to were examined quantitatively. To estimate the arsenic, a measured volume was diluted, reduced with sodium sulphite, saturated with H_2S, the filtered and washed precipitate dissolved in HNO_3, and to the solution thus obtained an excess of ammonia and magnesia mixture added.

		$MgNH_4AsO_4,H_2O$.		As_2O_3 Grains per 100 fluid ounces.
1.	18 c.c. yielded	·009 grm.	=	10·85
2.	18 „ „	·010 „	=	12·07
3.	14 „ „	not weighable		—
4.	25 „ „	·015 „	=	13·05
5.	14 „ „	not weighable		—

Of several other specimens examined, one yielded no less than 33·8 grains As_2O_3 in 100 fluid ounces.

I venture no remark upon the therapeutical effect of such infinitesimal amounts of arsenic as would be contained in a single dose of the above liquors when administered in the form of the tincture or diluted solution, but, granting the result to be *nil*, the presence of an impurity of such ill fame can scarcely be considered desirable from a pharmaceutical point of view. Probably very few pharmacists are in the habit of making their own liq. ferri perchlor.; they cannot, therefore, be held directly responsible for a preparation for which they are dependent on outside sources. But, in concluding this brief note, I would offer one observation upon a question which seems to me worth consideration. Is there not a danger, in the midst of the present excessive production and competitive prices, of neglecting to keep up the standard of what may be called cheap medicines? It is well to remember that the pecuniary and the therapeutical value of a medicine very frequently stand in an inverse ratio. Whilst, therefore, the pharmacist does well to assure himself that his scammony, opium and quinine are worth the money he pays for them, will he not be wise to spend an occasional half hour in inquiring into the character of more humble, but certainly not less deserving remedies?

The Gravimetric Estimation of Minute Quantities of Arsenicum by an Indirect Method.

BY F. W. FLETCHER, F.C.S.

The method most generally employed for the determination of arsenicum is that of Levol, who was the first to propose its separation in the form of the double arseniate of ammonia and magnesia. This process, whilst undeniably the best of any of the direct gravimetric methods in use, cannot be said to be entirely satisfactory.

It is, in the first place, by no means an easy matter to isolate the arsenical salt, when present in complex solutions, associated with other bases and acids precipitable by magnesia mixture. It is, moreover, extremely difficult, if not impossible, to effectually wash the precipitate of ammonio-arseniate of magnesia; since, as Bunsen[*] and others have pointed out, it will retain sensible traces of salts present in the precipitating liquids as obstinately as sulphate of barium. There is also a danger of inaccurate results by reason of the variable nature of the precipitate when dried at slightly different temperatures. At 100° C. it is said to retain from 1 to 3 molecules of water, one only at 102°—103° C., part of this equivalent being lost if the temperature is allowed to reach 105° C. Wittstein[†] proposed to overcome this objection by igniting the precipitate (preferably in a current of oxygen) and so converting it into arseniate of magnesia, but it has been observed by Rose[‡] that the arsenic acid is liable to be reduced at high temperatures by the ammonia, a corresponding loss being necessarily incurred.

The chief drawback, however, in my own experience of the process is, that it fails to estimate the arsenicum when present in very minute quantity, and as every pharmacist is aware, cases occur in which the accurate determination of even traces of arsenic becomes a matter of considerable importance.

An ingenious method for the estimation of arsenicum when contained in a solution in the state of arsenious acid was proposed by Rose,[§] based on the fact that when chloride of gold is added to a solution of arsenious acid, a precipitate of metallic gold is formed in accordance with the equation:—

$$\underbrace{3\,As_2O_3}_{594} + 4\,AuCl_3 + 15\,H_2O = 6\,H_3AsO_4 + \underbrace{Au_4}_{786\cdot8} + 12\,HCl$$

And from the weight of the gold thus liberated a very accurate estimation of the amount of arsenic can be deduced. It is, however, necessary to let the mixture digest for some days to ensure complete decomposition, and like the magnesia process, it is not applicable to the determination of very small amounts of arsenicum; inasmuch as the molecular weight of the precipitate is not very greatly in excess of that of the arsenious acid.

In a paper on the presence of arsenic in subnitrate of bismuth, published some years since in the *Pharmaceutical Journal*,[||] Dr. Herapath described a method which he had successfully employed for the estimation of traces of arsenicum based on the well-known test of

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[*] *Pharm. Journ.*, [2], i., 356.
[†] *Ibid.*, [2], iii., 568.
[‡] *Ibid.*, [3], i., 426.
[§] *Ibid.*, [3], ii., 864.
[||] *Ibid.*, [3], iii., 437.

[*] Liebig's 'Annalen,' 192, iii. Also 'Year Book of Pharmacy,' 1879, 51.
[†] *Chemical Gazette*, vii., 242.
[‡] *Chemical Gazette*, vii., 242.
[§] *Chemical Gazette*, vii., 242.
[||] *Pharm. Journ.*, [2], iv., 302.

Marsh. His plan consisted in employing an exit tube of very hard glass, narrowed in several parts by being drawn out with the blowpipe, and bent into a triangular form. This, after being accurately weighed was attached with an india rubber joint to the chloride of calcium tube connected with the hydrogen bottle. The gas having been generated, heat was applied by separate spirit lamp flames to three or four portions of the bent tube. Upon introducing into the apparatus the liquid to be tested, any arsenietted hydrogen evolved was of course decomposed in its passage through the tube, and the arsenicum deposited. The increase in weight of the tube at the end of the operation represented the total arsenicum present in the substance under examination.

When the amount of arsenicum is weighable, Herapath's method leaves little to be desired, whilst it has the merit of yielding the substance sought for in a state of purity. When, however, the weight of the deposit falls below a milligramme, trustworthy or concordant results can scarcely be expected.

Besides the various gravimetric processes referred to, there are, as is well known, several volumetric methods of estimating arsenicum. Of these, the older processes, based on the indirect oxidizing agency of iodine when that element is present in a solution containing arsenious acid, are only reliable when the amount of the latter is considerable. An important modification, rendering the volumetric method much more delicate, was proposed by Mr. W. A. H. Naylor, in an able paper on that subject, read at an Evening Meeting of the Pharmaceutical Society in December last, and to those who prefer a volumetric method of analysis, Mr. Naylor's process may be used with advantage.

Whilst engaged in the examination of some solutions of perchloride of iron, referred to in a previous paper, and having only limited quantities of material to deal with, in some of which the amount of arsenicum was too small to estimate gravimetrically by existing methods, it occurred to me that the beautiful reaction first observed by Soubeiran as taking place when a stream of arsenietted hydrogen is passed through a solution of nitrate of silver, might possibly be made the basis of an accurate and rapid method for the indirect determination of minute quantities of arsenic. It will be remembered that the decomposition involved in the reaction is expressed by the following equation:—

$$\underbrace{6\,AgNO_3}_{1020} + 3\,H_2O + \underbrace{AsH_3}_{78} = 6\,HNO_3 + H_3AsO_3 + \underbrace{3\,Ag_2}_{648}$$

From which it will be seen that for every 75 parts of arsenicum obtained in the state of AsH_3, no less than 648 parts of metallic silver are thrown out of solution. In other words, when the amount of arsenicum to be estimated does not amount to more than ½ of a milligramme (or about three one-thousandths of a grain), the weight of the silver precipitate is so large as to be capable of accurate determination on any balance of average delicacy.

The method I have employed for the estimation is very simple. An ordinary flask of about 250 c.c. capacity, having an indiarubber stopper fitted with a thistle and a right angled delivery tube, and containing granules of pure zinc, serves for the hydrogen bottle. Attached to the exit by a short piece of flexible tubing is a 50 c.c. wide mouth bottle, containing about 30 c.c. $\frac{1}{10}$ N. solution of lead acetate. In connection with this is another bottle of the same description, containing 30 c.c. of $\frac{1}{10}$ N. solution of silver nitrate, and attached to this a third of precisely similar description; the delivery tube from the last terminating in the air. Pure hydrochloric acid having been poured into the flask, and the stream of hydrogen allowed to flow through the apparatus for some minutes—at the expiration of which the solutions in the three small bottles should still remain perfectly clear, and likewise the extremities of the dipping tubes be free from stains—the arsenical solution, previously freed from oxidizing agents and concentrated to a bulk not exceeding 25 c.c., is very gradually introduced into the flask through the funnel tube, the last portions being washed down by a jet of distilled water from a wash-bottle. The silver solution in the second bottle at once commences to darken, and in a few seconds to throw down a precipitate of finely divided metal. If the arsenical solution has been carefully added, so that the evolution of gas is steady, and provided the proportion of arsenicum does not greatly exceed 10 milligrams, no change will be observed in the silver solution contained in the third bottle. At the expiration of from five to ten minutes, the apparatus is dismounted, the silver precipitate filtered off, washed, dried, ignited with its filter in a porcelain crucible and weighed. Its weight, minus filter ash, multiplied by ·1157, is the weight of arsenicum, or by ·1527 the weight of arsenious acid in the solution under examination.

The following table indicates the results obtained by operating upon known quantities of arsenic:—

·292 gram pure As_2O_3 was dissolved in distilled water with the aid of a little hydrochloric acid, and the solution diluted to 500 c.c.

5 c.c. of the solution containing ·00292 As_2O_3 gave ·0154 Ag. × ·1527 = ·00235 As_2O_3.

5 c.c. of the solution containing ·00292 As_2O_3 gave ·0156 Ag. × ·1527 = ·00238 As_2O_3.

5 c.c. of the solution containing ·00292 As_2O_3 gave ·0154 Ag. × ·1527 = ·00235 As_2O_3.

5 c.c. of the solution containing ·00292 As_2O_3 gave ·0158 Ag. × ·1527 = ·00241 As_2O_3.

10 c.c. of the solution containing ·00584 As_2O_3 gave ·0344 Ag. × ·1527 = ·00525 As_2O_3.

10 c.c. of the solution containing ·00584 As_2O_3 gave ·0340 Ag. × ·1527 = ·00519 As_2O_3.

20 c.c. of the solution containing ·01168 As_2O_3 gave ·0740 Ag. × ·1527 = ·01075 As_2O_3.

The loss in each experiment not exceeding the fraction of a milligram.

As regards the presence of other substances in the solution under examination, which by forming gaseous compounds with hydrogen might decompose nitrate of silver, and so interfere with the estimation of the arsenic, there are to be considered five, viz., antimony, sulphur, tellurium, selenium, and phosphorus. A preliminary examination would of course decide as to the first, and indicate a special method of procedure, whilst any sulphur, selenium and tellurium, would be arrested by the acetate of lead solution in the first bottle. The occurrence of phosphorus in its lower forms of oxidation would in most cases be rare. If, however, its presence is suspected, the solution must be treated with a little nitric acid, to convert into phosphate, the excess of acid being afterwards expelled by suitable means.

Estimations of traces of arsenicum occurring in different forms and under varying conditions, by the method I have described, have yielded excellent results.

The following will suffice as examples:—

Experiment 1. ·5 grams arsenious acid, dissolved in a little dilute hydrochloric acid, was digested for some hours with portions of a sheep's stomach. The fluid portion was then removed, and distilled with strong hydrochloric acid in the manner recommended by Taylor,* and the distillate diluted to 500 c.c. Five c.c. of this solution representing 5 milligrams of arsenious acid, estimated by the process I have described, yielded ·029 gram Ag. or ·0044 gram As_2O_3.

Experiment 2. 2 grams of pure subnitrate of bismuth were rubbed into a paste with 50 c.c. of a standard solution of arseniate of ammonium, containing ·0372 gram of the salt. The mixture was then heated for some time with 10 c.c. strong sulphuric acid, until all the nitric acid was driven off. It was then diluted and filtered, and the basic sulphate of bismuth on the filter repeatedly washed with distilled water, the mixed filtrate and washings being diluted to 100 c.c. 10 c.c. of this solution yielded ·012 gram Ag, equivalent to ·00356 Am_3AsO_4 found against ·00372 calculated.

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* *Pharmaceutical Journal*, [2], ii., 411.

Experiment 3. The mother-liquor, weighing 4 pounds, or 1818 grams, obtained from the crystallization of 100 pounds of bismuth metal was examined for arsenicum in the manner described. 75 grams were used in the estimation and yielded ·015 gram Ag, equivalent to ·0017 As, representing ·0412 gram As in the 100 pounds of bismuth. The last experiment affords a good illustration of the delicacy of the process, the amount of arsenicum to be estimated amounting to but little more than $\frac{1}{2}$ grain in 700,000 grains of the bismuth or less than one part in a million.

I need scarcely say that I lay no claim to originality as regards the chemistry of the method I have described. It is founded upon a reaction long well known, although, so far as I have been able to ascertain, its application to quantitative analysis has not been previously noted. Neither do I suggest that it should supersede the magnesia or any other process in present use. But in those cases where the proportion of arsenic to be estimated is exceedingly small, and it is yet necessary to assign to it a more precise limit than is conveyed by the additional "trace," I can strongly recommend the method as being both easy in its application, and accurate in its results.

My thanks are due to my assistant, Mr. H. P. Cooper, for the care and skill with which he has performed a large number of analyses bearing upon the subject of this paper.

Mr. Plowman said Mr. Fletcher had stated he had kept his apparatus going some five or ten minutes before dismantling it to weigh the silver, and he was somewhat surprised to hear that length of time mentioned, because some years ago he was making some experiments, the success of which depended on the complete conversion of arsenicum into arseniuretted hydrogen, and he then found that five hours was not sufficient, nor yet five days, nor as far as he remembered when the process went on continuously for a whole week. Operating with pure zinc he allowed the process to go on for a week, and still found traces of arsenicum being given off as arseniuretted hydrogen. As Mr. Fletcher's results came out very fairly, the question arose as to whether the equation put on the board exactly represented the decomposition which took place when arseniuretted hydrogen passed through a solution of nitrate of silver, or whether there was not some other change which caused a larger deposition of silver, and so account for the results. His own experience was that the arsenicum would not come off entirely.

Professor Attfield said that it occurred to him that Mr. Fletcher was somewhat on the horns of a dilemma. If the process were conducted too rapidly it was possible he might not collect all his arsenicum, whilst if he conducted it too slowly he might get metallic silver precipitated in his solution, not derived from the action of the arseniuretted hydrogen, but from the action of the hydrogen itself on the nitrate of silver. He appeared to have conducted his experiments fairly rapidly, and he noticed that he did not get out the theoretical quantity of arsenicum by a good deal. He was only working with minute proportions, and it was astonishing that he should get out so much, but still it appeared that he did not get within 10 or 20 per cent. of what he put in. Mr. Fletcher had mentioned a number of substances in which arsenicum had been found by different chemists to which he might add common salt, in which it was found many years ago by Campbell.

Mr. Schacht desired to say one word in favour of the process for the delicate detection of minute quantities of arsenicum to which Mr. Fletcher had alluded, but passed over rather slightly as though he was scarcely disposed to recommend it. He referred to the one devised by Dr. Herapath. He happened to see Dr. Herapath's process of work, and at the time repeated some of his experiments, and remembering that it was a very easy process, and one which required very little beyond the first experiment, and then a very delicate and careful weighing. He thought it deserved rather more respect than it had received at Mr. Fletcher's hands. It certainly acted very nicely down to the limit of a milligram.

Mr. Reynolds said there was a recent case of detection of arsenic in minute quantities which, he believed, had not yet been published. Professor Thorpe, of the Yorkshire College, had lately investigated the condition of the urine in a fatal case of poisoning by absorption of arsenical green from the walls of a house, but he had to be satisfied with reporting abundant traces. This was a case in which it would have been very satisfactory if a more delicate quantitative test for arsenic had existed.

Mr. Allen said although it was true there was a sensible loss, they could all see that when dealing with such minute quantities, literally only of $\frac{4}{100}$ths of a grain, that these were extraordinarily accurate results. It was no use to say, as Mr. Schacht had done, that Dr. Herapath's method was a very satisfactory one; no doubt it was so far as it went, but the objection was that in his method it was the metallic arsenic which had to be weighed, and there was not the advantage of a greatly increased weight. Now Mr. Fletcher weighed nine times the weight of silver which he had of arsenic, and therefore for every ·01 of a grain of metallic arsenic he had ·09 of metallic silver to weigh. Professor Attfield suggested that it was not certain metallic silver was not thrown down in some cases by the hydrogen, but Dr. Russell showed that only perfectly neutral nitrate of silver was apt to be precipitated by a current of pure hydrogen, and that the slightest trace of acid prevented such action; therefore, Mr. Fletcher had only to take the precaution of having it faintly acid and there would be no fear of any precipitation of metallic silver. It was a most convenient method provided all the arsenic was got off in gas in the time mentioned. It did not prevent one estimating it by any of the ordinary processes in the filtrate from the precipitated silver, though, of course, that involved the assumption, the truth of which Mr. Plowman seemed to doubt, that all the arsenic passed off in the form of gas. From his own experience, dealing with much larger quantities, he should be inclined to agree with Mr. Plowman that it did not all go off in the form of gas. On the other hand, he was quite inclined to suppose, as Mr. Fletcher's experiment showed to be the case, that, when dealing with minute quantities, practically the whole, or within a few per cent. of the whole, would be found in the form of gas. He would suggest to Mr. Fletcher that he might modify the form of the apparatus so as to insure a more complete absorption of the arsenetted hydrogen. It was not impossible that the low results might be due quite as much to incomplete absorption as to incomplete conversion into arsenietted hydrogen. Mr. Fletcher had pointed out one or two objections to the ordinary magnesia process, that it was not applicable to small traces, and that the precipitates were of variable composition, but it did not matter if they varied if the process was only used to estimate traces. What did it matter whether it contained one-half a molecule of water or more if one were only estimating traces? Hence Mr. Fletcher's objections were not really to the point, but nevertheless he had shown a method by which they could weigh nine times the amount of the thing they wanted to estimate; that was a matter of prime importance. Mr. Fletcher made mention of oxidizing such things as the lower acids of phosphorus by means of nitric acid, but he should contend that nitric acid was a very bad oxidizing agent in a dilute solution; it would be far safer to use permanganate.

Professor Attfield said the proportion obtained as against the proportion of arsenic used was important.

One could see at once that if 29 milligrams were used and 23 were recovered this was very close to the original weight, being in fact only 6 milligrams out, but the question was this, if 29 grams were put in, would 23 grams be got back, or 29 grams minus 6 milligrams only.

Mr. **Fletcher** said with regard to the time allowed for the gas to pass through the solution before adding the arsenical solution, he thought if no darkening in colour took place in from five to ten minutes one might be quite satisfied that it was free from any appreciable quantity of arsenic. Even if traces were present it would not interfere with the gravimetrical estimation of the arsenic. One might get a solution which would give what were apparently very dense mirrors with Marsh's test, but which when tested with nitrate of silver would scarcely give the faintest possible coloration. As to the equation, which it was remarked might not represent the reaction, he simply gave it because it expressed the salient point of the decomposition. As to Professor Attfield's remarks as to the discrepancies in the results obtained from the quantity of arsenic used it should be recollected that he did not recommend this process for large quantities of arsenic; in fact for a solution containing centigrams of arsenic the magnesia method might be used. He was not putting this forward in place of the magnesia process when dealing with a weighable precipitate. But one thing was quite certain, with a solution containing only 2·9 milligrams of arsenious acid one would never get a weighable precipitate with magnesia. If the result came to be multiplied into percentages it looked very large, but when it was recollected that there were barely 3 milligrams operated upon the results were not so bad. He was very sorry that Mr. Schacht should have misinterpreted his reference to Dr. Herapath's process. He did not in the least degree intend to disparage that process, in fact it was Herapath's paper which first suggested the method he now brought forward. As Mr. Allen had said, by Herapath's process one could only weigh the arsenic, and the molecular weight being low when there was less than a milligram it became almost impossible to get true results. He quite agreed with Mr. Allen's suggestion that probably a more complete form of apparatus would be better than the three bottles. If a larger quantity of arsenic were present, and the gas was desired to be generated more rapidly there could be four or five bottles. It was a very simple matter to filter off the precipitate out of each bottle.

A vote of thanks was passed to Mr. Fletcher.

The next paper read was on—

EMULSIONS.

BY A. W. GERRARD, F.C.S.,

Demonstrator of Pharmacy and Materia Medica to University College.

This communication is the result of some experiments made with the view of determining what would prove the most valuable agents for general use to render oils, balsams, resins, and oleo-resins, in the form of emulsions. Also to arrange formulæ practical and reliable, for the most commonly prescribed substances required to be dispensed in the emulsion form.

The subject, I know, is one upon which much has been already said and written, and yet withal there exists amongst pharmacists a wide difference of opinion and practice as to the material or process which shall best emulsify any given oil. The truth of this observation may be demonstrated by giving the same prescription, say for ½ an ounce of castor oil to be rendered into 2 ounces of emulsion according to art, to six different chemists to prepare; the products will vary most astonishingly, no two being alike either in colour or fluidity and some not even emulsified at all. This want of uniformity in our art applies not only to emulsions but various other preparations; and although some slight variations may be expected in preparations obtained from products themselves subject to natural variation, the difference is generally far too great to be explained on these grounds, and is often sufficient to create suspicion or distrust in the mind of a patient, to whom no amount of explanation is satisfactory. This is matter for regret and enables me to make the observation that I believe the blame for much of this can be traced to a deficiency in pharmaceutical education, for it is a fact that actual practical pharmacy, I mean the the real manufacture of preparations and practical use of apparatus, forms no part of the curriculum of our school. The remedy suggests itself.

The emulsifying agents most commonly employed and regarded with most favour are the mucilages of tragacanth and acacia, likewise their powders. My experiments have been confined to these substances, previous results having proven that where honey, yolk of egg, and almond powder are recommended for special purposes, acacia or tragacanth answers equally well or better.

To decide the respective merits of tragacanth and acacia some forty experiments were conducted with each gum, both in powder and in mucilage, mixed with various oils and resins in various proportions, and by varied manipulation, the results obtained being altogether in favour of powdered gum acacia, the emulsions it forms being perfect milk-like fluids, in which the eye cannot distinguish any particle of oil; they pour easily from the bottle and mix with water in any proportion without separation. Most of the forms given below have been kept for two months and show no deterioration.

For general instructions when using powdered gum acacia, it is essential that it be of the best quality and almost white. The substance to be emulsified, if it be a fluid, must be measured in a dry measure and poured into a dry mortar; the necessary amount of powdered gum can now be well incorporated, next the portion of water indicated in each case, but by no means let it be measured in the oily measure. Now stir well, taking care that every particle of oil is brought within range of the disruptive mechanical motion; want of attention to this part of the operation is a frequent source of failure, for if any oil gets up the side of the pestle or mortar and is omitted from the emulsifying process it will most certainly show itself by floating upon the surface of the finished product, spoiling what might otherwise have been a perfect preparation.

When the substance to be emulsified is a solid or semisolid body with resinous properties, it is advisable to dissolve it in twice its quantity of rectified spirit, then treat in the same manner as for fluids. Syrups, tinctures and flavouring agents when ordered should, as a rule, be added last.

Emulsion of Cod Liver Oil.

Cod liver oil	4 ounces.
Essential oil of almonds . . .	4 minims.
Powdered gum acacia	1 ounce.
Syrup	1 „
Water	to 8 ounces.

Mix the gum with the oil, then place on the mixture 2 ounces of water, and stir till the emulsion is formed, then add the remainder, water, essence and syrup.

Emulsion of Castor Oil.

Castor oil	4 drachms.
Powdered gum acacia . . .	80 grains.
Essential oil of almonds . .	1 minim.
Simple syrup	2 drachms.
Water	to 2 ounces.

Mix the powder with the oil, then add 2 drachms of water, and stir till the emulsion is formed, add the remainder, water, syrup and essence.

Emulsion of Turpentine Oil.

Oil of turpentine	4 drachms.
Powdered gum acacia . . .	2 „
Syrup	2 „
Water	to 2 ounces.

Mix the powder with the oil, add ½ ounce of water, and stir till the emulsion is formed, then add the remainder of the water and syrup.

Oil of turpentine is considered one of the most troublesome bodies to emulsify; prepared by this form there is no difficulty.

Emulsion of Balsam Copaiba.

Balsam of copaiba	3 drachms.
Powdered gum acacia . . .	3 „
Simple syrup	6 „
Water	to 6 ounces.

Mix the powder with the balsam and add 6 drachms of water, then stir till the emulsion is formed, gradually add the remainder of the water and syrup.

Emulsion of Resin of Copaiba.

Resin of copaiba	2 drachms.
Rectified spirit	4 „
Powdered gum acacia , . .	4 „
Water	to 6 ounces.

Dissolve the resin in the spirit, add the powdered gum and mix well, add now an ounce of water, stirring till the emulsion is formed, make up to 6 ounces with water.

Emulsion of Balsam of Peru.

Balsam of Peru	3 drachms.
Powdered gum acacia . . .	2 „
Simple syrup	6 „
Water	to 6 ounces.

Rub the powder well with the balsam, add 3 drachms of water and stir till the emulsion is perfect, then add the remaining water and syrup.

In emulsions containing resins or bodies heavier than water, there is generally a sediment forms; it is so with the two previous forms, but there is no aggregation into a hardened mass, and a slight shake of the bottle puts all right again.

Emulsion of Chian Turpentine.

Chian turpentine	2 drachms.
Ether	4 „
Powdered gum acacia . . .	2 „
Water	to 6 ounces.

Dissolve the turpentine in the ether, and filter, washing the filter with a drachm of ether, mix well with the gum, and add ½ ounce of water, stirring till the emulsion is perfect, lastly add the remaining water.

Attention has already been called to the superiority of acacia over tragacanth to emulsify Chian turpentine, and the statement cannot be disproved.

Many of these forms have been well tested and practically made by large classes of students, and the results have been most satisfactory.

Before leaving the subject I will say that no rule of thumb practice should be attempted in making an emulsion; success may occasionally occur, but annoyance and waste of time and material is the invariable result.

In conclusion, powdered gum acacia in my hands has achieved the greatest success, and so far as I am concerned merits the distinction of being called the perfection of emulsifying agents.

The PRESIDENT said this paper was perhaps one of the most interesting practically to the pharmacists which had come before the meeting.

Mr. GREENISH thought the Conference was very much indebted to any pharmacist who had thrown some light on the formation of emulsions. As a practical pharmacist he knew of difficulties in connection with the matter. With regard to the use of pulv. acaciæ it was not new, and they were indebted to their brothers across the Atlantic for a hint in that respect. Two or three pharmacists had written on the subject and he thought there was not much more to be said upon it, but it always did good to bring an important matter forward again. Sometimes tragacanth was used, and his experience quite agreed with Mr. Gerrard that it was not really suitable for the purpose. He should like pharmacists to occasionally put their emulsions under the microscope, when they would soon see the difference between a good one and a bad one; the small globules of oil would in the one case be much larger than in the other. Mr. Gerrard laid stress on using good acacia, and it was only the best which should be used. It was one of those substances which would repay any pharmacist for paying attention to. Some was introduced into the market, which was not soluble, and that in its emulsive qualities would very much resemble tragacanth. Gum acacia was an exudation and the best to use for this purpose was one perfectly soluble.

Mr. PLOWMAN said it was quite true that the suggestion to use gum acacia was not new, but he must do Mr. Gerrard the justice to say that instead of a mortar being used Mr. Winchell Forbes advised the use of a phial, and gave an instance of a turpentine emulsion in which the turpentine was to be put into the phial first and shaken up, the pulv. acaciæ was next added, the two were shaken together, a definite quantity of water being added first, and then the remainder gradually. Mr. Gerrard's process seemed to consist in using a mortar, and he had given definite formulæ.

Mr. SAVAGE said the subject was an old one, but members were much indebted to Mr. Gerrard for the definite preparations he had given and the simplicity of the method. With regard to the use of gum acacia it was recommended in Gray's 'Supplement to the Pharmacopœia' for 1831, in mixing oil of almonds.

A MEMBER said he had found a little difficulty in making emulsions with gum acacia, having had occasion to use a cod liver oil emulsion in his own family. On pouring it out, if the bottle were left in a dry room a layer of gum was left on the top, and every successive pouring left an additional layer, which was rather an objection. In other respects he found it form an excellent emulsion.

Mr. RICHARDSON (Aberdare) asked if it would not be better to add the oil to the gum.

Mr. COTTRELL suggested that if sugar were added at first it would assist the process very much indeed, and the proportionate quantity of water could be added afterwards, although no doubt it was a heresy if no syrup were ordered to put syrup in. It was a small quantity Mr. Gerrard had, but he would give a form for a larger quantity of emulsion which would last for years, would not separate and would be as good in five years' time as at present. It was one he was frequently making, though it was not used by those suffering from disease, but was more often taken by those persons who were in good health. He had a large mortar with the pestle through a ring, into which he put twenty-four eggs; it was not necessary to use gum for an emulsion, and he used a fine almond powder, which he obtained from a house in London, which would emulsify anything. It was very much Mr. Gerrard's system. The twenty-four eggs were put in the mortar and then he got 6 ounces of good Durham mustard, 2 pounds of crystallized brown sugar, these were worked together well until the cracking noise which had been referred to was heard, and hard work it was. Then he added 64 ounces of the very finest sublimed oil, and then when that was well mixed it was a beautiful smooth yellow emulsion, to which he added 4 pints of vinegar and 3 ounces of Taragona vinegar. It was exactly the same form as Mr. Gerrard had given.

Mr. WILLIAM EVANS desired to thank Mr. Gerrard for the paper. Country chemists sometimes found great difficulty in dispensing some prescriptions. Their customers sometimes went to town and got their prescriptions prepared there occasionally in a very different manner, and when they came back to the country if the prescriptions were not dispensed in exactly the same way they were not satisfied. He should be very glad if some gentleman present would make out some notes as a guide to apprentices and to serve as a standard as to how things should be prepared; there ought to be more uniformity in practice amongst chemists.

Mr. **WARD** (Sheffield) had prepared many emulsions, but must express his thanks to Mr. Gerrard for the simple way in which he had introduced his method. He should like to ask if he had allowed his emulsions to stand for a year, because some he had prepared stood very well for three or four months, but owing to a change of temperature, or some other circumstance, they did not keep well beyond that time.

Mr. **GERRARD** said his principal object was to show the simple and easy manner in which an emulsion could be made by the use of powdered gum acacia, and also to give formulæ which would introduce more uniformity of practice amongst chemists in the making of these preparations. He was quite aware that gum acacia had been recommended previously, but no good reliable formulæ had been given for the making of emulsions. It was necessary for him to arrange formulæ for his demonstrations and as they had turned out satisfactorily he thought it would be well to bring them before the Conference. Mixing the ingredients in a phial did not give so good results as with a pestle and mortar. It was always difficult to get away the last traces of oil from the side of the bottle. With regard to the emulsion becoming gummy on the surface and thickening, it really become clotted and difficult to pour, and consisted mainly of a mixture of oil and gum, and that was especially so with cod liver oil. With reference to castor oil emulsion when it was prepared with gum acacia, unless some essential oil were added it underwent some change, and became sour, but the addition of some essential oil to the emulsions would prevent that. His experience as to keeping did not extend beyond three months at the outside. One gentleman spoke of the advisability of adding syrups to the water before making the emulsion, but that rather retarded than aided the process. The flavouring agent, and the sugar should as a rule be added last.

A vote of thanks was passed to Mr. Gerrard.

(*To be continued.*)

Parliamentary and Law Proceedings.

THE USE OF CONCENTRATED TINCTURE OF CAMPHOR.

An inquest was held by the Bridgwater Borough Coroner (Mr. P. O. H. Reed), on Monday evening, September 20, at the Town Hall, on the body of Mr. James Coll, a commercial traveller, who died suddenly on the previous morning at the Royal Clarence Hotel.

The following amongst other evidence was adduced :—

Mr. George Rochester, commercial traveller, said, I was at the Clarence Hotel last Saturday evening, arriving there a little after eight. I found the deceased in the commercial room, lying on the sofa, apparently resting himself. He was a perfect stranger to me up to that time. I gathered from a remark he made that he had been taking some sherry and water. He seemed to be tired and exhausted, and he was indistinct and mumbled in his conversation. He asked when the North mail went for Ireland, and afterwards wrote a letter, and went, I believe, to the post office. About a quarter past nine he returned, and laid down on the sofa, stating that he was ill. I asked "What is the matter?" He replied that he had diarrhœa very badly. I advised, from my own experience, his taking some tincture of camphor. I rang for the boots for him, and at the request of the deceased the boots went to Mr. Good's, the chemist, and brought back a sixpenny bottle of it. I should know the bottle again if I saw it. I then opened the bottle, got a piece of sugar, and gave the deceased from three to five drops on it. After an interval of about twenty minntes I got another piece of sugar, and broke it in two, at his request, to make it smaller. I gave him another piece, with from ten to fifteen drops upon it, and I repeated the same dose about half an hour afterwards, at his request. He did not take any more of the tincture in my presence. About an hour elapsed between when he took the first lot and the last. Soon afterwards I was informed that a medical gentlemen had been sent for, and was with the deceased On his coming down I stopped him and informed him of having given the deceased some tincture of camphor. The doctor wished the bottle found. The deceased, on going to bed, took a piece of sugar and the bottle of camphor with him. I accompanied him to the bedroom, for the purpose of finding the bottle. This was about half-past eleven or quarter to twelve. The deceased was then in bed, partially undressed. The doctor asked the deceased for the bottle he had brought upstairs. Deceased replied "It's up above." I asked "Where do you mean?" and "Up above" was again the reply. We searched for the bottle, but could not find it for some time. Subsequently the bottle was found on the dressing room table of No. 21, another bedroom, and the bottle contained about the same quantity of mixture as when he carried it away. The deceased gradually got more violent, calling "Police," "Murder," "Thieves," and "Fire." He also exclaimed, "Let me go, and I will say nothing more about it." He tried several times to get out of bed, and had to be kept there by force. Afterwards I heard a crash of glass, and on returning to the room I found Mr. Parsons and others pulling him back from the window, and he was laid on the floor. A strait waistcoat was sent for, but one could not be procured. After that he became quieter, and I went down for some beef tea and other things that the doctor wished him to have. The deceased partook of some of this beef tea, and also some coffee, and, a small quantity of hot brandy and water that was recommended for him by the doctor. The deceased was then put to bed, and the doctor left about half-past four, recommending us to go to bed also, leaving two policemen in charge. The deceased at that time appeared rather exhausted, which I accounted for by the excitement and violent struggling he had previously undergone. About ten minutes afterwards I was called down. I found the deceased, supported by two policemen, apparently dying, and insensible. I ran down for the boots to send for the medical gentleman, and on my return to the bedroom I found that the deceased was dead. Before giving any drops I noticed a label on the bottle, and read it through, and observed that it contained directions as to the quantity to be taken on sugar, and also in cases of violent attack. The quantity I gave was within the quantity mentioned in the directions.

Mr. F. J. C. Parsons: I am a medical man practising in this town. On Saturday night, about half-past eleven, I was sent for to go to the Clarence Hotel. When I got there I saw the deceased in bed, half undressed. After a little conversation, I came to the opinion that in addition to a certain amount of alcoholism, he was suffering from something else. He was semi-rational. I asked what he had been taking. He showed me the bottle now produced, which was on his dressing table. I asked him if he had the prescription. He thought he had, and that it was in his coat pocket. I handed him his coat, and he gave me sundry papers, quite unconnected with the prescription. I felt his pulse, which was very quick and weak, and he was in a cold bath of perspiration. I left him for a short time to have an interview with Mr, Leaker and Mr. Rochester, to whom I was then introdnced. I learnt from the latter that the deceased had taken a certain quantity of tincture of camphor. I immediately suggested that we should find this bottle, which I understood had been procured from Mr. Good, chemist, by the under-boots. Eventually we found the bottle in an upper bedroom—No. 21. I produce the bottle, which was sealed in my presence. I attended to the deceased nearly all the night. He was exceedingly violent at times, constantly calling for the police, and by my wish the police were summoned, and two came into his bedroom.

Soon after four he made a determined effort to jump out of the window. I restrained him, and placed him on the floor; he was then in a state of great collapse. Some beef tea and brandy were administered. At five he seemed somewhat recovered, and I had him placed in bed. Soon afterwards he appeared much better, and I then left him in charge of two policemen. I was summoned again in half an hour, and found him dead, with a policeman on either side. The medicine given me by the deceased represents the prescription handed to Superintendent Lear by the druggist at Wells. It is perfectly harmless. The other bottle produced, found on the dressing table of No. 21 bedroom at the Clarence Hotel, is labelled, as to how the contents should be used, as follows:—"Four drops on a small piece of sugar every five minutes until the symptoms begin to yield. In very severe cases the dose should be increased from 5 to 20 drops every five minutes." I may say (added Mr. Parsons) that the public imagine this homœopathic solution of camphor to be a most harmless medicine, whereas it is a most poisonous and dangerous one. It is a medicine that should be used with very great care, and the public have no conception as to the danger they incur in using it. This is what Dr. Johnson (physician to King's College Hospital) says concerning it:—"It is time that the public should be warned of the danger which they incur by the use of this poisonous homœopathic concentrated solution of camphor, which is more than seven times the strength of ordinary spirit of camphor. It is notorious that the modern disciples of Hahnemann have gone from the ludicrous extreme of infinitesimal dilution to the dangerous extreme of the greatest possible concentration of active and poisonous drugs."

The Coroner: You have heard the evidence of Mr. Rochester as to the quantity given, no doubt with the very best intention and greatest kindness to the deceased. What do you say about that?—My opinion is, and I have no doubt of it, that the deceased died from the excessive use of alcohol, but I certainly do think also, and I am bound to say so, that the use of solution of camphor was, to say the least of it, very unfortunate. I do not mean to say that deceased died from camphor poison in any shape or form, but from what you, Mr. Coroner, and the jury would understand as *delirium tremens.*

The Coroner: Was the death accelerated, do you say, by the use of this camphor?—Well, I would not like to go so far as that; but you have already heard what I have had to say with regard to the danger attending its use, and I have felt it my duty to say so to you, and through you to the public.

Mr. Goldie: Would you prescribe it yourself, doctor? —No, and I may add that this solution of camphor is prepared by chemists each in their own particular way, and that each one puts his own doses upon the bottle. The public have not the least knowledge of the serious consequences that may result from it.

The Coroner: Is that medicine generally dispensed in shops for diarrhœa?—Yes; it is a most popular remedy for it, but not a less dangerous one.

The jury retired for deliberation for a short time, and returned with a verdict of "Death from the excessive use of alcohol and a severe attack of diarrhœa."—*Bridgwater Mercury.*

POISONING BY CARBOLIC ACID IN AN INFIRMARY.

On Saturday evening, September 25, a painful affair took place in Greenock Infirmary. One of the nurses gave a patient some medicine, supposed to be a black draught; but it was found that instead of this a quantity of carbolic acid had been administered to the unfortunate man, who expired in about an hour. Deceased was an American seaman. The nurse has been remitted to the sheriff on a charge of culpable homicide.—*Edinburgh Courant.*

Correspondence.

THE FUTURE OF PHARMACY.

Sir,—I was pleased to see the able letters from Mr. Chapman and Mr. Shields in the Journal relative to patent medicines, etc. Nothing would prove more suicidal than to follow the lead of the stores and grocers in that respect.

My opinion is, if the trade generally will only show a bold front on that point, and declare by such action they will not be intimidated, they will in the long run come out of the conflict better than they anticipate.

I doubt if the public generally have much faith in patent medicines supplied by cutting grocers, who know nothing of these preparations, and can give no opinion respecting them.

I believe when a chemist has obtained the confidence of the public, and has carried on his business in a straightforward manner, he can recommend preparations of his own in many cases, and he will find his advice listened to and appreciated.

In this town the chemists came to a resolution some years since not to lower the prices of any patent medicines, whatever grocers or others might do as regards them. This agreement has been faithfully kept by all, and, I believe, greatly to our advantage.

High Cross, Barnstaple. EDWARD PEATT.

THE BUOTT FUND.

The following additional list of donations to this Fund has been received:—

Proprietors of *Chemist and Druggist* ...	2	2	0
Alfred Bastin, Manchester	2	2	0
Wm. Matthews, 12, Wigmore Street, W.	1	1	0
Alfred Rose, 441, Edgware Road, W. ...	0	5	0
Thomas Holme, Pendleton	0	10	6
James Mackenzie, Edinburgh	0	10	0
Edward Hammerton, Colchester...........	0	10	0
E. B. Vizer, Brighton	0	10	0
B. W.	0	2	6
S. S. Beall, Cambridge	0	2	6
John Throssell, Cambridge	0	6	0
K., Cambridge	0	2	6
Alpha	0	10	0
J. Wellington, Fowey	0	5	0
R. H. A. Holborn, Highbury Crescent...	1	1	0

"*Pharmacist.*"—By the 3rd section of the Explosives Act the term "explosives" is made to include for the purposes of the Act a large number of articles, and amongst them "coloured fires."

"*Mentha.*"—Aq. menthæ is mint water, the product of *Mentha viridis.* See the answer to a similar question, "Dispensing Memoranda," No. 101, vol. viii., p. 850.

S. Griffith.—*Sedum spectabile.*

"*Fraxinus.*"—*Lastræa dilatata,* probably. The stem with the scales should be sent, not a mere fragment of a frond.

E. J. Cox.—*Colutea arborescens.*

Chemicus is thanked for his communication, to which, however, we do not think it necessary to give further publicity.

C. J. W.—We do not recognize any particular balance through your description, but you are recommended to consult a dealer in such apparatus.

G. F. T.—Royle's or Garrod's Handbooks of Materia Medica and Therapeutics.

"*Only a Junior*" is recommended to consult a manual of dentistry.

"*Tyro.*"—Apply to the Secretary for a copy of the pamphlet entitled 'Hints to Apprentices and Students.'

T. P. Morgan.—Up to the time of our latest advices no legislation regulating the practice of pharmacy in New Zealand was actually in existence, but an attempt was then being made to secure the passing of such an Act. See before, p. 52.

"*Socius.*"—We are unable to give you the information.

J. E. H.—Such a sale would be unlawful.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Cottrell, Guest, Flux, Latham, Whitfield, Pritchard, Kermath, Brady, Foster, Somerset

INTRODUCTORY ADDRESS

DELIVERED AT THE COMMENCEMENT OF THE THIRTY-NINTH SESSION OF THE SCHOOL OF PHARMACY,

Wednesday, October 6, 1880,

BY J. LANGDON DOWN, M.D. LOND., F.R.C.P.

When your Council did me the honour to request that I would address a few words to you at the commencement of the thirty-ninth session of your school, I felt that I could not decline that honour, as my affections had been entwined, from the very commencement of your Society, round its noble and successful efforts to advance pharmacy in Great Britain; and from the recollection that it was within the walls of this building that I received some thirty-four years since my first scientific impulses, and my earliest scientific training.

It may be permitted me, as one outside your special work and yet belonging with you to the great commonwealth of medicine, to take a review of your past and present position and to make forecasts as to your future. You may feel assured that where any of my remarks may appear to be antagonistic to your interests, that they will have been conceived in no unfriendly spirit, but with a tender sympathy begotten by early affection and with some knowledge of your difficulties, traditions, and aims.

This great Society, under whose auspices we are met to-night,—what is the reason for its being? Its origin is, I conceive, a most philosophical one: to take cognizance of a differentiating process which had been and ought to be going on in medicine, and to bring to the process all the best powers and aids which pharmacy could muster. The fathers of this Society had no selfish aims: they were men who were occupying the foremost ranks of their calling; they stood out for the most part as prominent lights on a background, which aided them by contrast, and, like all dark backgrounds, absorbed the light that was emitted rather than assisted in the illumination. They were men whose names are now household words in pharmacy,—the Allens, the Bells, the Hanburys, the Savorys, the Morsons, and the Squires,—whose interest, if they had been influenced by low motives, would have been to have profited by a prominence which the absence of a wide diffusion of pharmaceutical knowledge fostered. All credit, then, to those who had the prescience to anticipate and the zeal to aid in the process of specialization, of which this Association is the outcome.

In a rude condition of society the healing art was necessarily comprehensive; it combined the treatment of disease, both medical and surgical—disease, too, not confined to the human species, but including that of domestic and other animals. With this was combined the preparation and sale of medicines, the collection of plants and drugs, and the commercial transactions associated therewith. Realizing the physiological process of the amœba, which, without any definite parts adapted to special work, extemporizes out of its homogeneous structure organs for locomotion, for prehension, for digestion, and for all the other requirements of its simple life, propagating itself even by division of its structure, and never advancing beyond a simple mass of sarcode, so the medicine man of prehistoric or even early historic times went on in this amœboid state of existence, performing offices of diverse characters without any special adaptation, and carrying out a low and inefficient function in the economy in which he existed. But just as the mass of sarcode is probably by a process of evolution differentiated into special organs adapted to fulfil with exquisite nicety the purposes for which they are designed, giving rise to beings higher and higher in the scale of organization in proportion to their differentiation of structure and function until the highest vertebrate animal is reached, so by a process of evolution—a process which should ever be regarded with satisfaction—the medicine man of early historic times has become differentiated into the physician, surgeon, dentist, veterinary practitioner, and pharmacist, and, according to all philosophical analogy, each member of the commonwealth of medicine becomes higher, more evolved, more useful to himself and for the common good, in proportion to the perfection of the differentiating process. This is the touchstone in my opinion to which should be referred all questions arising between the different branches of the profession. Every indication of multiplicity of function in any member of the body is a mark of retrogression; every instance of minute adaptation of means to ends is a mark of evolution and an evidence of progress.

You will readily gather from this that the adoption of pharmacy by large commercial companies under the name of stores, whether co-operative or otherwise, is a phase of retrogression, and one which, in the nature of things, cannot continue if pharmacists are true to themselves and promote that higher culture and scientific knowledge which this Society has done so much year by year to diffuse. I know, from having been a constant reader of your Journal, and I may say that I have been so from the appearance of its first number, that the recent legal decisions and re-decisions have been a source of perplexity and annoyance, and that the future of pharmacy seems to many under a cloud. For myself I can see danger only from a growth of quackery in pharmacy itself. The true pharmacist, like the true physician, should be ever working to raise his art, to give to it a scientific basis, and to discourage pretence and shams.

The great peril for pharmacy is the growing tendency to the sale of proprietary and secret remedies. That this is an increasing evil I am thoroughly convinced. Constantly the physician is thus interviewed when at his morning receptions.

A gentleman of good address is ushered into his consulting room; he has been taking his turn with others at the physician's *levée*. With Saxon tones or American phrase he commences a story which is evidently learned by heart, and reminds him forcibly of the historical disquisitions of the guides at the Tower of London. He is anxious to make him acquainted with the latest developments of science; he knows the physician takes a keen interest therein, and he has therefore called to tell him of a very marvellous discovery—a discovery which is so pregnant with potentialities for the future that anxiety was felt to ascertain the opinion of the more thoughtful members of the medical profession on a matter which was only in its newest stage. Professor Driveller, of the University of Niagara, had discovered, while making optical investigations of the spray of the cataract as it passed through wire gauze of infinitesimal gauge, that a portion of the metal was taken up by the water in a condition perfectly new to science. It was, in fact, iron in such an allotropic condition as to have assumed all the properties of a hitherto unknown *quasi*-element. For some time the said professor had met with the serious difficulty that there was no known solvent, and that, moreover, it was perfectly unstable; after months of experiment the learned professor had hit upon a plan of reducing it to a perfect and stable solution. Then he pours out some physiological statements regarding the place which this agent is to fill in the human economy, and is anxious that his colleagues should try it on patients in the wards of his hospital. Presently the physician has the pleasure of seeing this same agent advertised in the columns of the morning newspaper, detailing how it has the patronage of the leaders of the medical profession, and cures dyspepsia, nervousness, hepatic, renal, and cardiac trouble—in fact, all the ills which flesh is heir to. This pestilent flood of American and English specifics is not only an insult to the medical profession, whose time the projectors impudently take up, but it is a blight to the profession of pharmacy, paralysing its energies and lowering it to a debased commercial existence.

If the time should ever come for the physician to prescribe Professor Driveller's Ferric Phosphate, Mother Hubbard's Lymph Generator, and Doctor Pillule's Peptonic Assimilator, then scientific therapeutics will be at an end, and pharmacy, such as it would be, could be as well transferred to the perfumery department of the linendraper's shop, to the Italian warehouseman, or the bookseller, as to exercise the attention of the cultivated men who have honoured me with their presence to-night. The proprietary or patent medicine, enveloped with its bill of laudatory puffs and its stated dose, can be handed over the counter without much scientific acumen or pharmaceutic lore. The educated physician and the skilled pharmacist have clearly no interest in fostering this growing and unprofessional upas tree. Medicine will have fallen to a lamentable stage when the physician prescribes for his patients preparations the composition of which is to him unknown, and the pharmacist is simply employed in dispensing nostrums of the mode of preparation of which he is equally ignorant. Clearly the future aspirations of pharmacists should not be in this direction. On the other hand, should it be in encroaching on the functions of the medical prescriber? This would be, according to my test, a mark of retrogression, and equally opposed to the specialization of function, which is the characteristic of advance and refinement. The branch of the medical commonwealth whose function is prescribing and treating disease has never felt the slightest jealousy of the advancing knowledge and education of that branch whose function it is to prepare and dispense the medicaments of the healing art. For it is well known that a refined and cultivated pharmaceutical body would be a great aid in that division of labour which is essential to the development of a scientific medicine. The whole progress of medical science has been so vast, the teachings of the deadhouse of such increased importance, the developments of physiological knowledge so extensive, and the refinements in diagnosis so multiform, that it is more and more hopeless for the pharmacist to compete with his medical brother, having regard to the safety of his clients, the quiescence of his own conscience, or the solidity of his reputation. No one can fail to appreciate the public advantage of an educated body of pharmacists throughout the land, whose opinion can be readily obtained on the action of medicines, their doses and suggestions thereon; but the more educated in their specialty the more slow will they be to consider that what is called "counter-prescribing" should be their function and their aim. When one recollects how the proper treatment of disease depends on a correct diagnosis, and that only by prolonged study in the wards of a great hospital, with the opportunity there afforded of verifying or correcting the opinion formed on the living by the examination of the dead, can this be mastered, it needs no argument to enforce how thoroughly impossible it is for the pharmacist to gain this knowledge with all the means at his disposal. A treatment of symptoms will often be attended by the most disastrous results. A man complains of pain in his knee; you prescribe some embrocation, wasting precious time while a popliteal aneurism is threatening life. You are asked to treat a pain in the eye, and your collyrium is being uselessly employed while an acute glaucoma is surely and rapidly compromising a vision which might readily have been saved. Another complains of headache, and your saline aperient kicks the balance between life and death in a patient having initial symptoms of enteric fever. A little girl limps with pain referred to the knee; your lotion or palliative applied thereto wastes only precious time while destruction and irreparable mischief has taken place in the joint of the hip. One might go on illustrating this in a variety of ways. The growth of medical science and the greater demand now made on the time of the medical student has rendered it impossible that he can compete with you in your acquaintance with the branches of professional knowledge which fall more especially within your domain. I am able to speak with some authority in the matter, and can assure you that in no medical school in London is chemistry taught as efficiently as it is taught here. Nowhere do medical students have the advantages which are furnished here for acquiring a knowledge of botany and materia medica. It is in these directions that your power lies, and when one considers the importance of chemistry, and its endless ramifications in sanitary and pharmaceutical directions, and how very much the tendency is growing on the part of medical students to give it but slight attention, and to ignore more and more botany and materia medica, it does not require much prescience to predicate that you may be as superior to your medical *confrère* in these branches of knowledge as he will certainly be to you in the diagnosis and treatment of disease. No one can have studied the papers presented at your Pharmaceutical Conferences without being convinced that the day is not far distant when the medical man will have to leave all that relates to pharmacy to those whose education shall have been vouched for by this Society, if his object is to secure the best results to his client, and when this Society will take a more important place than heretofore in the production of our British Pharmacopœias.

In an age when the prevention of disease is regarded as equal in importance to its treatment, and when the pollution of our drinking water is known to be a fertile cause of evil, how natural it will be to fall back on the cultivated pharmacist for opinion as to the potability of any given water supply, and the detection of the sophistications of articles of food. It will be the fault of the pharmacist of the future if he is not the recognized appeal in these and similar cases. Again, there is an increasing tendency to prescribe Galvanism or Faradism in various nervous lesions, and I cannot conceive a better arrangement for developing the scientific value of these powerful curative agents and rescuing them from being abused by the charlatan, than for the pharmacist being prepared to carry out the prescription of the physician with regard to these therapeutic powers. Doubtless, if pharmacists would lend themselves to the exhibition of these agents much benefit would result to their specialty and to the public.

I am aware I am addressing you at a period of great depression in pharmacy. The recent decisions in our law courts have rendered it possible for large co-operative commercial bodies to compete with you in some divisions of your calling. The growth of that department which includes proprietaries in patent medicines, and which has in the main been a source of evil to the great medical body, as well as to the public itself, and which I have already referred to, has proved a very vulnerable point of attack. The fact that it requires no more skill to sell a box of proprietary pills than to sell the last number of "*The Nineteenth Century*" has opened the mere druggist and patent medicine vendor to an attack which he may rely on will never be impotent, and which will deprive him of a source of income in that direction for ever. The transition which must inevitably be the outcome of these tactics must be faced, and no advantage can be gained by not looking the situation fairly in the face. Does it mean the effacement of pharmacy? Certainly not. The attack has been made on the commercial side of the calling only, and the result, if met in a right spirit, will be that pharmacy will come out of the trial purified, with greater power of development in its professional aspect, and less assailable than aforetime by simply commercial associations. It may be that at present too many are engaged in the mere work of distribution, and that the numbers of those engaged in pharmacy are beyond what are required. If that be the case, then the process of evolution will be in pharmacy the same as in biology, one of natural selection and the survival of the fittest. The pharmacists of the immediate future will be fewer in number, but they will be men of higher culture and of still more scientific standing, if this Society and the body it represents rises to what I conceive their duty at the present crisis. In proportion to the scientific culture of the pharmacist so, in like manner, will he be removed from the competition of huge commercial bodies, the more will he rely, and successfully rely, on his personal aptitude and skill. The greater the growth of the professional side of his character, the less vulnerable will he be on his commercial aspect. The duty of this Society will be, I conceive, to increase rather than lessen the scientific culture of its votaries. The time will have arrived when the candidates for its diploma will be required to show that they have been carefully trained, as well as sedulously examined, and that they have entered the profession without the blighting influence of "cram." As a former medical tutor of my college, I became convinced that it would have been possible to have an intelligent cabman to pass examinations who had never dissected a body, or had seen the inside of a hospital ward; but, fortunately, it was essential to those who presented themselves for examination that they should prove that they had gone through a process of training in the dissecting-room, lecture-room, and hospital wards, and assuredly I should much prefer to be treated, either medically or surgically, by the unexamined candidate who had gone through his curriculum than by the perhaps over-examined cabman, however intelligent. I would submit that every candidate for pharmacy as a profession should, as now, give evidence of scholastic education at a preliminary examination anterior to his apprenticeship. I conceive that proof of three years' practical work in a pharmaceutical establishment should be required, where he would learn habits of order, precision, and cleanliness, which are so essential to after laboratory work, and where, moreover, he would gain an intimate physical knowledge of the agents employed in medicine, facility in reading prescriptions, and neatness and care in dispensing. Before commencing further study he should pass an examination which might be called the "preliminary technical," in which he would show evidence of sufficient skill in reading prescriptions, in practical dispensing, and in naming at sight every agent used in pharmacy. He should then be required to go through a curriculum in some recognized school, taking the one at Bloomsbury as the type, where, by lectures, demonstrations, and laboratory work, he would acquire without cram a scientific knowledge of his profession, and establish a basis for future development. Certainly not less than an entire session of ten months should be insisted on before he presented himself for the honourable title of Pharmaceutical Chemist. Those who have means and time at their disposal might spend with advantage another ten months at the laboratory in practising original research, while possibly for the present only five months might be insisted on for the Minor qualification. Only in this way, I am convinced, will the proper education of the pharmacist of the future be secured, and an adaptation of numbers to requirements arrived at in a way which will tend to elevate pharmacy, to confer advantage on the medical commonwealth, and to benefit society at large.

But I must not forget that I am addressing some who are commencing their strictly academical career, and who are entering on a course of study which is to influence in no small degree their future lives. You who are here for the first time, and who are strangers to one another, and possibly to the professors of this school, are to work together for a season in order to fit yourselves for a profession to which you have determined to devote yourselves. Have you thoroughly considered the requirements it demands, and the sacrifices it claims? Have you, by a process of introspection, well satisfied yourselves that you come here with holy purpose and high resolve to be true to yourselves and to your race in the exercise of a vocation to which, if you do not bring a loving heart and a vigorous mind, it were better that you came not at all? I presume, however, that without the pretence to a special call to the work, you are prepared to enter on its scientific studies with all the truthfulness of youthful enthusiasm, and all the earnestness of unsophisticated hearts. You are embracing a calling which does not hold out the prospect of unlimited wealth or of political renown, yet you may readily by common industry insure a competency without the risks of purely mercantile life, and the anxiety which commercial speculations entail. Your capital will, to some extent, be the knowledge you will have gained here, and which no bankruptcy can ever take away. Your every-day pursuits will have far more inherent interest than the rise and fall of markets, while your acquirements may render you fit companions for the cultured of the land.

What during your student's period have you to do? How are you to do it? I will presume that you have entered this school with the preliminary training, both scholastic and technical, which is essential as a groundwork for a successful pharmaceutical education. Without preliminary scholastic training much of the language of the lecture-room is difficult to understand, whereas a knowledge of classics makes the language of science easy. You have now to engraft on your preliminary training that scientific knowledge which is to fit you for the practice of pharmacy in its largest sense. Chemistry will occupy a large share of your attention—chemistry not of books merely, but of the spirit-lamp, the test tube, and the balance. It ramifies in every department of your art, regulates the preparation of medicaments, investigates into the condition of food and the presence of poisons, and is the basis therefore of public hygiene and medical jurisprudence. I cannot too strongly urge on your giving much of your time to the mastery of the principles and practice of this most fascinating science. The study of systematic botany and zoology will cultivate the faculty of observation, and will make you acquainted with the true position in the animal and vegetable kingdom of the vast assemblage of products which are used either as food or medicine, and will, moreover, place you in a position for understanding those questions of biological discussion which are ever forcing themselves on the attention of the cultivated beyond your profession, and your ignorance of which would surely tend to your disadvantage.

Physical science, as represented by the laws of light, heat, electricity, and magnetism, must perforce secure your regard.

You will be but a sorry practitioner of pharmacy if medical agents and their properties—in other words, materia medica and therapeutics—do not secure a large share of your attention.

Your time will be divided between the laboratory, the lecture theatre, and the museum, while your evenings should be devoted to reading your lecture and laboratory notes, and the text-books which will be recommended to you. I am aware that there is a tendency in the present day to depreciate the value of lectures, and to assume that reading is the best process for obtaining information. Of course there may be peculiar mental constitutions that cannot derive much advantage from lectures. I speak, however, from my own experience, and from observation of others, and I feel convinced that any tendency to neglect oral teaching is to be deplored. I am daily conscious of numerous things of importance which occur to me, which were received from the living mouths of Pereira and others, and which would never have been so remembered had they been merely read. Books are of great value, but they cannot supersede the digested truths and careful demonstrations of a well-appointed lecture. The lecture will be a guide to you; you will learn therefrom what should demand most attention in your general reading. Moreover the lecture-room is a pleasant change to the earnest student. He employs for the time another organ of special sense for the imbibition of knowledge, and returns to his reading with more vigour for the change. My advice is, read vigorously; but also attend the laboratory, the demonstrations and lecture room no less assiduously. Where the professors examine as well as lecture, lose never the opportunity of being questioned. Let your work in the laboratory be systematic and continuous; irregularity at your bench means loss of time by the spoiling of your products other than the precious moments squandered. Regard loss of laboratory work as loss of golden opportunities which will never recur. Do not be ever asking yourselves whether the examiners require this, that, or the other, and, as is too frequently the case, ignore what they do not insist upon. Say rather, what will the welfare of my future clients require, and what knowledge should I possess in order to become an accomplished pharmaceutical practitioner? I hope that you have come here with some nobler purpose than the mere adoption of a gentlemanly calling; that you have a higher motive than that it has been the possession of your father and grandfather, and that you wish to inherit a business which, by virtue of their well-founded name, will ensure your success without their industry and skill. I would have you know that there is no royal road to worthy and abiding pharmaceutical knowledge. I know only the steep but well-trodden one of earnest and persistent work. Everything will be done at this school to facilitate your journey. Guides will be furnished at every pass—guides who have made successful transits themselves, and who, while having lent their aid to others, have not lost sympathy with new adventurers whose aims are high, but whose courage falters. Under their guidance difficulties apparently insurmountable will vanish. The path that seems to be lost in obscurity will reappear and lead you to the wished-for point. The crevasse which appears too difficult to leap will, by their experienced tact, be crossed in safety, and the community of others with kindred aims will be a help in the mountain journey. The ascent, which would have been hopeless to a desultory wanderer, will be quite a pleasant and long remembered tour, in consequence of the facilities which organization and multiplied guides secure. Moreover emulation will lead you to renewed energy. You will see others climbing slopes that seemed impracticable, you will resolutely determine not to be left behind. With a powerful will those and far more difficult ones will be scaled by you.

Your guides will have strong sympathies with you in your efforts. They were enthusiastic novices themselves once, they know all the difficulties and dangers, and they still retain lively interest in your successes as they will have sympathy with you in your failures. Nothing will so commend you to their regard as manifest earnestness, and nothing will so command success as a well-determined purpose. Set out this day with a definite object and the loftiest possible purpose, and a determination to practise self-denial in the attempt and you shall be astonished at your own success. The morning may be cloudy, thick mists may surround your path. You start with elastic step and blithesome spirits, seeing naught before you, trusting only to your guides. You traverse the outskirts of the village and leave behind the last landmark with which you are familiar; that old crag you had almost reached in some of your more desultory wanderings. Onwards and upwards you toil, no defined view greets the eye; you are conscious of exertion, but nothing more. You rest at regular halts, refresh yourselves with mountain fruit, and pluck some favourite flowers. Onwards and upwards, still in mist; you are conscious that you have made some advance for the umbrageous trees no longer o'erhang the path. Presently the clouds disperse, and as if by the machinery of a transformation scene the whole geographical region opens to your view. You trace the meanderings of the road, you see the hamlet of the valley, far down, a tiny speck, and can appreciate the lovely view your tardy footsteps have attained.

Your journey, henceforth, shall be more joyous, for you shall see the route by which the summit shall be reached. The path, moreover, shall lead to beauties with which you were never before familiar: Nature exhibited in a variety of wondrous aspects, now astonishing you by the height and massiveness of her primeval rocks and anon luring you by the exquisite minuteness of her glacial flowers. Amid all your arduous work you shall have time to cultivate the æsthetical side of your nature, and to worship and reverence the bountiful Creator of all things. Your guides, from past experience, are conscious of dangers, of which they would in all earnestness warn you. They remember many of whom it might be said "Ye did run well, what hath hindered you?" Some started briskly, but got languid on the journey; they had never practised themselves to effort of any kind before; they strayed behind—were lost. They might have succeeded well in valley labour, and in more humble pursuits have made themselves useful in their day, but they undertook an expedition for which they were not suited and perished in the attempt. They remember others who started with every promise of a brilliant ascent, who had all the possibilities of a successful career, who were swift of foot and expert of limb, but who wandered out of the beaten track and searched for gems and flowers in deep gorges and sequestered nooks; anon they would rest and take their fill of pleasure, trusting to their instinct to reach their fellow-travellers by some short cut. But the lost ground was not to be so readily made up, and they were to be seen seeking for refuge in some miserable châlet half up the mountain, while their less gifted friends attained the hospice on the summit.

They remember others who had come from loving friends with all the hopes of widowed mother and the blessings of sympathizing sisterhood, for whom relatives had scraped together all that they could spare, and had even debarred themselves to supply the wallet and provide the necessities of the route, but who wandered away from their guides, chasing some gay butterfly o'er ice slopes that made one shudder at the venture. The homestead heard the daily prayer for a successful journey to its loved one. The guides used all their influence to enforce the danger of the pursuit; they told of dreadful catastrophes that had happened and would surely happen again. They remember how their expostulations were disregarded—the merry laugh at the slow—the preference for perilous paths and treacherous transits, for the cerulean blue of the fissured ice. They were in their own estimation too sure of foot for danger; but alas! the slippery surface, true to itself, led to their downfall, and the echoing chasm told the wayfarers of the life that had been lost.

The guides remember, however, other than doleful tales and miserable failures. They preserve fresh in their memories the names of some of the companions of their own first ascent; of others who before and since have scaled the difficulties, and are now far away from leading strings, making explorations where no human foot has been; who are ascending higher and yet higher, with no assistance of chart, for their toil is in order to provide one; who are daily collecting facts and recording observations; who are permeating mankind with their thinkings; who are carving their names in enduring characters, and are spending and being spent for the glory of God and the good of man.

Let these animate you. Let the student's life which you commence to-day be a fitting prelude to your work beyond the stage of pupilage, and to the higher life hereafter. Let it be characterized by all that is earnest, true, and noble. Let it be honest, despising all seeming in lieu of reality. Let it be gentle, blossoming with kindly acts and genial sympathies. Let it be generous, crediting to the full the goodness of your fellows, and hesitating to sully their fair fame. Let it be brave, meeting trials with fortitude, and sharing the burthens of others. Let it be wise, redeeming the time, and adding knowledge with increase of days.

I have already furnished you with the formula to aid you in the solution of your problem, the secret that will command success, the talismanic charm which turns everything into gold, the potent spell at which all difficulties vanish—it is earnest and persistent work. Let it be supplemented by a gentle, Christian life—terminated by a peaceful, hopeful death.

The Pharmaceutical Journal.

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Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

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THE SOCIETY'S SCHOOL OF PHARMACY.

THOUGH the Council of the Pharmaceutical Society has at its late meeting decided not to adopt the proposal of discontinuing the work of teaching, it is evident from the frequent discussion of this subject and from the nature of the opinions expressed, no less by those who oppose than by those who advocate the limitation of the Society's action to examination alone, that there is a growing tendency to recognize the desirability or at least the expediency of such a limitation of its functions. Whether that tendency will soon or ever become so general as to bring about the course suggested by Mr. HAMPSON's motion is a point upon which it would be hazardous to venture an opinion at the present time, more especially since the grounds upon which the cessation of direct educational work by the Society is proposed partake more of the nature of abstract principles than of actual demonstrations that the educational work conducted under the auspices of the Society is inefficient or in any way less calculated to promote the interests of pharmacy than it should be. Mr. HAMPSON's chief argument in support of his proposition is that education and examination cannot consistently be carried out by the same body; but whatever *à priori* plausibility may attach to this argument it is insufficient to counteract the evidence afforded by past experience that education and examination have been consistently carried out by the Society, and that both functions have been performed with as much advantage as the existing conditions would allow of being expected. And though it must be admitted that the maintenance of the Society's School of Pharmacy has not been productive of such generally beneficial results in regard to pharmaceutical education as might be wished, that circumstance must be ascribed to the comparatively very small extent to which the opportunities for education afforded by the School have been taken advantage of, rather than to any want of consistency between the educational work of the Society and its action as the examining body. It is not by the abolition of the Society's School that we can hope to provide a remedy for the indifference to thorough educational training which is manifested by the proportionately small number of students who seek to avail themselves of the opportunities it affords; but it may at least be expected that, if the School continues to be maintained in a thoroughly efficient manner, the example afforded by it and by the students who have been educated in it will exercise a powerful influence in making the benefit and necessity of sound technical training more generally appreciated.

There is also another point of view from which we are induced to regard the continuance of the Society's School as desirable. Education has been, since the foundation of the Society, the point to which its efforts have been principally directed. That was in fact the chief want of the pharmaceutical body. To supply it the funds of the Society have been most freely applied, and the aid of distinguished teachers has been obtained. That it is at present much less a want than formerly we cannot say; but at the same time it is satisfactory to know that some good result has been achieved. To a certain extent the necessity for education has been established, and so far as the possession of it can be tested by the examination which must be passed in order to obtain legal qualification for carrying on business, it has been made by the Society's efforts an essential for everyone that intends to enter upon the business of pharmacy.

But the work that has thus been done is only partial, it has not been sufficient to raise the average educational status of British pharmacists to an equality with that of continental countries, and for the sake of promoting the disposition to obtain a higher qualification than that provided for by the Minor examination there is still a wide field for the exercise of such an influence as can be exerted only by a thoroughly efficient school that will attract the more enterprising and emulative students. For some time to come we can only hope for this being done on a voluntary principle, and the educational work of the Pharmaceutical Society will not have been completed until the need for higher education of this kind has become generally recognized and the demand for it has become the rule rather than the exception.

In what way can the objects of the founders of the Pharmaceutical Society be more surely sought after than by maintaining a school where not only the bare necessities of the Minor examination can be obtained, but a thorough proficiency in those scientific acquirements which will enable the pharmacist to fulfil the higher demands upon his skill which Dr. LANGDON DOWN referred to in his inaugural address as coming properly within the province of the business? There is surely no more fitting way in which the funds of the Society can be applied, and if the average cost of education in the Society's School amounts to as much as was stated by Mr. HAMPSON that circumstance alone would appear to point to the necessity of maintaining the School by the help of the funds at the Society's disposal for the benefit of pharmacy.

As regards this higher education of pharmacists the Society is at the present time precisely in the same position that it was formerly in regard to the qualification now recognized as legally essential. It must be supported by the Society as a voluntary body and promoted by the expenditure of its funds in such a way as to secure the desired result. That students in the Society's School should under such conditions enjoy advantages over those outside of it is evident, but we cannot concur with Mr. **Hampson** in regarding that fact, as he does, as being an argument against the connection of the Society with the School. Neither can we agree with him in thinking that the scientific education of pharmacists could be as efficiently conducted at medical schools or other teaching institutions as it might be at the Society's School; for, as regards medical schools, it is unquestionable that, as pointed out by Dr. **Langdon Down**, the modern growth of medical science and the demands now made upon the time of the medical student in studying various subjects have driven into the background those subjects with which the pharmaceutical student has to concern himself especially. Speaking with the authority of experience he declared that at no medical school were such advantages furnished for studying chemistry, materia medica, and botany as at the School of the Pharmaceutical Society, and we are disposed to think the same would hold good in the case of other teaching institutions.

The argument put forward by Mr. **Hampson** that the amount of business to be transacted by the Council is so great as to prevent satisfactory performance of the duties connected with the maintenance of a School seems in our opinion to be the least forcible of all as indicating that the School should be abolished. It is almost a matter of course that with the growth of the Society and the increase of its importance there should be an accession to its duties and an augmentation of its work, but these results of development would seem to be rather matter for internal organization than a reason for abandoning a course of action which has been more than any other fruitful in creating the position now held by the Society and in giving it the importance it has attained.

THE BENEVOLENT FUND.

It will be seen by the official report that the Council of the Pharmaceutical Society, at its meeting last Wednesday, decided that in December next four more persons should be placed on the list of annuitants on the Benevolent Fund. As, however, there are at present no less than ten approved applicants for annuities, it is evident that an election will be necessary, and we hope that the interest excited in the selection of so large a number of annuitants will be manifested in a greatly increased number of subscriptions forwarded to the Secretary.

THE APPLICATION OF THE METRIC SYSTEM TO DISPENSING.

In a communication to the *New York Medical Record*, Dr. **Oldberg**, whilst protesting against the resolution to which the United States Pharmacopœia Convention has come in favour of expressing all the official formulæ in parts by weight, advocates the introduction of the metric system, which he thinks can easily be done and yet to retain the liquid measures. The plan that he suggests is to have only two units, one for weights and one for measures. As the unit for weights he would have the "gram," which being equal to about fifteen grains, would fairly represent one-quarter of a drachm. The other unit, for the liquid measures, he would call the "fluigram," which would be equal to about fifteen minims, or about one-fourth of a fluid drachm. This Dr. **Oldberg** thinks would be a great simplification, and one that would not clash too much with the systems at present in use in the United States and this country.

ALLEGED POISONING BY CANNED MEAT.

An inquest has been held at Poplar respecting the death of a child after eating some American corned beef. The medical practitioner who made the *post-mortem* examination attributed the death to an irritant poison, and according to the *Daily Chronicle* had "come to the conclusion that a portion of the tin "had become absorbed with the meat and so caused "a deadly substance known as hydrochloride of "zinc." It is quite possible that for the extraordinary chemistry and transmutation of metals, as well as the eccentric phraseology, the local reporter is responsible and that the medical practitioner only expressed an opinion that in some way the death was due to an admixture of tin from the can with the meat. But at present we know of no evidence that such a toxic effect would follow, and it seems much more probable that the poisoning was due to the putrescence of the meat.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

We have received a programme of the proposed proceedings of this Association during the coming session. The Association meets once a month from October to April inclusive, in the rooms of the North British Branch of the Pharmaceutical Society in Edinburgh, for the discussion of matters relating to pharmacy. Amongst the subjects to be brought before the members during the next six months are such practical ones as "Chloral and Croton Chloral," "Rhubarb," and "Cochineal and Cochineal Colouring," whilst discussions on what may be called the politics of pharmacy will not be wanting. We need hardly say that we are glad to express our sympathy with this effort of the junior pharmacists of Edinburgh for mutual improvement.

We are requested to state that in the list of signatures reported recently, on p. 172, to have been attached to the Address presented to Professor **Attfield** at Swansea, the name of Mr. **Richard Bremridge** was erroneously substituted for that of Mr. **Richard Reynolds**, the President-Elect of the Conference.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, October 6, 1880.

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT, IN THE CHAIR.

Present — Messrs. Andrews, Atkins, Bottle, Butt, Churchill, Frazer, Gostling, Hampson, Hills, Mackay, Radley, Richardson, Robbins, Sandford, Savage, Squire, Symes, Williams and Woolley.

The VICE-PRESIDENT said that he had received a letter from the President, writing in St. Petersburg, expressing his fear that he would not be able to reach London in time to attend the meeting that day, in consequence of the delay of a day in the sailing of the packet by which he intended to return.

The minutes of the previous meeting were read and confirmed.

The VICE-PRESIDENT called attention to one point arising out of the minutes, namely, the special application made by Professor Redwood for the modification, to some extent, of the course of instruction at the school by the forming of a class for the instruction of students in dispensing. Upon that subject the following letter had been received by him that day from Professor Redwood:—

"17, Bloomsbury Square,
"London, Oct. 5th, 1880.

"To the Council of the Pharmaceutical Society of Great "Britain.

"Gentlemen,—At the last August meeting of your Board you authorized the adoption of a new arrangement of the mode of conducting my class, by which it was proposed—

"1st. To connect, more intimately than heretofore, the lecture teaching in chemistry with the practical instruction in the Laboratory, and

"2nd. To supply to students requiring it, instruction in practical dispensing and the discrimination of chemical and pharmaceutical preparations.

"The first part of this arrangement is now being carried into effect, and I defray the expense of doing so out of my lecture fees, by paying Dr. Senier for his assistance at my lectures.

"The second part of the arrangement is not yet in operation as it requires apparatus and fittings which have to be provided.

"My principal object in thus addressing you is to ask if you will be good enough to provide what is necessary in the way of specimens and dispensing apparatus. I have undertaken to pay Mr. Dimmock for conducting the class, and we propose to charge a small fee of—say £1 1s., to meet the cost of materials used up, and to supplement the £20 a year I am to pay Mr. Dimmock.

"This class will be instructed in the reading, translating and dispensing of prescriptions, and the discrimination of chemical and pharmaceutical preparations. We propose having it conducted one day in the week, from five till six o'clock in the evening, in the Lecture Room. We have the tabling suitable for the purpose, which was used for a similar purpose in the same place eighteen years ago by Messrs. Braithwaite and Wood.

"Ten of the students who have entered to my class for the present session have expressed a wish to join the class of Practical Dispensing.

"I am, gentlemen,
"Yours truly,
"T. REDWOOD."

The proposition made to the Council was, in short, that the Society should from its resources supply the requirements mentioned in the letter for the purpose of instruction to the students in dispensing. All the materials used by Professor Redwood in his lectures would be the property of the Society, and the charges would be well covered, the Professor considered, by the small sum asked as a grant from the Society.

Mr. SYMES asked whether Professor Redwood was in order in forming the class at all. The appointment of a demonstrator to assist at the lectures as well as in the laboratory was made, he quite understood, in order that the Professor of Practical Chemistry might be enabled to carry out a course of teaching which should bear a proper relation to the lectures. So far no exception could be taken to the proposition; but the Council should not forget that what was now brought before it had been brought forward on a former occasion and negatived. Personally he had not been aware that Professor Redwood proposed to form a class of the kind suggested. He was not taking exception to the formation of such a class in itself, but surely the Council should consider whether the class was to be formed under circumstances which would meet with its sanction.

Mr. WILLIAMS pointed out that it was left in the hands of the President to arrange details with Professor Redwood.

Mr. SYMES said no doubt that was so; but at the same time the Council had not approved the scheme submitted by Professor Redwood.

Mr. HAMPSON understood that a gentleman had been engaged for the dispensing instruction. Reference had been made to Dr. Senier; but it appeared that another gentleman, Mr. Dimmock, had been already engaged for the practical dispensing. A straightforward application had been made, and had been discussed by the Committee, whose report had been accepted by the Council, the Committee, in fact, not having agreed to the proposal.

Mr. SAVAGE understood that the fee originally asked from the students for the course had been reduced by half.

Mr. ROBBINS thought Mr. Hampson was wrong in stating that the Committee had refused to comply with the recommendations. It was the Council, and not the Committee, who had rejected them.

Mr. SYMES said that one of the chief points in the view of the Council was that no extra fee should be charged to the students; but here was a proposal to charge them a fee for a course of an hour's instruction a week, which must be an inadequate teaching.

The VICE-PRESIDENT read an extract from the minutes of the former resolution of the Council referred to, stating that the proposal was agreed to with the view of enabling the professor to increase the number of his experimental illustrations, and for the purpose of providing instruction in practical dispensing for those students who had had but slight means previously of obtaining it.

Mr. MACKAY asked whether it was not understood, when the Council acceded to the recommendation, that no extra fee should be charged to the students.

Mr. WILLIAMS referred to the minutes as showing that it had been stated by the Council to be desirable that the fees of the school should not be increased in consequence of the giving of such lectures.

Mr. SYMES protested against a proposal which had been put forward in a plain and simple manner, and negatived, being carried by a side wind, as it was now being attempted to be carried through.

The VICE-PRESIDENT said the only objection taken by the Committee was to the fact of an increased charge being made to meet the expenses of the demonstrator's assistance at the lectures. The request of the professor was that he should be allowed to charge a small fee per student to those who attended this special distinct class, to which one lecture a week was to be delivered during the session. It could not have been contemplated by the Committee that the students should receive that special teaching for nothing. The professor would himself give time and attention to the class, and for the proposed small fee it had been already considered by several of the students that they would get their full money's-worth.

This was not a question really of assistance for additional lectures, but for a class which was to keep the school abreast of the time.

Mr. MACKAY said that the only question before the Council was whether Professor Redwood's request to be allowed to charge a small fee to the students and that a grant should be made to him by the Society for apparatus for the class, should be acceded to or declined. He certainly thought the Council was not in a position to allow a fee to be charged. It had been understood that the additional instruction was to be provided entirely at the expense of Professor Redwood; that was part and parcel of the bargain and it was a matter of surprise that Professor Redwood should now come forward with this request, his profit being in the increased number of pupils who were likely to attend his lectures.

Mr. SANDFORD agreed with Mr. Symes that it seemed inconsistent for the Council to agree in August to that which it had positively refused to accede to in July; but that it had consented was certain, and it was too late for it now to question Professor Redwood's arrangements. It was not unreasonable that an extra payment should be made by the students of the class, as dispensing was not included in the regular course of education in the school. The expenditure for apparatus was a matter which might be referred by the Council to the Library, Museum and Laboratory Committee.

Mr. WILLIAMS said that communications having taken place between the Council and the professors on this subject had resulted in alterations being proposed by Professor Redwood which had been agreed to, with the exception that it had been finally left to the President to settle the details, and as it was necessary the matter should be arranged before the school session recommenced, this regulation had, he presumed, been agreed to by the President. Personally he (the speaker) had opposed the appointment of a dispensing tutor in the school, so that he was not at all an advocate for the change, but it was certainly quite in accordance with the resolution of the Council at its last meeting.

Mr. WILLIAMS moved—

> "That the letter from Professor Redwood be received and entered on the minutes and the question referred to the Library, Museum and Laboratory Committee to consider, and that they be empowered to act at their discretion."

He said that motion was prompted by his belief that the Council stood committed to the proposal and it must now be in some way carried out. Possibly the Committee might come to the conclusion that the charge for the tutor should be borne by the professors. It should, however, be borne in mind that in the appointment of the tutors this special course of instruction was not contemplated. Professor Redwood had informed him that ten of the students were already anxious to avail themselves of the additional course.

Mr. RICHARDSON seconded the motion.

Mr. GOSTLING moved as an amendment—

> "That the matter of Professor Redwood's letter be referred to the Library, Museum and Laboratory Committee, and that the Committee shall report thereon to the next Council meeting."

He said that he was disappointed to find that the students were to be asked for another fee when they had already to pay as much as they could afford, and he thought the instruction should be included in the general teaching.

Mr. CHURCHILL moved as a rider to the motion—

> "That if instruction in dispensing be given at the school it should be for not less than three hours per week, and that the instruction be given without extra charge to the students."

Mr. ANDREWS seconded the rider.

The VICE-PRESIDENT remarked that a reference to the Committee would involve a delay of a month and a half.

Mr. ATKINS recommended the adoption of some *via media*. If instructions had gone forth to the professors that they might at their own charge engage a dispensing tutor, then he thought the Council was pledged in the matter and should not at this period of session draw back. He objected to extra charge being made to the students, but would not quarrel with the small grant proposed. Dispensing was taught in other schools and should be taught in the Society's.

Mr. WOOLLEY was also of opinion that the Council should not draw back, and said the strongest evidence in favour of the proposal was that ten of the students had already paid the fee for the special instruction.

Mr. FRAZER would not consent to any Committee having power to bind the Council, who had never contemplated an extra charge being made to the students. Any delay in awaiting a further report could be made up by the delivery of a double set of lectures during the remainder of the session.

Mr. ANDREWS reminded the Council that the matter had been brought forward on the former occasion at the fag end of the meeting, when half the members had left, and the remainder probably did not hear what passed. Questions of such importance should only be brought forward on previous notice.

The VICE-PRESIDENT said that it would be impossible to arrange that each matter should be brought forward at a particular period of the day, and in this instance it was impossible that notice could be given.

Mr. HAMPSON coincided in the remarks of Mr. Andrews, that the matter had been disposed of without sufficient discussion. The usual course would have been to submit the matter to the Library, Museum and Laboratory Committee.

The VICE-PRESIDENT said that it could not be done, as there had been no other meeting until the present and in the meantime the session was actually proceeding. The professor was not pledged to the fee mentioned, but at the same time he was decidedly of opinion that instruction obtained for nothing was not appreciated.

The amendment was then put and lost; the original resolution was carried, and the rider, on a general expression of opinion by the Council, was withdrawn.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Linton, Ralph Tait	Edinburgh.
Stammwitz, Louisa	London.

Chemist and Druggist.

The following registered chemist and druggist who was in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society:—

Willcox, John Williams	Madeley.

ASSOCIATES IN BUSINESS.

The following, having passed the Minor examination, being in business on their own account and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Binks, Burcham	Falmouth.
Mason, William Drury	Grimsby.
Squire, Fredk. John Cripps	Plymouth.
Taylor, Charles Edward	Sedbergh.
Wells, Ernest William	Grahamstown.

ASSOCIATES.

The following, having passed their respective examinations and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Beard, James Hogg	Manchester.

Coverdale, George	Leeds.
Leicester, Frederick	Northwich.
Ray, William Frederic	Westerham.
Wallis, George	Ryde.

Modified.

Brown, Joseph	Liverpool.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Baker, Edmund G.	London.
Banks, Alfred	Stratford-on-Avon.
Coates, Thomas	Malton.
Cole, Taliesin	Merthyr Tydvil.
Grant, John Merson	Cullen.
Hoare, William Herbert	Windsor.
Irwin, Thomas	Aldershot.
Jacklin, Alfred	Louth.
Jamieson, Simpson	St. Andrews.
McDonald, John	Liverpool.
Maitland, Frank	Stonehouse.
Marsden, Charles Edwin	Huddersfield.
Percival, Thomas	Falkirk.
Polack, Emanuel	Rochester.
Quine, Richard Henry	Warrington.
Rees, Richard	Neath.
Robinson, Harry	Guiseley.
Skinner, Richard	Oxford.
Stephens, James, jun.	Gamrie.
Thomson, William	Cullen.
Walker, Arthur	London.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who had severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

George Bywater, 215, Arundel Street, Sheffield.
Horace Arthur Costerton, 90, Western Road, Brighton.
Henry Morton, 16, Broadway, Deptford.

ADDITIONS TO THE REGISTER.

The Registrar reported that—

William Fox, Westerham, Kent,
Robert Stephen, 8, Orchard Place, Old Aberdeen,
John Williams Willcox, Madeley, Salop,

having made statutory declarations that they were in business before the passing of the Pharmacy Act, 1868, and these declarations having been supported by duly qualified medical practitioners, their names had been placed on the Register.

THE CHEMISTS' BALL.

A letter was read from Mr. Arthur L. Savory, the Honorary Secretary of the Ball Committee, asking permission to use one of the Society's rooms for the meetings to make arrangements for the next Ball. The request was acceded to.

RESIGNATION OF AN EXAMINER.

The VICE-PRESIDENT read a letter from Mr. John Moss, resigning his seat on the Board of Examiners.

Mr. WILLIAMS said while the Council must be sorry to lose Mr. Moss, it might be inconvenient to fill the vacancy created, at the present moment, in view of the approaching appointment of the full board. Such an appointment was a serious matter and one which should be well considered by the Council.

It was resolved—

> "That Mr. Moss's letter be received and entered on the minutes, and that the Council accepts his resignation with an expression of great regret at the loss of his valuable services as an Examiner."

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was received and adopted, and sundry accounts ordered to be paid. The accounts included a large item for law costs in the House of Lords, in connection with the case of the Pharmaceutical Society *v.* The London and Provincial Supply Association, and an item for expenses connected with reporting the proceedings of the Conference at Swansea for the Journal, upon which a discussion arose, and

Mr. RICHARDSON moved—

> "That all applications for money payments should be submitted to the Finance Committee before being brought before the Council."

The motion was withdrawn.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the daughter of a former member.
£10 to a registered chemist and druggist, aged 55.
£10 to a registered chemist and druggist, aged 84.
£10 to orphan children of the late James Isherwood.

Five applications for relief were ordered to stand over, and two were not entertained.

The Secretary had reported that there were thirty annuitants upon the Fund, and had given particulars as to the present age and date of election of each.

The Committee, having considered the financial position of the Fund, was of opinion that four annuitants might be elected in December.

The report and recommendations were received and adopted.

LIBRARY, MUSEUM AND LABORATORY.

It was resolved that Mr. Butt should be added to this Committee.

GENERAL PURPOSES.

The report of this Committee, which included the usual statement from the Solicitor as to the progress of cases placed in his hands, was considered in committee.

The Council having resumed, the Report of the Committee was received and adopted.

THE MEETING OF THE GERMAN APOTHECARIES' ASSOCIATION.

The Secretary read a letter from the Editor stating that, in accordance with the wish of the Council, he and the Sub-Editor had attended the recent meeting of the German Apothecaries' Association in Breslau, and had been very cordially received by the officials of the Association. It also stated that the intimation of the projected holding of the International Pharmaceutical Congress in London next year had been received with much approval.

On the motion of Mr. Robbins, seconded by Mr. T. H. Hills, the Secretary was requested to write to the President of the German Pharmaceutical Association, to thank him for invitations to their annual meeting and for the cordial reception of the delegates sent to it by the Council of the Society.

THE SCHOOL OF PHARMACY.

Mr. HAMPSON moved, in pursuance of notice—

> "That the Pharmaceutical Society, among other duties and responsibilities, being authorized by Act of Parliament to examine, certify, and register all persons entitled to practise pharmacy in Great Britain, it is inexpedient to be directly engaged by means of a school of pharmacy in giving instruction to pharmaceutical students."

He would deal first with the duties of the Society under the Act. By the Society's charter it had to do with those who carried on the business of chemists and druggists. Provision was made not only for the supervision by the Society of the education given to chemists and druggists, but it had the office of examining candidates and granting certificates, besides the all-important duty of keeping an annual register. The work comprised also the management of a large museum and library; the publication of a weekly journal for the trade; the disposal of considerable finances of the association, and the Act of Parliament also included the administration of a benevolent fund. The work of the Committees of Council, to carry out these duties, was very great, and he really thought sometimes that altogether the Council was hardly able to satisfactorily perform the work it had to do. It was, therefore, a matter of economy of energy that the Society should not undertake more than its own essential duties. Pharmacy, it was to be feared, occupied at present a somewhat gloomy position, and the Council had the prospect before it of an amended Pharmacy Act, in connection with which all its energy and sagacity would be required. When the Society was established in 1841, and subsequently incorporated (in 1843), the condition of chemists and druggists was such that it was the imperative duty of the Society to begin to educate them, for the simple reason that no means of education existed in other quarters. No other body was then in existence which could give the requisite teaching in pharmacy, laboratory work, and scarcely in botany; and it was necessary that the trade should be recognized as an educated body. But times had changed since the Charter was obtained. Facilities for education had so multiplied all over the country that it was no longer necessary for the Pharmaceutical Society to itself engage directly in giving instruction. No doubt the Society's school had in the past done great and noble work. But the Society was no longer a voluntary body; it had to examine students from all quarters and was bound to register them so long as they were sufficiently educated to pass the examinations. One argument against the connection of the Society with the school was the advantage possessed by students within its walls over those outside them, and upon that point he must refer, though very reluctantly, as an illustration, to a case which had occurred in the examinations. Seeing the practice of the medical and other corporations in these matters he thought that this Society should consider itself as a university or examining rather than an educating body. The average cost of education in the school, which had been in past sessions £2 9*s.* 6*d.*, was now about £6 5*s.* per student. That represented the expenditure of a very large sum, and it was not right that so much money should be paid annually out of the members' subscriptions. The Society's charter gave the Society the care of chemists and druggists, and empowered it to promote a uniform system of education for those who should practise chemistry and pharmacy. That educational work could be efficiently done in connection with King's College, or some other teaching institution; while the Society's own necessary duties occupied so much time month after month that the Society really could not properly attend to it. The Society could in that way encourage education outside its own walls and do better work than by continuing to hamper itself with unnecessary responsibilities. He could only, in conclusion, submit his proposition to the Council to decide upon the wisdom of severing education and examination, both of which he submitted could not be efficiently carried out by the same body.

Mr. ANDREWS seconded the motion, but reserved his remarks.

Mr. ATKINS was reluctantly compelled to differ from the views expressed by Mr. Hampson in support of his motion. He did not think the time had arrived yet, at all events, for disendowing and disestablishing the school. That time might come, but, on the other hand, the disposition appeared to be growing stronger on all sides to associate education and examination. Both undoubtedly should not be carried out by the same men—undoubtedly they should be accompanied by the greatest precautions against possible collusion in the examinations. Oxford and Cambridge were both examples of bodies which first educated, then examined, and finally granted certificates to students on passing out of those universities. The same system obtained in the London University, which, in connection with its colleges, was both an educating and an examining body, though it was founded as an examining body only. Tradition had been invoked by Mr. Hampson in support of his motion, but, looking at the past history of the school, there could be no doubt that it had done good work during the last forty years, and he (Mr. Atkins) hoped it had not yet finished its labours. Even assuming it was true, and there had been powerful representations to that effect both in the outside world and in the press, that the education within the walls of the school was imperfect, that was the greater reason why the Council should itself take care that the materials for a genuine product should be furnished by the school. The question must be argued either upon principle or expediency: on principle he could see no reason why education should not be efficiently and honourably conducted within the Society's school; and, on the ground of expediency, he believed the time had not yet come for interfering with its present position. The efforts of the Council should be concentrated, not on disestablishing or disendowing, but upon infusing new life and new zeal into it.

Mr. SYMES, while regretting that the motion had been brought forward, had no doubt that the Committee would be glad of an expression of opinion from the Council upon it. He had endeavoured to look at the question entirely without prejudice from his early associations with the institution, and he had certainly come to the conclusion that, if Mr. Hampson's suggestion pointed in the right direction for future measures, at all events the time had not yet arrived when such a step could be taken. The Society was founded for the purpose of elevating the position of pharmacy, and no more effective means for doing so could be found than by affording support to the school where the education could be given, which was the secondary object of the Society. He considered that the Society should in fact go much more largely into education than it had hitherto, and that it should affiliate itself more with outside schools. For that purpose, therefore, he should like to see the Council placing itself in connection with town and provincial schools, and it might also encourage education by offering Society prizes to schools in which a certain number of lectures were delivered, and which had a certain number of students. Regulations might also be made for the payment of teachers by results, and those steps would enable competent teachers to be readily found. Certainly the Council should endeavour to bring about a more universal system of education. He could not see anywhere a single school which furnished so thoroughly all the conditions that could be desired for a general pharmaceutical education. His inquiries on the subject had shown him that all the universities, except the London University, were both educating and examining bodies. Although the Council might possibly in the future thank Mr. Hampson for opening the question, he certainly thought the motion was premature at the present time.

Mr. GOSTLING also, although he confessed that he had considerable sympathy with Mr. Hampson's views, thought the time had not arrived for abandoning the school. Rather, he would do all he could to improve the school of pharmacy through which most of the leading men who had done honour to the Pharmaceutical Society had passed. He felt compelled, therefore, to oppose the motion.

Mr. SAVAGE, in opposing the motion, pointed out that new arrangements had recently been made which would remove many of the existing difficulties. He regretted the reference that had been made to the Board of Examiners, and contended that a more worthy body could not be found. The examiners were always thoroughly fair in their examinations, and the candidates were quite unknown to them.

Mr. **Mackay** also looked upon the motion as singularly premature, as it could not have been brought forward at a more inopportune time than the present. Seeing the general feeling of the Council with regard to it he would venture to suggest that Mr. Hampson should consent to withdraw it, as there was not the slightest chance of its being passed.

Mr. **Williams** said that one reason given by Mr. Hampson why the school should be abandoned was that the examiners were biassed.

Mr. **Hampson** repudiated having made any such charge against the examiners.

Mr. **Williams** said that at any rate the charge had been made by implication, and he could only say that Mr. Hampson would find upon inquiry that he had been greatly misinformed.

The **Vice-President** asked whether Mr. Hampson was disposed to accede to the suggestion to withdraw his motion.

Mr. **Hampson** having declined to do so,

Mr. **Bottle** urged that that gentleman had advanced no reasons whatever why the Council should abandon the present system of teaching. Mr. Hampson might perhaps be one of those men who were in advance of their time, and might live to see the change made which he was now proposing; but the time had not yet arrived for it. Nothing could possibly have cropped up more inopportunely than such a discussion at the present, and with regard to the examinations he was convinced that they were most impartially conducted.

Mr. **Mackay** added that he had been present at every examination which had been held in Edinburgh and could state that there had never been the slightest disagreement with regard to them or anything but the most straightforward conduct on the part of the examiners. There was no possibility of collusion amongst them, and in fact it only happened once in some three or four hundred times that there was any necessity for the examiners to consult as to whether any particular candidate should pass or not.

Mr. **Andrews** said that if he did not speak his silence might be misunderstood; it might be thought that he had seconded the motion merely to promote discussion, and not from any sympathy he had with it. On the contrary, he did mainly coincide with the views expressed by Mr. Hampson, and was fully convinced that, even if the time had not yet arrived, it would be necessary eventually to close the school. This opinion, which he had long held, had been more strongly forced upon him by facts which had been brought very prominently forward before a committee upon which he had sat--that the school was gradually dwindling away, and would soon die of inanition—and he thought it more honourable to the Society to close it than to let it die out. Further that, in common with many others, he entertained the hope that a college of pharmacy might be founded, that would not only be honourable to the pharmacy of the country, but would help to raise it to a still higher position; but that he feared there was no prospect of such a college being formed until the Society's school was closed. He could see clearly from the course the discussion had taken that there was no probability of that at present, and to make this school a success, therefore, was an object of the greatest importance, but to do so it would be necessary to conduct it on different principles. It was advertised as *the* School of Pharmacy of *the* Pharmaceutical Society, whereas the Council had nothing to do with it beyond the appointment of professors and exercised no superintendence over it. In his opinion, to make the school a success it was necessary to appoint some one to be the head of it, who should have the sole responsibility of it, who should have no other occupation and no emolument but what he derived from it. He thought that if the right man could be found, the school might perhaps be raised to its former condition, but otherwise it would soon cease to exist for want of support.

Mr. **Sandford** emphatically denied that there was any ground for a charge of partiality against the examiners, and was sorry Mr. Hampson had taken the opportunity at the opening of the session of mooting the question. He hoped, therefore, the motion would be withdrawn, after what had been said. Mr. Andrews had spoken of the school not having prospered, but this was not the way to improve its prospects of success. The Council was really now asked to put a rope about the neck of the school, and it was very much like asking a doomed man to go forward to his fate in comfort and with pleasure.

Mr. **Richardson** said it was very painful to have such a proposition brought forward after the professors had gone into the subject and given the Council a scheme which, it was to be hoped, would be eventually of great benefit to the School of Pharmacy. This discussion was most ill-timed, but one good could spring from it—from the high opinion of the professors shown to be entertained by the Council.

Mr. **Frazer** also testified to the fairness of the Board of Examiners in fulfilling its duties, and stated that the examinations were conducted separately as at the universities.

Mr. **Squire** pointed out the fact that no building could be better adapted than the school in every way for educational purposes, and said he would therefore be very sorry on that account to see it done away with. No reason whatever had been given to the Council for any considerable change.

Mr. **Robbins** was of opinion that the school might be made a good one, and only required the adoption of proper measures to make it by far the best school of pharmacy.

The **Vice-President** suggested to Mr. Hampson the advisability of withdrawing his motion in accordance with the generally expressed opinion of the Council. That gentleman had appealed to the charter, but the charter recited that it was the duty of the Society to educate. He had appealed to the cost of the school, but the fact was that it was maintained at a cost ridiculously small as compared with that which would be entailed by the counter-proposition for the foundation of a college of pharmacy, a necessarily very large expenditure in place of the £300 or £400 a year at present expended on the school. He had appealed to the university system, but in that system education was clearly included as well as examination. Finally, he had referred to the many other claims upon the time of the Council, but the Council had never yet found itself unable to perform its work, including attention to the affairs of the school. Possibly there might be a good deal to be said in the abstract against the existence of such a school, but it was quite clear the present opinion of the majority of the Council was that, in view of the good so far done, it should not be abandoned. On those grounds he hoped Mr. Hampson would not press his motion, and he had only to add his own testimony to the careful impartiality with which the examiners decided on the merits of each candidate who came before them.

Mr. **Hampson**, in reply, again denied that he had made or intended to make any charge against the examiners of the kind suggested. No charge of favouritism could, he believed, be justly made against them. At the same time he must repeat that the Council had so much other work to do that it could not possibly give proper attention to the education afforded in the school, and that was one of the reasons why the school had not prospered. The duty of the Council towards the school had not, however, ceased, and the Council could not be satisfied with its condition unless certain radical changes were sooner or later made in it. With those remarks he would, in accordance with the generally expressed view of the Council, consent to withdraw his motion.

Administration of the Benevolent Fund.

Mr. Robbins moved, pursuant to notice:—

> "That it be an instruction to the Benevolent Fund Committee in the administration of the Fund that members and associates of the Pharmaceutical Society, widows and orphans of the same, and also subscribers to the Fund, on their application for aid should be considered to have a prior claim over those who have never been connected with the Society nor have contributed to the Benevolent Fund."

He said that his reason for moving the resolution was that the Committee had at present no power to make distinction between persons connected with the Society and those who had no connection with it. An idea prevailed among outside chemists that they had as great a claim on the Benevolent Fund as the members of the Society themselves, and he was desirous to see that idea removed. The fund was founded by the Society for the benefit of its members and associates, and was at the present time almost entirely sustained by their subscriptions, so that the present system was a great injustice to those whose interests it was the duty of the Council to protect. That injustice would be seen when it was considered that there were 10,000 chemists, mostly non-subscribing, outside the Society's ranks against the 3000 members, and it could not be matter for surprise, therefore, that the large proportion of applications were from non-members, to whom it was never contemplated when the fund was founded that more than half of it, as was now the case, should be given. The evil was a growing one, and if nothing were done the time would come when three-fourths instead of half the fund would be taken by those outside the Society. He would like to see a rule adopted to the effect that members and associates elected in the usual way as annuitants should, if their subscriptions had amounted to say £10, be eligible to receive £40 a year, and if to £20, to £50 a year. Such a rule as that would act as a stimulus to subscribers, but he merely threw it out as a suggestion as it was no part of the motion. It was a fact that members had taken umbrage at the large grants made to outsiders in comparison with those made to members, and he wished therefore that power should be given to the Committee to make a distinction between them.

Mr. Richardson seconded the motion, considering that in view of the dark future threatening for pharmacy, it was desirable the Society should put its house in order and take steps to be in a position to afford needed assistance to its own distressed members.

Mr. Williams wished to correct the statement of Mr. Robbins as to the source of the subscriptions, in case it should create prejudice if allowed to go forth. It was by no means the fact that nearly all the subscriptions to the fund came from members, and Mr. Robbins had exaggerated the proportions of payments. At the same time outsiders did not contribute as they might, and even half-a-crown from each of the non-members would be amply sufficient to meet all the claims upon the fund. Last year against £376 which had been granted to members only £322 had been distributed among persons not connected with the Society or subscribers to the fund. He could not understand what Mr. Robbins meant by acknowledging the prior claim of the former, as the Society had never yet been unable to respond to every appeal made to it for charity. At one time the benefit of the fund was exclusively given to the subscribers, and he then declined to subscribe a penny to it, and it was only when an alteration was made, and the benefits of the fund were extended to all who were on the Register that he had done what he could to assist the fund. If its application were now to be restricted to subscribers he would be one of the first to retire from subscribing to it.

Mr. Savage thought some distinction should be made to show that there was an advantage in subscribing to the fund.

Mr. Sandford hoped the fund would not be made the subject of any illiberal distinction, and that the Council would not pass the resolution, however much it might deem it desirable to protect the interests of the members of the Society.

Mr. Symes said the motion appeared to be a coercive measure intended to compel subscriptions to the fund. It was said that many of the people who came upon the fund had not subscribed to it, but probably they had never been in a position to do so and had not for years and years had a shilling to spare for the purpose. He would not say a word in defence of those who could subscribe to the fund and did not, but would urge upon the Council that if there was any question on which it should be careful not to narrow its sympathies it was in the distribution of the Benevolent Fund. The wording of the motion was most unfortunate; in spirit it might be good but in letter it was very bad.

Mr. Frazer pointed out that a comparison of the amounts distributed with the stated numbers of subscribers and non-subscribers proved that if there had been any preference shown it had not been in favour of the latter.

Mr. Radley said that at all events whatever became of the resolution, the discussion would probably benefit the fund by inducing numbers in the trade to become subscribers who were not already.

Mr. Hampson said it would not be right for the Council to make a distinction between members and non-members, nor would it be wise for it to make a distinction which was not made in the Act of Parliament. Hitherto, the Society had always been able to afford relief to all who asked it. It seemed unfair, no doubt, that those who did not contribute to the fund should derive benefit from it, and he would prefer to alter its character more in the direction of making it a provident fund.

Mr. Mackay suggested that it would be wise, after the discussion which had taken place, for Mr. Robbins to follow the example of Mr. Hampson and withdraw his motion. As a rule no case brought before the Committee and properly supported failed to receive relief, and it was only in very bad cases that substantial assistance was or should be refused.

Mr. Squire was also of opinion that it would be better the Committee should continue to inquire into the merits of each case for relief, and not to be fettered by such a resolution.

Mr. Robbins, in reply, denied that he had made exaggerated statements, and said the figures showed that considerably more than half the fund had been given to non-members of the Society. His resolution would not stop relief to persons outside, but would only make their cases subject to the prior claim of members and subscribers, and the measure was, he thought, really one of the mildest character. He had known positive instances where members had suffered under the present system by the Committee holding back after having made grants to a considerable amount.

The motion was then put and lost.

Donations to the Museum.

In reply to the Vice-President's inquiry,

Mr. Frazer stated that a number of specimens had been handed to him as a gift by the Directors of the Tharsis Sulphur and Copper Company, Glasgow, as a donation to the Museum of the Society. The specimens represented the raw ores, their products and by-products.

Application to be placed on the Register.

Among the letters read was an application from a person to be placed on the Register without an examination, but the Council was unable to accede to the request

REPORTS OF THE GOVERNMENT VISITORS TO THE EXAMINATIONS.

The Secretary submitted to the Council three reports which he had received from the Privy Council Office in August. These it is intended to publish in the next number of the Journal.

The Council then adjourned.

Erratum.—On p. 64, col. ii., in the list of persons who passed the Minor examination in Edinburgh, on July 13, *for* "Dick, James Miller," *read* "Dick, George Walter."

PHARMACEUTICAL MEETING.

Wednesday October 6, 1880.

The first evening meeting of the session was held on Wednesday, October 6, the chair being taken at half-past eight by Mr. Schacht, Vice-President of the Society.

The **CHAIRMAN** said that the President was absent in consequence of the delay of a steamer by which he was about to return from St. Petersburg, and he (Mr. Schacht) was bound to take his place. Although regretting his absence, he was also, he must confess, somewhat pleased and gratified by an accident which allowed him to take such a prominent position on such an interesting occasion, although he had certain misgivings about being able to fulfil its duties properly. He was sorry for the President, as it would have been to him a matter of great gratification to preside on the present occasion, and welcome the young men who were destined to receive the reward of their hard work at his hands, and certainly it would have been a great gratification to the President to welcome Dr. Langdon Down, who had been good enough to undertake the delivery of the address to the students. His (the Chairman's) first duty would be to ask Professor Redwood, the Professor of Chemistry and Pharmacy, to report on the competition for prizes in the Chemistry and Pharmacy Lecture Class.

REPORT ON THE CHEMISTRY AND PHARMACY CLASS.

Professor **REDWOOD** said that although the custom which was adopted on these occasions of connecting the past with the present and with the future had, undoubtedly, some very important advantages, he had sometimes wished, as he had wished then, that it had been possible to invert or to alter the order of the proceedings, so that instead of commencing with the commonplace expression of a professor's report, they might bring more prominently into the foreground the address which they would all be anxious to hear, or the students of the past session who would by-and-by have to appear before the meeting. He was very glad to find that the important part of the evening's proceedings, the delivery of the address, had been taken by his friend Dr. Langdon Down, who was a student within those walls more than thirty years ago, and had been a very able assistant in the school. No one could be more fitted than that gentleman to offer words of advice and encouragement to the students. He had risen from the class, and pursued a most prosperous and successful career, and his experience offered a bright example of what could be done by steady perseverance and fixed determination to attain to the object of one's ambition. It would be a source of considerable gratification to Dr. Down to find that after the lapse of so many years they were still pursuing the same course of sound pharmaceutical education which was founded by those who might be called the fathers of British pharmacy. The illustrious names of those who were engaged in founding this systematic education included those of William Allen, Charles James Payne, Jacob Bell, Thomas Newborn Morson, Peter Squire, George Waugh, Daniel Bell Hanbury, and Henry Deane. And among those who were the first active agents, they had Anthony Todd Thompson, Jonathan Pereira, and George Fownes. The last session of their school was its thirty-eighth, and they had, therefore, had some experience in the work of pharmaceutical education. It might be asked of them, "Have you discovered any royal road to knowledge?" "Have you found that it is possible to get at the spring which continues to flow without digging deeply and laboriously?" Their answer was "No; we still adhere to the same system." That system which was first founded and established by those who bore the honourable names which he had mentioned was that which was alone advocated and supported by all good and wise men who took an interest in the subject of pharmaceutical education. The Professors found it their duty to endeavour to convey knowledge deliberately, not to hasten it, for they were assured that knowledge to be permanent and useful must be deliberately acquired. They felt that it was their duty not merely to teach but to educate. It was mainly through the persistent study and application of the students that credit could be acquired by the institution and benefit be conferred upon the profession of pharmacy. He had to bring under the notice of the meeting the gentlemen whose names had already been communicated by him to the Council and to whom the Council had awarded certain marks of distinction. There were two classes of students who were thus rewarded. One class had studied for one course of five months, and might attain to the distinction of receiving a bronze medal or certain certificates of merit. During the last session there had been two courses of instruction, one extending from October to February, and the other from March to July. During the first of those courses there had been a larger number of competitors for the bronze medal and certificates of merit than during the second course, for in the second part of the time a certain number of the students were students not of five months, but of ten months, and it had always been the object of the Council and of the Society to encourage those who came to study for the longer period. At the end of the course, which ended in February, Mr. William Elborne, who was a Bell Scholar, obtained the bronze medal, the value of his answers in the class being estimated at 88 out of 100. Mr. Robert Wright was close upon the heels of Mr. Elborne, and he (the Professor) had a difficulty in deciding whether the medal should be given to Mr. Elborne or to Mr. Wright. The lowest number of marks in any one of the cases was 76 out of 100. During the second five months, as he had already said, there was a smaller number of these students; there were three to whom awards had been made. But there was what might be called a higher class of ten months' students, and in that category there was a silver medal awarded, and there were two classes of certificates, namely, certificates of honour and certificates of merit. Certificates of honour might be looked upon as, perhaps, equal in value to the bronze medal, because the number of marks which must be gained must amount to the same as in the case of a bronze medal. He hardly needed to say that the gentlemen to whom the awards had been made had all well merited the distinction which they had obtained.

The following is a list of the students in this class to whom prizes were awarded:—

Five Months' Courses.

FIRST COURSE.

Bronze Medal	William Elborne.
Certificates of Merit	Robert Wright. David Hooper. James Williams. William Fowler.

SECOND COURSE.

Bronze Medal	Thomas Hart.
Certificates of Merit	John Henry Chaplin. Ernest Frederick Salmon.

Session. Ten Months.

Silver Medal	William Fowler.
Certificates of Honour	Robert Wright. John Thomas. William Elborne. David Hooper.
Certificates of Merit	Ed. Chas. James Davies. Wm. Hodginson Jackson.

The following were the questions for the examination:—

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES.

Time allowed: 4 *hours.*

1. What is the weight of a fluid ounce of a liquid, the specific gravity of which is 1·48?

2. If a piece of platinum were weighed in the usual way in air, with brass weights, and its weight found to be 500 grains, and if it were afterwards weighed with the same weights under an exhausted receiver, that is, *in vacuo*, would the second indication differ from the first, and if so, would it be more or less?

3. What is the meaning of the expression "mechanical equivalent of heat?"

4. What are the best excipients for giving a pilular consistence to the following medicines—namely, calomel, camphor, creasote, copaiba, oil of peppermint, mercurial ointment?

5. Describe the terms maceration, digestion, elutriation, lixiviation, percolation, and displacement, as used in pharmacy.

6. Describe the production of sulphurous anhydride from sulphuric acid and mercury, and from sulphuric acid and charcoal.

7. Describe the action of sulphurous acid as a decolourizing agent, and the difference between its action and that of chlorine. Name some of the organic substances to which the former is advantageously applied for depriving them of colour.

8. Describe the effects of different degrees of heat on zinc, and the way in which this metal may be reduced to the coarsely granulated and also to the finely granulated state.

9. Define the terms *alcohol*, *ether*, *aldehyd*, *ketone*, and *olefine*, as used by chemists as generic terms.

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES.

Time allowed: 4 *hours.*

1. Give the values of the gramme, metre, decagramme and litre, in English measures.

2. Give the values of the ounce, pound, pint, fluid drachm, and minim, in grains and grain-measures.

3. Describe the method you would adopt for determining the specific gravity of a liquid the quantity of which at your disposal is only a fluid drachm.

4. In a balance, should the fulcrum be above or below the centre of gravity of the beam?

5. Which is the best and which is the worst conductor of heat, and also of electricity among the following substances: copper, iron, bismuth, charcoal?

6. In distilling water, how much cold water is required in the condenser (a worm-tub, for instance) to produce a gallon of distilled water?

7. Describe the processes of elutriation and clarification, as applied in pharmacy.

8. Describe chlorine, its production, properties, and some of its compounds.

9. Describe the production of alcohol from sugar by fermentation. Give the composition of alcohol, and show the relation it bears to ether, acetic acid, and aldehyde.

SESSION.

SILVER MEDAL AND CERTIFICATES.

Time allowed: 3 *hours.*

1. When was the French metrical system of weights and measures first introduced, and what was taken as the initial measure from which all others were deduced in that system?

2. When was the English system of imperial weights and measures first introduced and legalized, and what was taken as the initial measure from which all others were deduced in that system?

3. Has any essential change taken place with regard to the use of the initial measures originally referred to in the French and English systems of weights and measures for the purpose of verification by comparison?

4. Describe the law known as Boyle's or Mariotte's law relating to the compression and expansion of gases.

5. In a simple galvanic arrangement of a zinc and a platinum plate immersed in acidulated water, with connecting wires, which is the positive and which the negative terminal?

6. Describe and explain the phenomenon of fluorescence, referring especially to its occurrence in solution of sulphate of quinine.

Time allowed: 3 *hours.*

7. Describe the production of iodine from sea-weed. Give its properties, and the modes of producing some of its compounds, especially iodic and hydriodic acids, and iodide of potassium.

8. Describe the production of potash from wood, and the principal compounds of potassium, especially those used in medicine, from commercial potash.

9. How are the chlorides of calcium, magnesium, aluminium, and chromium respectively prepared?

10. Describe chloroform, its composition and properties, the method by which it is prepared, and the supposed reactions which occur in its production.

11. What are the essential characters of an alcohol? Illustrate the subject by reference to examples.

The Chairman then asked Prof. Bentley for his—

Report on the Botany and Materia Medica Class.

Professor **Bentley** said that his esteemed colleague, Professor Redwood, had gone into matters of detail which applied both to his (Professor Bentley's) course and to Professor Redwood's. There was only one matter which he should like particularly to mention. Professor Redwood had spoken of the old and the new. He (Professor Bentley) could not but recollect amongst his brightest remembrances that he attended as a pharmacy student the first course of lectures in that institution, and got the first prize that was ever given in it. He could speak now, as he had always spoken in former years, of the good conduct, regularity of attendance, punctuality, and progress of the students attending his class. This was a tale that had been told for thirty-eight years. The reputation which the students of the School of Pharmacy had obtained had been maintained in every respect during the last year. In the first five months' course the bronze medal was obtained by Mr. David Hooper with 90 marks out of 100. In the case of the certificates of merit, the marks must be over 75 out of 100. This was a very high standard for a certificate of merit, the ordinary standard being 60, and therefore everyone present would be satisfied that the gentlemen who received the certificates of merit had well deserved those distinctions. In the second of the five months' courses, the bronze medal was obtained by Mr. John Henry Garrett with very high marks. As to the ten months' course, it was a source of peculiar gratification to him to find that the silver medal had been taken by Mr. David Hooper, the student who obtained the bronze medal in the first course. Two years ago Mr. Hooper sent in a collection of plants, for which he obtained a bronze medal. He (Professor Bentley) then ventured to say that that was not the last time they would hear of Mr. Hooper, and on the present occasion he came before them most honourably distinguished. They might depend upon it that those men who worked during their articles of apprenticeship, and obtained distinction in the School of Pharmacy, were those who generally succeeded in after life. Mr. Hooper obtained the silver medal with a very high average, having obtained 113 marks out of the possible number 125. This was a high proportion. There could be no question as to the merit of his answers. The others were also highly distinguished, and the average of marks was very large. He felt fully persuaded that the gentlemen who were rewarded on this occasion would maintain the dignity of pharmacy.

The following is a list of students in this class to whom prizes were awarded:—

FIVE MONTHS' COURSES.

FIRST COURSE.

Bronze Medal	David Hooper.
Certificates of Merit	Robert Wright. William Elborne. Willam Fowler. John Thomas.

SECOND COURSE.

Bronze Medal	John Henry Garrett.
Certificates of Merit	Alfred Hornby. John Henry Chaplin. Thomas Hart.

SESSION. TEN MONTHS.

Silver Medal		David Hooper.
Certificates of Honour		William Elborne.
	Equal	William Fowler. John Henry Garrett. Robert Wright.
Certificate of Merit		John Thomas.

The following were the questions for the examination:—

FIRST COURSE.

BRONZE MEDAL AND CERTIFICATES.

Time allowed: 3 *hours*.

1. Describe the structure of the bark of a dicotyledonous stem.
2. Define the following terms:—Parenchymatous, prosenchymatous, epidermis, stoma, vitta, node, tuber, and corm.
3. What is the structure of the ovule? Explain the terms angiospermous and gymnospermous.
4. What are the official parts of *Aconitum Napellus;* and what are the distinctive characters of aconite and horseradish roots?
5. What is tragacanth? How is it obtained, and what are its botanical and geographical sources?
6. What are the botanical sources, general characters, and chemical composition of black pepper, long pepper and cubebs; and mention the constituents to which their medicinal properties are due?

SECOND COURSE.

BRONZE MEDAL AND CERTIFICATES.

Time allowed: 3 *hours*.

1. What are the distinctive characters of roots and stems? Define the following:—Spine, prickle, rhizome, tuber, corm, and bulb.
2. Describe the structure and mode of development of a leaf-bud.
3. Distinguish between determinate, indeterminate and mixed inflorescences; and define a spadix, corymb, panicle, capitulum, umbel, and helicoid cyme.
4. What are the physical and chemical characteristics of black and white mustard seeds?
5. What are the botanical and geographical sources of the official buchu leaves, and what are the characters of each?
6. Enumerate the official plants of the Rosaceæ, and describe the botanical source, general characters and chemical composition of bitter almonds.

SESSION.

SILVER MEDAL AND CERTIFICATES OF HONOUR.

Botany.

Time allowed: 3 *hours*.

1. What is protoplasm? Where is it found, and what are its chemical composition and uses?
2. Define the following terms as applied to leaves:—Peltate, decussate, obvolute, reclinate, serrate, retuse, obovate, pinnate, pinnatifid, biternate, ligule, and phyllode.
3. Describe the structure of pollen, and explain the process of fertilization in angiospermous dicotyledons.
4. Describe the principal kinds of dehiscence in simple and compound fruits.
5. Distinguish the Iridaceæ from the Amaryllidaceæ, Liliaceæ and Melanthaceæ.
6. Give the essential characters of the following natural orders:—Malvaceæ, Caryophyllaceæ, Umbelliferæ, Oleaceæ, Boraginaceæ, and Polygonaceæ.

Materia Medica.

Time allowed: 3 *hours*.

1. What are the botanical and geographical sources of the official Cusparia bark and of the spurious bark? and show how they may be distinguished from one another.
2. Enumerate the official substances of the Umbelliferæ and their botanical sources. How is galbanum obtained, and what are its general and chemical characters and its official preparations?
3. What are the botanical and geographical sources of calabar beans? Describe their general and chemical characters.
4. What is storax? How is it obtained, and what are its general and chemical characters?
5. Describe the general and chemical characters of dandelion root. Show how it may be at once distinguished from other roots, and mention the period usually regarded as the best for its collection and the data on which such an opinion is founded.
6. What are the botanical and geographical sources of kamala? Describe its general and chemical characters and state its uses and doses.

REPORT ON THE PRACTICAL CHEMISTRY CLASS.

Professor **ATTFIELD** said that during the whole pharmaceutical year there was no duty which he performed with more pleasure and satisfaction than that of testifying at the October evening meeting to the uniform assiduity and gentlemanly behaviour of the students of the Society's school. On the present occasion not only could he endorse all that his colleagues had said on that subject, but he could also go somewhat further than usual. In considering the condition of a school, mere numbers may mislead. Regard must also be had to the quality of the knowledge which the pupils directly and indirectly acquired. With regard to the former it was not for a professor to say one word. As to the knowledge which they might obtain indirectly, he thought that he should be able to show that during the past session the condition of the school as a school, without reference to the numbers attending, was satisfactory. There was a growing demand on the part of the public, not only that all known remedies should be presented to them in as active and as palatable form as possible, but that new remedies which might at present only be known to the uncivilized savage, or exist only in the unexplored forest, or the undug mine, should be properly investigated and placed at the public service. Where was to be obtained the knowledge which would enable that demand to be supplied? He thought that no member of the medical profession would claim that such knowledge would be forthcoming from medical pharmacy; and although the public might obtain pharmacy of a kind from another quarter, and obtain it very cheaply from the places which he was thinking of, he was sure that they would not obtain high-class pharmacy from co-operative stores. The kind of knowledge to which he was alluding, pharmacists amongst themselves termed "original pharmaceutical research." But what was especially wanted was a widely distributed power of seizing on the researches of the few and applying them to the medicinal wants of the public. Medical pharmacy could not supply the demand; here too, co-operative pharmacy failed; the passing of an examination did not ensure its supply. It could only be got from those who have been soundly and deliberately trained. He claimed that the Council of the Society provided such training in their School of Pharmacy. As evidence in support of this, he would adduce the fact that although last session the number of pupils attending the school was small, the desire which they evinced to be led into the beginnings of paths of pharmaceutical research was greater than it had been in any previous session. No fewer than twenty-eight papers and reports were read by students before the School of Pharmacy Students' Association, which Association the Council had done its utmost to support. This was a greater number than had been read in any previous session. All these papers had a bearing on pharmacy, but four might be classed as chemical, one botanical, one educational, one biographical, one physiographical, and six were pharmaceutical in the strictest sense of the word. Of the reports, two were botanical, two were on materia medica, two were on pharmacy, two on organic chemistry, two on inorganic chemistry, two on analytical chemistry, and two on physical chemistry. All the reports were considered of sufficient importance to be noticed by the talented Editor of the *Pharmaceutical Journal*, and many of the papers were printed *in extenso*. The knowledge which enabled men to produce work of that kind was the knowledge which would enable the new remedies of the world to be presented to the public for their use; and he claimed that the Council provided successfully for the attainment of that knowledge in their School of Pharmacy. With regard to the competition at the end of the session, he had to report that no fewer than seventeen entered to compete for the Council's prizes, consisting of medals and certificates of honour and merit, and that a gentleman whose name they had already heard several times before—Mr. Hooper—obtained, not merely 87 per cent. of the possible marks, but 100 per cent., and he, consequently, took the silver medal. Two bronze medal were also obtained by gentlemen whose names they had already heard—Mr. Robert Wright and Mr. John Thomas, these gentlemen having obtained respectively 95 per cent. and 85 per cent. of the full number of marks. As to the certificates of honour and merit, the Council had awarded four to the following gentlemen—Mr. Thomas Burrell, Mr. William Hodgkinson Jackson, Mr. John Henry Chaplin and Mr. Thomas Hart. He had one word more to say about Mr. Hooper. That gentleman was one of those men who were blessed with perfect health, and he could get up at four o'clock in the morning day after day, and work hard till very late at night. He was a man who could eat plenty of bread and butter, and what was a far greater blessing than that, he could very well assimilate it. But, after saying that, he (Professor Attfield) must say that of the many men whom he had known who could eat bread and butter and assimilate it, he never knew one who could so persistently refuse all those temptations which a healthy man was likely to fall into, and who could work more persistently from early morning till late at night than Mr. Hooper.

The following is a list of students in this class to whom prizes were awarded:—

Silver Medal	David Hooper.
Bronze Medals	Robert Wright. John Thomas.
Certificate of Honour	Thomas Burrell.
Certificates of Merit	Wm. Hodgkinson Jackson. John Henry Chaplin. Thomas Hart.

The following were the questions for the examination:—

July 21st and 22nd, 1880.

Hours 10 to 5 each day.

(*Books and Memoranda permitted.*)

Standard number of Marks, 100.

FIRST DAY.

1. Prepare for me a small specimen of acetate of potassium—half an ounce or an ounce.
2. Make a qualitative analysis of the accompanying sample labelled "Moist Iodine," and state what impurities are present.

SECOND DAY.

3. What percentage of alkaloid is present in the "citrate of iron and quinia" supplied to you?
4. State not only the general but the special character of the "organic powder" placed before you; using such chemical and physical aids as may be at your disposal.

NOTE.—Manipulation as well as results will be scrutinized.

REPORT ON THE BOTANICAL PRIZE.

PROFESSOR BENTLEY, being called on to report on his subject, said that he had already indicated the value of the prizes which were given by the Council for herbaria, by stating his belief that those who succeeded in after years were those who distinguished themselves by their botanical knowledge during their early training. The recent competition had been a very good one, and five herbaria were sent in. The Council had awarded the silver medal for a very valuable collection of British plants, indicating great industry and practical knowledge, to Mr. John Hutchinson. He (Professor Bentley) was sure that, like Mr. Hooper, Mr. Hutchinson must have got up at four in the morning, or he could not have sent in nearly nine hundred specimens, as he had done. The two bronze medals were awarded to Mr. Walter Clark Drew and Mr. John Henry Leech, both of whom were eminently deserving of them. The number of specimens sent in by one exceeded the number sent by the other, but there were other elements to be taken into consideration besides number. The principal point was that they should have a knowledge of plants and be able to name them accurately; and, moreover, attention ought to be paid to the careful selection and preservation of specimens. Although the number of specimens was greater in one instance than in the other, the smaller collection was so admirably preserved that he had no hesitation whatever in reporting to the Council that he thought that it would be difficult to draw a distinction between the two collections. A collection sent in by Mr. James Thomas Bays was deserving of a certificate of merit. In conclusion, he most cordially congratulated all these gentlemen upon the awards which had been made.

The following were the awards:—

Silver Medal		John Hutchinson.
Bronze Medals	Equal	Walter Clark Drew. John Henry Leech.
Certificate of Merit		James Thomas Bays.

THE COUNCIL EXAMINATION PRIZES.

The CHAIRMAN said that they had another series of prizes, which went by the name of the Council Examination Prizes. The professors had already reported upon the work done by the younger students. The prizes which were about to be reported upon were for another set of students, namely, those who had already passed the Major examination. None could compete but those who had passed during the last session. The competition was consequently one amongst the selected spirits. He would ask Mr. Carteighe to report on the Council Examination Prizes.

Mr. CARTEIGHE said that the first medal in this competition bore the name of Dr. Pereira, a man who was honoured all over the world. He thought that it added very much to the lustre of a student if after having obtained medals and certificates in the class examinations he should obtain the present very high distinction in a competition with a select few. A prize in this competition was not a distinction for one subject only, for the competition embraced the three main divisions of the science of pharmacy—botany, materia medica, and chemistry. It afforded him and his colleague, Mr. Corder, great gratification to find that the papers were of great excellence, and they had felt much pleasure in carrying out the examinations. They had been delighted to find that the standard of knowledge had not deteriorated amongst the select few, and he thought that if Dr. Pereira were alive, and could examine this year's papers himself, he would be right glad in his heart. The Pereira medal in silver, with books to the value of £5, which were kindly added to the prize by the generosity of Mr. Hills, had been gained by Mr. Hooper. The examination was a written one, and therefore it was impossible to carry the test of practical work to the same extent as in a laboratory or elsewhere; but when he found that a Pereira medallist who exceeded by far all his competitors was, at the same time, the best practical chemist in the laboratory, he felt perfectly certain that Mr. Hooper was a man of unusual ability, and would do credit to any school. The two other medals had been gained by Mr. Drew and Mr. Fowler, both of whom had written exceedingly good papers.

The following are the names of those to whom the prizes are awarded:—

Pereira Medal (silver); and Books value £5, presented by Mr. T. H. Hills.

David Hooper.

Pharmaceutical Society's Medal (silver); and Books value £3, presented by Mr. T. H. Hills.

Henry William Drew.

Pharmaceutical Society's Medal (bronze); and Books value £2, presented by Mr. T. H. Hills.

William Fowler.

The following were the questions for this examinations:—

CHEMISTRY.

Time allowed: 3 hours.

1. Distinguish between atomic, equivalent and molecular weights.

2. An organic compound on combustion yields the following percentages. Calculate its formula, and name the compound:—

Carbon	68·67
Hydrogen	4·95
Oxygen	26·38

3. Acetic acid contains C 40·0 H 6·6 and O 53·4 per cent.; and chloracetic acid contains 37·5 per cent. of chlorine. Calculate the molecular weight of acetic acid.

4. How are carbolic and salicylic acids obtained in a pure state? Give their physical and chemical properties.

5. An acid solution contains antimony, arsenic, and tin. How would you separate them?

6. Describe briefly the chemistry of brewing and vinegar making.

BOTANY.

Time allowed for the following two papers: 3 hours.

1. How would you distinguish the leaves of *Taxus baccata* (common yew) from those of other plants?

2. What plants produce tea, coffee, cocoa, chocolate, and chicory? Give the natural orders and the parts used.

3. Give the characters of the natural order Rosaceæ, the sub-orders with the fruits; and mention the plants of this order used in medicine, commerce, and the arts.

4. Describe minutely the plant before you, and give the natural order to which it belongs.

MATERIA MEDICA.

1. What is ergot, and what is the cause of its growth?

2. Give the botanical names and habitats of the trees yielding the turpentines of commerce; describe the

methods by which they are prepared and their physical and chemical characters.

3. What are the characters of Jamaica sarsaparilla and whence is it obtained?

The CHAIRMAN, before handing the prizes to the successful competitors, congratulated them very heartily in the name of the meeting. He thought, from what they had heard, that they might very fairly congratulate the professors in the school and the teachers of the classes on the students having passed such very good examinations. Lastly, they might congratulate the Society on the possession of a school which turned out such creditable results at the end of a session.

The CHAIRMAN then presented the various prizes and certificates to the successful competitors. He also presented a copy of 'Pharmacographia' and a copy of 'Science Papers' to Mr. David Hooper, and a similar gift to Mr. William Fowler. He reminded the meeting that copies of these works had been placed in the hands of the Society by Mr. Thomas Hanbury to be given in memory of Daniel Hanbury to the winners of silver medals in the sessional school competitions.

The PRESIDENT then called upon Mr. Plowman to report on the competition for

THE JACOB BELL MEMORIAL SCHOLARSHIPS.

MR. PLOWMAN said that he rose to perform a peculiarly pleasant task. When the report upon the examination for the Bell Scholarships had been presented in former years, a complaint had usually been made by the reporting examiner that there had been so little competition for these valuable prizes. Last year, in particular, his then colleague, Mr. Taylor, was very emphatic in calling attention to the value of these scholarships and to the small number of competitors for them. As an old Bell Scholar himself he could fully bear out what Mr. Taylor had said as to the value of these prizes and from personal experience could testify to the very great advantages enjoyed by the Bell Scholars, for not only was the money value of the scholarships considerable, but successful competitors were granted a free education in the school of the Society under its distinguished professors. The latter was a privilege he could not possibly over-estimate. He might also add that with characteristic generosity Mr. Hills presented in addition an annual prize of books to each of the scholars. With regard, however, to the character of this year's competition, he was sure his hearers would share his satisfaction in being able to state that there could be no possible ground for complaint. In fact the number of competitors was nearly double that of last year. Nineteen candidates in all presented themselves, 10 in London and 9 at different centres throughout the country; of these no less than 9 earned more than two-thirds of the full number of marks; that is to say more than enough to qualify for a scholarship. The number of candidates was quite unprecedented, and it was also unprecedented that such a large number should attain such a high degree of excellence. The successful candidates were Mr. Frederick Charles Bird, of Bath, and Mr. John Oldham Braithwaite, of London, so that the honours were equally divided between town and country. As only two scholarships could be awarded the Council had already marked their appreciation of the high average merit of the non-successful competitors by publishing the names of those who qualified for, but did not obtain a scholarship. After these remarks it was needless to say anything in praise of the successful competitors. The fact of their being placed at the head of the list after such a severe competition in itself spoke volumes, and further comment was unnecessary. A word, however, to the so-called unsuccessful ones. He said so-called advisedly, because he considered that they had really achieved a solid success, for though they were not rewarded by prizes, the training which the majority had undergone would be of the greatest possible value to them, and many of the papers gave promise that their writers would become accomplished members of their calling, and would raise its dignity and status. Amid so much excellence it might seem ungracious to call attention to anything that was not praiseworthy. At the suggestion, however, of his colleague, Mr. Brady, he must make some reference to the writing. He spoke feelingly of the matter, for in some cases the writing was simply execrable, and it required a considerable amount of study on the part of the examiner to arrive at the candidate's meaning. Mr. Brady, in a letter, suggested that about six easy lessons in writing should be taken by intending candidates before presenting themselves, and added with epigrammatic force that "words, we know on good authority, were given to men to conceal their ideas, but I have never learnt that writing was given them to conceal their words." Seriously, however, he (Mr. Plowman) considered that it was almost as important for the pharmacist to write a plain legible hand as to be able to turn out a decent box of pills or to make a good emulsion. Mr. Plowman concluded by hoping that the competition next year would be as good as or still better than this.

The CHAIRMAN presented the Bell Scholars with the books given by Mr. Hills.

The successful competitors for the Scholarships were—

Frederick Charles John Bird

and

John Oldham Braithwaite.

The questions set for this examination were as follows:—

Time allowed: Three hours.

LATIN.

Translate into English:—

1. "Quæcumque in foliis descripsit carmina virgo,
Digerit in numerum atque antro seclusa relinquit,
Illa manent immota locis neque ab ordine cedunt;
Verum eadem, verso tenuis cum cardine ventus
Impulit et teneras turbavit janua frondes,
Nunquam deinde cavo volitantia prendere saxo,
Nec revocare situs aut jungere carmina curat:
Inconsulti abeunt sedemque *odere* Sibyllæ.
Hic tibi nequa moræ fuerint dispendia *tanti*,
Quamvis increpitent socii et vi cursus in altum
Vela vocet possisque sinus implere secundos,
Quin adeas vatem precibusque oracula poscas
Ipsa canat vocemque volens atque ora resolvat."

2. "Arida simul in pulverem subtilissimum tere, et in vase obturato conserva. Tum quoties confectione *utendum est*, instillato syrupo, iterum tere; denique *adjecto oleo*, omnia misce."

3. Parse the italicized words in the passages given above.

4. Decline in singular and plural *quæcumque carmina*, and give the present, perfect, infinitive and supine of *digerit, relinquit, tere, misce*.

ENGLISH.

Write a short essay on Money.

Parse fully :—

"Good sir, I do in friendship counsel you
To leave this place."

ARITHMETIC.

1. The specific gravity of a liquid is 1·25. How many grammes does 1 gallon of it weigh?

2. A piece of land is sold for 490 guineas. A. takes $\frac{19}{32}$ of $\frac{3}{5}$ of the money, B. takes $\frac{17}{25}$ of $\frac{3}{7}$, and C. takes the remainder. What amount does each receive?

3. What decimal added to the sum of $1\frac{7}{24}$, $\frac{5}{8}$, and $\frac{13}{36}$ will make the sum total equal to 3?

4. Find the sum of 2·56, 8·493, and 4·63 correct to six places of decimals.

FRENCH OR GERMAN.

The candidate is at liberty to choose either French or German, and is not required to show a knowledge of both.

FRENCH.

Translate into English :—

"Comment! C'est un homme qui fait des miracles. Il y a six mois qu'une femme fut abandonnée de tous les autres médecins : on la tenait morte il y avait déjà six heures et l'on se disposait à l'ensevelir, lorsqu'on y fit venir de force l'homme dont nous parlons. Il lui mit, l'ayant vue, une petite goutte de je ne sais quoi dans la bouche; et, dans le même instant, elle se leva de son lit, et se mit aussitôt à se promener dans sa chambre, comme si de rien n'eût été."

And :—

"Les eaux distillées ne possédent pas toutes leurs qualités au moment où elles viennent d'être préparées; ce n'est qu'au bout d'un certain temps qu'elles ont acquis leur plus grande suavité : aussi convient-il de ne les employer qu'un mois ou deux après leur préparation."

GERMAN.

Translate into English :—

"O, eine edle Himmelsgabe ist
Das Licht des Auges—Alle Wesen leben
Vom Lichte, jedes glückliche Geschöpf—
Die Pflanze selbst kehrt freudig sich zum Lichte.
Und er muss sitzen, fühlend, in der Nacht,
Im ewig Finstern—ihn erquickt nicht mehr
Der Matten warmes Grün, der Blumen Schmelz,
Die rothen Firnen kann er nicht mehr schauen—
Sterben ist nichts—doch leben und nicht sehen,
Das ist ein Unglück."

CHEMISTRY AND PHARMACY.

Time allowed: Two hours.

1. What is meant by the term combustion? If a lighted candle be placed in a jar of chlorine what is the result?

2. Describe methods for preparing chlorine, bromine and iodine. In what respects are these bodies analogous?

3. What is the chemical composition of vermilion, Iceland spar, gypsum, cinnabar, butter of antimony, galena, verdigris, white lead and calamine.

4. What weight of hydrate of potassium is formed by the action of 10 grammes of metallic potassium upon water?

5. In what respect does the preparation of an infusion differ from that of a decoction? Mention any peculiarities in the methods of preparing infusum calumbæ, infusum chiratæ, infusum cuspariæ, infusum cusso, infusum quassiæ and decoctum granati radicis.

BOTANY.

Describe a complete flower.

State what you know of the general structure and functions of the leaf.

INAUGURAL SESSIONAL ADDRESS.

The **President** then called upon Dr. J. Langdon Down, M.D. Lond., F.R.C.P., to deliver the Inaugural Sessional Address. This will be found on p. 289.

At the close of the Address—

The **Chairman** rose to convey to Dr. Langdon Down, in the name of the meeting, their hearty thanks for the address which he had just delivered. He felt that the occasion was a special one, and that there was a difference of which they ought to take cognizance, for the words of wisdom and advice and sympathy which the address contained came from one who was outside their own body. When they heard such words come from one who was an eminent member of the medical profession, and from one who, with the eye of a philosopher, could see clearly the relation of parts to a whole, as Dr. Down saw it, they felt, with a little more emphasis than if those words had been presented by one of themselves, that their calling was an important one. He was sure that the meeting would join with him (the Chairman) in conveying their hearty appreciation of the value of the address.

Mr. **Sandford** said that the Vice-President had requested him to second the vote of thanks, but it was entirely unnecessary for him to do so. He was sure that they all felt greatly indebted to Dr. Langdon Down for the admirable address which he had given them. He had given them words of congratulation and encouragement, and he had added words of caution. He (Mr. Sandford) hoped that these would sink deeply into their minds, and that they would all be better for what they had heard that night.

Dr. J. **Langdon Down**, in acknowledging the vote of thanks, said that it was quite cheering to come again and to meet so many friends of his early days. He might tell the prizemen that the first scientific impulse which he received was the prize handed to him at the table in that room.

On the motion of Mr. **Taylor**, a vote of thanks was accorded to the Chairman. The Chairman made a brief acknowledgment.

Correspondence.

****⁎* No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.***

H. Flux.—We do not know where you could get a set of Modified examination questions that have been given recently. Neither do we think it probable that the Board of Examiners would allow such an examination to be held by a local secretary.

H. Nicholson.—A recipe for Chilli Paste will be found in the *Pharm. Journ.* for May 1 last, p. 887.

W. R. Kermath is thanked for his communication.

L. Pritchard.—The 14th section of the Weights and Measures Act provides that—"One sixteenth part of the imperial standard pound [avoirdupois pound] shall be an ounce, and one sixteenth part of such ounce shall be a drachm, and one seven thousandth part of the imperial standard pound shall be a grain."

C. P. C. (who should have sent his name and address).—Some information respecting luminous paint may be found in the Journal for May 1st, p. 882.

"*Crinis.*"—A solution of peroxide of hydrogen is said to be used for the purpose.

"*Xenophon.*"—A solution of bimeconate of morphia may be prepared as follows:—Bimeconate of Morphia, 10 grains; Rectified Spirit, 1 fluid drachm, Distilled Water, 13 fluid drachms.

Communications, Letters, etc. have been received from Messrs. Conroy, Fletcher, Gall, Brown, Long, Darling, Thomson, Haydon, Street, Foster, Hill, Agnos, Spathula, Pharmacist.

NOTES ON CHIAN TURPENTINE.

BY PROFESSOR FLÜCKIGER.

This drug has recently been in much request, as may be seen from the notes in this Journal, vol. x. (1880), pp. 955, 1026, and xi. (1880), p. 271, which have been devoted to this turpentine.

It is not at all probable that a good and regular supply of it could be obtained from Chio. The island, on the whole, has never produced it largely, as already stated in the 'Pharmacographia,' 2nd edition, p. 166.

Pistacia Terebinthus being distributed over a very wide area, could well be laid under contribution from other countries. The best plan would perhaps be to go to Algeria. In the Algerian forests the terebinth may be found very frequently, either mixed with oaks and lentisks, or even in clumps in small woods. The trees grow to the height of 50 feet and to more than 6 feet in circumference and attain a very great age. I was surprised some time ago to learn the following statements in regard to the turpentine, which I will translate literally from the "Flore forestière," 3rd edition, 1877, p. 72, written by a very competent observer, viz., Mr. A. Mathieu, conservator of forests, and professor in the French School of Forests at Nancy.

"Tears of a white and very fragrant turpentine exude from the bark of *Pistacia Terebinthus*; in the hot season they are flowing out in such an abundance that it becomes difficult sometimes to enjoy the shade of the tree. The tears soon solidify. The resin is then termed in Algeria 'lek' or 'alk' meaning lacker. It is very similar to the 'mastick' of Scio or Chio."

A large terebinth tree will yield 7 to 14 ounces annually.

Mathieu's statement as to the rapid hardening of this turpentine is quite in accordance with the description given in the 'Pharmacographia.' It may fairly be presumed that the Algerian resin is identical with that originally collected in the island of Chio.

The authors of the 'Pharmacographia' are of the opinion that another kind of terebinth, "*Pistacia atlantica*," Desfontaines, growing to a large size all over Northern Africa, is but a variety of *Pistacia Terebinthus*, but Mathieu considers them to be distinct trees. However this may be, he further says that *Pistacia atlantica* also affords an abundance of the same turpentine as the genuine *Pistacia Terebinthus*. We may further suppose that the supply of products under notice might be largely increased by systematically puncturing the bark.

There is thus a possibility of procuring any quantity of Chio turpentine at a moderate rate, in order to enable the medical profession to settle the question as to the real merits of this old drug, which is singularly again claiming a position in the modern materia medica.

CHIAN TURPENTINE.

BY PROFESSOR JOHN CLAY.

The following paragraphs are extracted from some Notes on Chian Turpentine, by Professor Clay, published in the *Lancet* for the 2nd instant:—

"It is a matter for regret that the supply of the genuine Chian turpentine has been so limited, as this has led to the substitution of factitious drugs, the use of which, as I have previously explained, unfavourably influences the results, besides entailing the further disadvantage of preventing a thorough testing of this method of treating cancer. I believe it is a fact that Chian turpentine, in mass, can scarcely be procured in this country at the present time, and therefore it is obvious that the treatment of the disease must be somewhat in abeyance until a supply of the pure drug arrives from abroad. I hope that the difficulty will soon be overcome, as I have been making special efforts to obtain the pure turpentine direct from Scio, and have had three excellent samples of the genuine drug sent to me through the post from that island; a supply may therefore be expected shortly, when the purity of the drug at least will be definitely determined. The specimens referred to differ in some particulars from the Chian turpentine which I have previously described, and which had been in stock some years. There are also samples of larch turpentine in the market, which slightly resemble the recently gathered genuine drug. It may be of advantage therefore to the profession to describe each, and to note their differences.

"Specimen No. 1 is of a pale, amber colour, and almost entirely free from impurities. It has the fragrant odour peculiar to Chian turpentine well marked, which is readily perceptible after rubbing a small portion between the thumb and finger. It has a mild terebinthinate taste, which rapidly disappears. On placing a small portion of the drug on a piece of glass, and exposing it to the atmosphere, it considerably thickens after a few days' exposure.

"Specimen No. 2. This, obtained last year, is the drug as collected. It contains a large quantity of foreign matter, such as pieces of bark, sand, etc., all of which give it a darker colour than the last mentioned specimen. Two ounces of this crude product yielded, after straining, upwards of half an ounce of impurities. The strained portion contained still a quantity of minute particles of foreign substances. The taste and odour are the same as in the specimen No. 1.

"Specimen No. 3 resembles soft glazier's putty, but is somewhat whiter, and is of the same consistence. It is Chian turpentine that has been well washed in water to free it from impurities. It has a mild taste of turpentine, and the peculiar odour is well marked. If a portion is subjected to pressure between two pieces of glass, water can be readily forced out of the mass.

"Three specimens have been submitted to me as genuine Chian which were purely larch turpentine. They may, as alleged, have been gathered in Cyprus. They have a strong odour of pine wood, and are of a browner appearance than the recent specimens just described. On tasting a portion, it appeared tasteless for the first minute, after which a strong bitter nauseous flavour became manifest, eventually leaving a strong sickening sensation at the back of the throat, which is slow to disappear. A portion placed on glass, and exposed to the atmosphere for four weeks showed no signs of thickening, and readily adhered to the fingers.

"The degree of solubility of the two kinds of turpentine, in ether and alcohol, is not materially different from that described in a former paper. The mild terebinthinate taste of the pure drug, its peculiar odour, with its power to solidify on exposure to the atmosphere, are characters sufficient to distinguish it from any other turpentine resin.

"It would appear to be not an easy matter to decide the question of purity, for upwards of three hundred specimens have been sent to me for examination by English and foreign medical men, most of them being guaranteed by the druggists supplying them, and it was a surprise to me to find so few examples of the genuine article amongst them. It will be as necessary now as before to use extreme vigilance in this respect in expectation of the new supply. In a large percentage of cases the factitious turpentine only has been used in the treatment of cancer. In one institution this was particularly so; and after the genuine drug had been tried for about three weeks, the results of the two were combined, and a letter forthwith appeared in the *Times*, alleging that the remedy was useless. A similar instance occurred in an institution in this town, where the impure drug was first used, and then after a trial with the pure drug for about three weeks, letters appeared in a medical journal declaring that the remedy was of no benefit in the treatment of cancer. It is plain that sufficient time has not been allowed to elapse for the full effects of the remedy to be manifested, as in these instances of condemnation it has almost invariably been declared inoperative after a few weeks' trial only. Besides the unsatisfactory results which have accrued from the use of the impure drug, the full effects of the pure turpentine have not been gained in some instances from the drug not having been entirely digested. This has arisen occasionally from its incomplete preparation for administration. In compounding the mixture, freshly prepared mucilage of tragacanth, B.P., has not been used, and then it rapidly decomposes; or sufficient of the mucilage has not been employed, which causes the resin to separate, and the doses of the medicine, therefore, have been irregular and insufficient. It has been shown in the *Pharmaceutical Journal* that acacia powder might be advantageously substituted for the tragacanth. It is necessary, therefore, to provide that a sufficient quantity of either gum shall be used in the preparation of the Chio turpentine mixture. Where the digestive powers are impaired, an addition of twenty minims of the compound tincture of cinchona to each dose has occasionally proved beneficial. The discontinuance of the sulphur has been advised, in order to make the mixture more elegant and miscible. I believe, however, that the mixture is more efficient, when it is well tolerated, if prepared with the sulphur.

"In reference to the pills, if they are not properly prepared they are not always digested. If this is discovered on examining the evacuations, the use of the mixture in conjunction with the pills is indicated; that is, a dose of the mixture should be taken by the patient night and morning, and two pills in the middle of the day, in each case after food. It is advisable, when commencing the treatment, to give only half doses of the turpentine for the first week. Magnesia should not be used as an excipient in the preparation of the pills, but whether this exception ought to apply to the recently collected drug future experiment will have to decide. Pills prepared with magnesia are almost insoluble, and the same remark applies to some coated ones. The pills may be prepared sometimes with ether, to soften the turpentine, or it may be made soft by immersing the mortar in a hot-water bath, the sulphur being added to the mass in its softened state. The latter mode appears preferable, if only to facilitate the digestion of the pills, as if any difficulty is met with in this way they may be roughly powdered and taken in milk or some bland liquid, and then they are generally digested.

"The statements made in my original paper as to the efficacy of Chian turpentine in cancer appear to me to be fully confirmed by the additional experience gained in the use of the remedy. In the cases previously reported the cancer has disappeared, and there are no signs of its return. This fact must be considered at least as a complete refutation of the statements, recently and boldly made, that Chian turpentine in the treatment of cancer is useless. The cases just referred to are unique of their kind, for, so far as I know, they are the only instances on record of cancer being cured solely by the administration of an internal remedy. I feel justified, therefore, in stating that uterine cancer at least may be removed by the use of Chian turpentine."

THE PRESERVATION OF TOMATOES.

The following description of the process of canning tomatoes occurs in a letter from Mr. Sharples, of Boston, Mass., published in the October number of *The Analyst*:—

"The tomatoes are raised in the surrounding country here—chiefly in Arlington and Belmont, which lie about six or seven miles north-west of Boston. The kind preferred at present are known as the Boston Market; these are a smooth, compact tomato, weighing from 150 to 200 grams; they are very solid, being well filled with meat and very few seeds. These are brought in daily and sold to the factories. At the factory they are emptied a bushel at a time into a wire basket, and then scalded by dipping into a tank of boiling water. They are then removed to a large table, when they are sorted into firsts and seconds only, the ripest being packed as firsts. They are then measured out into pails holding about a peck each, and passed on to the skinners who carefully skin and core them. They are then ready for packing. The cans are filled by hand, the tomatoes being packed as closely as possible into the can. It is found at this stage of the operation that the juice is present in excess and a considerable portion of it is thrown away. No water is ever used, as the tomatoes furnish more than enough.[*] After the cans are filled to within an eighth of an inch of the top, the lid is placed upon them and soldered fast. A small hole is then punched in it, and the cans are placed in a hot bath until steam issues from the hole; they are then removed from the bath and allowed to cool slightly and sealed; they are then returned to another bath in which they are boiled from thirty to forty-five minutes; from this bath they are removed to a cooling room. Next morning, when cooled, they are stacked. At the end of the packing season the cans are examined, and those which have spoiled are rejected. The condition of a can can almost always be told from an examination of the outside. A can in good order has the ends concave. If, on the other hand, the ends are convex, it is almost certain that the can is spoiled."

CHINESE WHITE WAX.[†]

From an article in the *British Mail* on the white wax industry of China, it seems that the average annual value of this peculiar crop amounts to about £650,000. From Hankow alone upwards of £81,000 worth of this wax was exported in 1879. The Chinese white wax is a deposit found on twigs of *Ligustrum lucidum*, and caused by the puncture of an insect. It is said that in Keenchang district the plant thrives in great abundance, and in the spring of the year the twigs are covered with countless swarms of flies having the appearance of a brown film. The branches soon became covered with a white soap-like incrustation, which increases in volume till the commencement of the fall of the year, when the sprays are cut off and immersed in water which is kept boiling. "The viscid substance rises to the surface, and is skimmed off, melted, and allowed to cool in deep pans. It was accidentally discovered, that by transporting the insects from their native districts to the more vigorous one of Keating-fu, in the north of the province, their power of discharging wax was largely augmented—a property which was promptly and extensively availed of by the Sze-chuen traders. The period between evening and morning is chosen for conveyance, because many hours of sunlight would precipitate the hatching. This should take place only after the females have been attached to the trees. Arrived at their destination, six or more of the mothers—which are enormously prolific—are tied, wrapped in a palm leaf, to a branch of the ligustrum. A few days later the young flies are swarming on the twigs, where they fulfil their mission by the month of August; then they perish in the cauldrons, where the results are immediately collected. It is stated that this peculiar industry requires the exercise of great care and forethought."

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[*] A perfectly ripe tomato, skinned and cored, weighed 127·5 grams. On drying it left a residue weighing only 7 grams, or 5·49 per cent. of the original weight.

[†] From the *Gardeners' Chronicle*, October 2, 1880.

The Pharmaceutical Journal.

SATURDAY, OCTOBER 16, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACEUTICAL EDUCATION.

In speaking last week of the decision arrived at almost unanimously by the Council to continue the maintenance of the School of Pharmacy established by the Society in 1843, we confined our remarks chiefly to a consideration of the arguments put forward in support of the idea that there is no longer any need for the Society to carry on its direct educational work, and though we could not avoid the conclusion that those arguments were in themselves insufficient to warrant the adoption of the course proposed by Mr. Hampson, it is at least evident, from some of the remarks which fell from several members of the Council in discussing Mr. Hampson's motion, that the question raised by him has not been finally disposed of. Reverting also to previous action of the Council in regard to pharmaceutical education, and especially to the Society's School, we must infer that it points in the same direction as the remarks referred to above as having been made at the last meeting of the Council. The motion brought forward by Mr. Schacht, last June, to appoint a special committee to inquire into and consider the general question of the relation of pharmaceutical education and the pharmaceutical examinations, as well as the appointment at the same time of another special committee to consider the condition of the Society's School, are circumstances which show, as we then took occasion to remark, that something is felt to be wanting, and the proposal of new arrangements by the professors is even more conclusive evidence that this is the case.

We may perhaps take Mr. Hampson's withdrawal of the motion brought forward by him at the last meeting of Council as practically indicating his acquiescence in the generally expressed opinion that it is at present inexpedient to discontinue the Society's School, and as manifesting his concurrence in the view that it is desirable to improve that School by the adoption of such measures as would make it more efficient and still more prosperous than it has been. When Mr. Schacht's Committee enters upon its work, it may be expected that the mode in which this is to be attempted will be pointed out, and definite remedies suggested for the wants that may be found to exist. Meanwhile some estimate may be formed of the necessities of the case by a consideration of the reports made to the Privy Council by the Government visitors of the examinations held in London and Edinburgh during the last three years. These reports were submitted to the Council last week, and they are published in the present number of the Journal.

The most prominent fact revealed by these reports is the very large proportion of failures among the candidates who present themselves for examination. From one-third to one-half of the number are rejected, and, as Dr. Maclagan points out, this is a proportion above what is observed in the practice of most examining boards. From this fact alone we may infer that there is a very great deficiency in the existing system of pharmaceutical education, and that the opportunities afforded for acquiring a knowledge of the subjects in which aspirants for legal qualification to carry on business have to be examined are far from being sufficient. As regards the instruction to be obtained by apprentices while engaged in that capacity, Dr. Maclagan is of opinion that their masters do not generally take that amount of interest in the youths who are supposed to be under their tuition which they ought to take with the object of leading them to appreciate more correctly the serious nature of the career they are intending to enter upon. He dwells upon this omission as being one of the main causes of the failures among candidates for examination, and urges that if masters find it impossible to give more attention to the instruction of their apprentices and assistants, that circumstance would be a strong argument in favour of requiring all aspirants for the pharmaceutical profession to pass through a fixed curriculum of instruction in recognized schools.

Even in the special subject of practical pharmacy there are indications that the education obtained by apprentices and assistants is very imperfect owing to the common practice of obtaining such pharmaceutical preparations as extracts, tinctures, etc., from wholesale houses instead of making them. So far as the examinations in Edinburgh illustrate this point it appears that the number of failures in pharmacy come next in order to those in botany and are rather in excess of the failures in chemistry. The subjects in which there are least failures are prescription reading, materia medica and dispensing, and this is so far satisfactory that it shows the candidates may generally be trusted to dispense drugs without risk to the public, although it does not give evidence of such a high standard of knowledge as might be desired in a thoroughly well educated pharmacist.

If we examine the statistics of the examinations it will be seen that the candidates are chiefly deficient in the strictly scientific subjects, a knowledge of which is calculated to raise the pharmacist from the grade of a mere tradesman to that of a professional man. Thus, for instance, botany is the subject in which failures are most numerous.

In chemistry, which may be regarded as the chief foundation of a successful career as a pharmacist, we are told that there is a marked deficiency in the candidates' acquaintance with general principles, though there may be some knowledge of chemical facts apparently learnt by rote. Still it is satisfactory to learn that there are signs of considerable improvement in the chemical knowledge of the mass of candidates, and perhaps we may not be unreasonable in believing that if there were greater facilities for obtaining sound practical instruction in chemistry the percentage of failures in the examinations would be less.

Altogether the results of the examinations tend to support the opinion expressed by Mr. SYMES at the last Council meeting that the Pharmaceutical Society should take even a greater part in education than it has hitherto done, not only by maintaining an efficient central school, but also by supporting provincial schools or offering inducements for students to devote greater attention to scientific subjects.

The results of the examinations for the qualification of pharmaceutical chemist reported upon by Dr. GREENHOW serve to show very plainly that notwithstanding the disposition to seek this distinction there is no proportionate indication of the requisite scientific proficiency on the part of candidates. Thus for instance, in 1879 no less than 54 candidates out of 126 failed to pass. Among these, 20 failed in the practical chemical work to be done in the laboratory and 12 more in the *vivâ voce* examination in chemistry, so that more than one-half of the failures in this examination were in that subject in which especial proficiency is intended to form the distinguishing characteristic between those who have passed the Major and those who have passed only the Minor examination.

With these facts before us it is evident that there is need for strenuous efforts to be made with the view of impressing upon the young men who intend to seek their living by the practice of pharmacy the imperative necessity of devoting greater attention to acquiring a practical knowledge of chemistry. For that purpose it is not sufficient merely to study books or to attend lectures. Practical work in a well directed laboratory is the only means by which the requisite proficiency can be gained, and a certain amount of time must be devoted to this work after the period of apprenticeship has been passed. For the model upon which provision should be made for pharmaceutical students in this respect it is but reasonable that we should look to the well appointed laboratory of the Pharmaceutical Society. If there be any reason for the representations hinted at by some of the speakers at the last Council meeting that the education there given is imperfect or wanting in any respect, such a fact would be grievously detrimental to the best interests of pharmacy, for any such imperfections would assuredly be magnified in other schools that have not the prestige and advantage of the Society's support and control.

In past times so much interest has been taken in the Society's School by many leading men connected with pharmacy that the maintenance of its character as the most efficient means for the advancement of pharmacy should be regarded as a debt we owe to their memory, and no effort should be wanting to prevent the possibility of even a rumour that the School was gradually dwindling away or a suspicion that it was in any respect less efficient than it might be. Let us hope, therefore, that the discussion of its merits and of the propriety of its continued existence which has taken place, perhaps somewhat inopportunely at the commencement of a session, may be succeeded by such conclusive evidence of good work as will satisfy its opponents and encourage its supporters.

THE AMERICAN PHARMACEUTICAL ASSOCIATION.

THE twenty-eighth annual meeting of the American Pharmaceutical Association was held at Saratoga Springs, N.Y., commencing on Tuesday, September 14, and concluding on Friday the 18th. The members assembled in the ball-room of the Congress Hall and the meeting is described in the *Druggists' Circular* as having been "the most brilliant gathering that ever graced such an occasion."

The first session, as is customary with this Association, was called to order by the President of the past year, Mr. G. W. SLOAN, who delivered an Address which had for one of its topics the gradual extinction of native medicinal plants that is going on in the United States, especially through the destruction of forests. At the next session the executive for the coming year was elected, the new President being Mr. JAMES J. SHINN, of Philadelphia.

The Report of the Executive Committee stated that there were at that time 1152 members on the roll, and subsequently 141 new members were elected, being a considerable excess over the losses during the year. The Treasurer's Report also showed some improvement in the financial position.

Notwithstanding that the proceedings lasted four days only a small number of scientific papers appear to have been read, a great part of the time having been taken up with the discussion of the bye-laws, the reception of reports of committees and other similar business. One important alteration in the bye-laws that will come into force at the next meeting commits the first consideration of all business matters to a "council," and this will prevent a great waste of the time of the general meetings on trivial affairs. There was also an exhibition of articles of interest to pharmacists held in connection with the meeting. Before adjourning it was agreed that the next meeting should be held in Kansas City, to commence on August 23, 1881.

THE CHEMISTS' ASSISTANTS' ASSOCIATION.

THIS useful Association commenced its fourth session on Thursday in the present week, the opening address being delivered by the President, Mr. F. W. BRANSON. Thursday evening next the 21st inst., is to be devoted to a Social Meeting. The programme issued contains a list of papers on interesting subjects that are promised for reading during the coming session.

Transactions of the Pharmaceutical Society.

Reports of the Government Visitors.

The following are the reports to the Privy Council from the Government Visitors to the Examinations which were brought under the notice of the Council at its meeting last week:—

Dr. Greenhow's Report of the Examinations held by the London Board of Examiners of the Pharmaceutical Society during the year 1878.

No change has been made in the mode of conducting the examinations of the Pharmaceutical Society during the last four years; neither, indeed, is any change at present desirable, the examinations as at present conducted affording a sufficient guarantee of the fitness of the successful candidates to be registered under the Pharmacy Act, 1868, and to keep open shop for the retailing, dispensing and compounding of medicines.

The Preliminary examination in English, Latin and Arithmetic continues to be conducted by the College of Preceptors, under the direction of the Board of Examiners, an arrangement which secures a fair, uniform and sufficiently rigid examination. I have already, on several occasions, commented upon the unsatisfactory results of this examination, as showing the imperfect character of the elementary education amongst the candidates who present themselves for it. The same remark applies to last year, for out of 1130 candidates who offered themselves for the examination only 538 passed, whilst 592, or 52·4 per cent., failed. The proportion of failures in 1878 was thus much larger than it had been in the years 1876 and 1877, when it was 42·41 and 46·72 per cent. respectively, but about the same as in 1874 and 1875, in the former of which years it was 52·18, and in the latter 51·81 per cent.

Only 77 candidates presented themselves for the Major qualification during last year, 49 of whom passed and 28 failed, being in the proportion of 36·36 per cent. The failures were therefore proportionately less numerous than they had been in 1877, when, out of 94 candidates who were examined, only 50 passed, and 44, or 46·8 per cent., failed, but did not differ very widely from that in each of the years 1875 and 1876, in the former of which the failures were at the rate of 36·11, and in the latter of 37·75 per cent.

All the candidates who come up for this examination having previously passed the Minor examination, and been registered as chemists and druggists, the examination, as I have said in previous reports, must be regarded as one for honours, and it is quite reasonable that a higher amount of scientific knowledge should be required from the candidates than from those for the Minor qualification.

During the year 1878, 528 candidates were examined for the Minor qualification, 257 of whom passed and 271 or 51·33 per cent. failed, being a larger proportion than had failed in 1877, when it amounted to 48·19 per cent., and nearly the same as in each of the years 1875 and 1876, in the former of which 52·9 and in the latter 51·15 per cent. failed. A large proportion of the failures last year was due to the weakness of the candidates in chemistry; 98 having failed in that subject by itself and 22 in conjunction with either materia medica or botany; these being the three most important scientific branches of the examination.

Only 25 candidates came up for the Modified examination during last year, 11 of whom passed and 14 failed to satisfy the examiners.

In conclusion, I have only to add that the examinations were conducted, on the one hand, with fairness, impartiality, and a due consideration for the position and feelings of the candidates, and, on the other hand, with sufficient strictness to afford a satisfactory proof of the competency of the successful candidates to be admitted to registration under the Pharmacy Act, 1868.

Dr. Greenhow's Report upon the Examinations held by the London Board of Examiners of the Pharmaceutical Society during the year 1879.

I have again no change to report in the mode of conducting the examinations of the Pharmaceutical Society, neither has any alteration been made during last year as regards the regulations for candidates.

The Preliminary examination continues to be conducted by the College of Preceptors, under the direction of the Board of Examiners, and the results of this examination last year did not materially differ from those I have had to report on former occasions. The large number of 1474 candidates presented themselves for this examination during the year, of whom 783 passed and 691 were rejected; the percentage of rejections was therefore 46·88, being somewhat less than in the preceding year, but almost identically the same as was the case in the years 1876 and 1877.

A small number of the candidates (39) who gained the minimum passing number of marks in each of the subjects comprised in this examination failed to pass because they did not obtain four-tenths of the number of marks allotted to the examination in the aggregate; 117 candidates failed in all the subjects of the examination, namely English, Arithmetic and Latin; 116 failed in English, 249 in Arithmetic, or in Arithmetic and English conjointly, and 170 in Latin, or in Latin conjointly with either Arithmetic or English. It is scarcely necessary to repeat, what I have said on former occasions, that these results manifest a lamentable deficiency of elementary education in a large proportion of these candidates. No doubt most of the rejected candidates will present themselves again, and perhaps eventually pass; but no subsequent study, even though it may enable them to pass the examination, can supply the absence of that sound elementary education which they have missed in early life.

The Board of Examiners held twenty-five meetings for conducting the technical examinations during last year. The number of candidates who presented themselves for the Major qualification, that of pharmaceutical chemist, was 126, of whom 72 passed and 54 failed; the rejections therefore amounted to 42·86 per cent., being a larger proportion than that of the preceding year, and somewhat less than that of the year 1877. In this examination, again, 7 candidates were so weak that they failed to obtain the aggregate number of marks, namely, four-tenths, required for passing, although they had each of them obtained the minimum passing number of marks in each of the separate subjects included in the examination. Of the remainder, 20 failed in the practical chemical work done in the laboratory, and 12 more in the *vivâ voce* examination in chemistry. Thus more than one half of the failures in this examination were in that subject especial proficiency in which is intended to form the distinguishing characteristic between those persons who have passed the Major and those who have passed only the Minor examination.

During the year 1879, 525 candidates for the Minor qualification were examined, 268 of whom passed, and 257 were rejected; the rejections were therefore at the rate of 48·95 per cent. This proportion is slightly lower than that of the previous year, or of either of the years 1875 and 1876, but rather higher than that of 1877; upon the whole, however, the fluctuations in the annual proportion of rejections have been only small; for, taking the last five years together, the failures in this examination have been at the rate of 50·34 per cent. The failures last year were so generally distributed among the several subjects of the examination that it would serve no good purpose to quote them in detail.

A few candidates continue to come up annually for the Modified examination; they amounted to only 23 in the year 1879, 14 of whom passed and 9 failed.

In conclusion, I am of opinion that, as at present conducted, the examinations of the Pharmaceutical

Society, held in London, offer a sufficient guarantee that those persons who have passed them are competent to be registered under the Pharmacy Act, 1868.

(Signed) E. Headlam Greenhow, M.D.

Dr. Maclagan's Report on Pharmaceutical Examinations in Edinburgh.

Edinburgh, June

I have for two years, by circumstances which I need not detail, been prevented from giving in a formal report on these examinations, and my present remarks thus embrace a period of three years. I was present at all the examinations held in Edinburgh during this time except on the following occasions, July 11, 1877, October 16 and 17, 1877, December 20, 1877, July 25, 1878, July 23 and 24, 1879, October 29 and 30, 1879, and December 17, 1879.

The number of candidates examined during these three years was as follows:—

	Passed.	Failed.	Total.
Major Examinations . .	10	6	16
Minor Examinations . .	209	127	336
Modified Examinations .	8	8	16
			368

These numbers suggest the following remarks:—

(1). That in all the examinations there is evidence from the large number of rejections that there is at all events no undue leniency on the part of the examiners. In every class of candidates the proportion of rejections is large. Viewed as percentages the failures are

Majors . .	37·5 per cent.
Minors . .	37·8 „
Modified . .	50· „

As I have remarked in former reports the Majors and Modifieds are too few to enable me to generalize on them, and the Minors must be taken as the real foundation of any remarks which I have to make.

It appears, therefore, that more than one-third of the candidates failed. This is a proportion above what we observe in the practice of most examining boards. It is in one sense satisfactory because it shows that the examiners are stringent in the performance of their duty. In an other, it is unsatisfactory, because it shows that a great many young men present themselves as candidates for admission to the profession of pharmacy with totally inadequate ideas as to what is to be required of them, and with apparent forgetfulness of the fact that by passing this examination they are to get entrance to what is understood to be a scientific profession, not merely to get permission to follow a particular trade. Seeing that young men are, in their ideas on professional subjects, much influenced, or at least ought to be influenced, by the advice of those who are their professional seniors, it appears to me to be the necessary but lamentable conclusion, that many of the pharmacists of Great Britain do not take that amount of interest in the youths who are under their tuition which they ought to take, and which would lead their juniors to estimate more correctly the seriousness of the undertaking to enter the pharmaceutical profession. I would take this opportunity of urging upon all those who have young men as apprentices or assistants, that it is an unkind thing to use them as aids in carrying on their own business, and not at the same time to do all they can to make the young men properly fit themselves for a line of life which is a profession as well as a business. Although I do not forget that the number of failures before any examining board is liable to fluctuations, I am led to make these remarks because the experience of the Board which I have the pleasure of supervising shows that the number of failures has not been lessened by either the precepts contained in reports or by the example of facts brought out by actual returns, that on the contrary the proportion of failures so far as the experience of these three years goes is rather increasing than diminishing. Taking the Minors as an example, the percentage of failures during the last three years has been:—

1877	25·5 per cent.
1878	39·6 per cent.
1879	45 per cent.

I trust that if these facts come under the notice of any pharmacists who have young men under them, they will think more seriously than they may have done of their responsibility, and may not merely utilize, but help to educate their subordinates.

If it be the case that masters, with the best desires for their juniors, find it impossible to do this consistently with due attention to their business, we have a very strong argument in favour of requiring all aspirants to the pharmaceutical profession to go through a fixed curriculum of instruction in recognized schools. It will be useful, not merely as a contribution to examination statistics, but as a guide to any conscientious master or teacher who may be disposed to listen to the hints reluctantly given above, to see what are the special causes of the rejection of the candidates who have failed, irrespective of those who have been remitted for general deficiency. The following indicate the subjects in which actual failure to come up to the pass value occurred, two of them sometimes referring to the same individual:—

Botany	47
Pharmacy	36
Chemistry	35
Dispensing	24
Materia Medica	10
Prescription Reading	3

These numbers show that it is in the strictly scientific branches that there is most deficiency. These are the very branches the knowledge of which raises the pharmacist from the grade of tradesman to that of professional man.

Botany, as usual, is pre-eminent in this respect. My observation is to the effect, that not a few of the candidates have a sort of empirical power of naming medicinal plants, shown to them as herbarium specimens, while they are very loose in their ideas of vegetable organography, and totally at sea in the matter of vegetable physiology.

It appears to me, therefore, that there is much room for improvement in the botanical education of candidates. The same remarks, *mutatis mutandis*, apply to chemistry.

There is in many of the candidates a knowledge of chemical facts, apparently learned by rote, but a want of grounding in chemical principles, and, in many cases, great ignorance of chemical physics.

I must, however, allow that although candidates occasionally present themselves whose ignorance of chemistry is absolute, there is considerable improvement in regard to chemistry in the mass of candidates.

Perhaps there is a growing feeling that chemistry has a direct practical bearing upon their daily professional work, and this feeling ought, by all means, to be encouraged; but it ought to be impressed upon the minds of pharmaceutical students that the object of admitting them to these examinations is not merely to see whether or not they may be trusted to dispense drugs to the public, but, by raising the standard of knowledge in individuals, to elevate the profession of the pharmacist; and, therefore, that they should be warned, more and more, that they ought to pay increased attention, not only to chemistry, but to botany, which they will be apt to consider less important to them practically.

It is, however, unpleasant to know that among the special causes of rejection, pharmacy stands as high as chemistry. It is not easy to understand how this should be, if candidates only take the trouble at their leisure moments to make themselves familiar with the physical properties of the preparations which they are constantly dispensing. It is remarkable that this does not apply so much to materia medica, many of the specimens of which can be studied chiefly in museums. Is it that familiarity with ordinary pharmaceutical preparations breeds contempt for a careful study of them?

I do not attach much importance to the mere exercise of memory, involved in stating, for instance, what proportions of drug and spirit are ordered in the Pharmacopœia to be used in preparing a tincture, though this should be known; but I have in several instances observed that candidates had little knowledge of the mode in which some of the common preparations are made and have heard them plead in excuse that their employers buy their tinctures, etc., from wholesale houses and do not prepare them for themselves. It is, of course, obvious with regard to chemical and galenical preparations, which can be made successfully only on the large scale, that this system of purchase is unavoidable; but, with regard to many preparations, such as tinctures, which can be made as economically and successfully on the small as on the large scale, employers of candidates ought to give them every possible opportunity of doing these under the master's superintendence, and thus of fixing these pharmaceutical operations in the candidates' minds.

I wish it to be understood, that in making these observations, I repudiate any intention of accusing the pharmaceutical profession generally of indifference as to the tuition of their assistants and apprentices.

My remarks are suggested only by the failures, with which alone I am at present dealing, and take no note of the many successful candidates, who must have had all the benefits which a considerate master's instructions can confer upon them.

I have little to say as to the other departments in which failures have occurred. I think that, setting aside a few flagrant exceptions of almost total ignorance of chemistry, most of the candidates make a better appearance in this department than formerly. The experience of these three years confirms me in the belief, that the conjunction of the theoretical chemical examination with the practical testing in the laboratory works well.

Several useful additions to the apparatus in the laboratory here have tended to make the practical examinations more satisfactory.

I must, before concluding, repeat a formerly expressed opinion of mine that the omission to call in the aid of the microscope in testing candidates, especially Majors, is a defect in these examinations. I am led to understand that this suggestion when formerly made by me was unfavourably received in London. It is of importance that the examinations in London and Edinburgh should be as nearly as possible alike, and it would therefore not do to bring the microscope into use at the Edinburgh Board if that of London objected to it. I confess, however, that I cannot see any good reason for thus ignoring a means of research which is appealed to in several instances in the British Pharmacopœia, and for debarring the examiners in botany from ascertaining whether the candidates have any real acquaintance with vegetable histology, without which their knowledge of botany can hardly be said to be scientific.

I would earnestly desire that, after due intimation, the appearances under the microscope of drugs and vegetable structures were made a part of the examination of the Majors, and in due time of the Minors also.

(Signed) DOUGLAS MACLAGAN.

Pharmaceutical Society of Ireland.

ANNUAL MEETING, 1880.

The fifth annual meeting of the Society was held on October 4, at the Royal College of Physicians, Dublin, at 4 o'clock. The following members attended:—Professor Tichborne, President; Messrs. Allen, Batt, Bennett, Brunker, Conyngham, Galwey, Goodwin, Grindley, Hayes, Holmes, Hodgson, Park, Payne, Oldham, Simpson, W. F. Wells, jun., J. Wells and Vance.

The President having appointed Messrs. Simpson, W. F. Wells, jun., and Allen as scrutineers of the voting papers,

Mr. J. Wells asked the President the meaning of the regulation on page 55 of the Calendar as to persons being engaged in compounding and dispensing for at least two years, whether it necessitated attendance during the whole working day or only any part, and as to the legality of a certificate given to a person who had only served a part of the day.

Mr. Hodgson did not think any gentleman holding the qualification of the Society would be guilty of so gross an act as to give such a certificate.

The President said they could hardly take upon themselves to dictate to any chemist how long each day he should keep his shop open or his assistants working.

After some further conversation the matter dropped.

The Treasurer then laid before the meeting his annual statement, audited by Messrs. Hayes and Oldham, showing a cash balance in favour of the Society of £133 18*s.* 7*d.* and funded in 3 per cent. stock £296 5*s.* 11*d.*

On the motion of Mr. Brunker, seconded by Mr. Grindley, the Treasurer's account was passed.

The Scrutineers having brought in their report, the President announced the result. Sixty-one papers were received, one only was rejected, being unsigned. The following were the numbers of votes obtained by each candidate:—

Professor Tichborne, 59 votes.
John Goodwin, 46 votes.
William N. Allen, 46 votes.
William Hayes, 44 votes.
Stanley Oldham, 43 votes.
Alexander Doran, 41 votes.
G. H. Grindley, 40 votes.
John George Boileau, 29 votes.
William Whitla, M.D., 14 votes.
W. F. Wells, 1 vote.

The first seven were declared elected. Mr. W. F. Wells was not a candidate.

The election of officers was then proceeded with.

Charles R. C. Tichborne, LL.D., Ph.D., was re-elected President on motion of Mr. E. M. Hodgson, seconded by Mr. Hayes.

Aquilla Smith, M.D., was re-elected Vice-President on motion of Mr. Brunker, seconded by Mr. Oldham.

Mr. E. M. Hodgson was re-elected Treasurer on the motion of Mr. Hayes, seconded by Mr. Oldham.

Mr. Hugh J. Fennell was re-elected Registrar on the motion of Mr. Oldham, seconded by Mr. Brunker.

Messrs. Hayes and Oldham were re-elected Auditors on the motion of Mr. J. T. Holmes, seconded by Mr. James Vance.

On the motion of Mr. Brunker, seconded by Mr. Simpson, the following gentlemen were elected upon the Law Committee:—Messrs. Collins, Brunker, Oldham, Hayes, Allen, Payne and Whittaker.

On the motion of Mr. Brunker, seconded by Mr. Goodwin, the present Examiners were re-elected.

The consideration of the notices of motion was then proceeded with, the first by Mr. Allen being as follows:—

> "That in the opinion of this meeting it is not desirable that any person who is engaged in preparing students for the Examination of the Pharmaceutical Society of Ireland should be appointed an Examiner of the Society."

The President remarked that he had had some doubt as to whether he should receive the notice of motion given by Mr. Allen, as he considered that it related to the appointment of Examiners, a matter with which the Council alone had to do, and that it was not for members to dictate to that body; at the same time he approved of the intention of the motion, but asked Mr. Allen to withdraw it with the view of bringing the matter before the Council.

Mr. Allen, in reply, stated that in deference to the President's suggestion, he would withdraw his motion with the permission of the meeting; at the same time, while disclaiming any attempt to dictate to the Council, he thought that the annual meeting was one at which the members had their only opportunity of ventilating any matters or making suggestions. He instanced the case which induced him to give notice of his motion, which was that of a gentleman who had some intention of seeking for the post of examiner, and if appointed, had in contemplation to add to his income by instructing pupils.

Considerable conversation of a desultory character ensued, and finally the motion was withdrawn.

Mr. W. F. Wells, jun., then read his motion, as follows:—

> "That in future a full report of Council or other meetings of this Society be sent to the *Pharmaceutical* and *Chemist and Druggist Journals*, immediately after each meeting, for publication."

He said there had been great irregularity during the past year in publishing reports of the meetings of Council; four times there was no report of the proceedings, and frequently it was not until the following month after the meeting that the notice was inserted in the *Pharmaceutical Journal*. Many members had informed him that they did not care to subscribe to a Society of which they knew so little, and he thought there was a loss on that ground, as many who had not joined would do so did they see what action the Council was taking. He complained that the accuracy of the reports was not what it should be, and said the report of the last annual meeting did not correctly represent what occurred upon that occasion, and also called attention that there was no report of the Council meeting in September, when a letter was received from the Privy Council approving of certain regulations affecting the annual election, and which he considered should have been made known to them.

The President admitted that there had been irregularity, but hoped in future to have more regular insertions of the proceedings, and explained that at some of the meetings no business of importance was transacted, and no report issued. He quite agreed with Mr. Wells that the meetings ought to be properly reported, and suggested that the motion should be withdrawn, and promised that in future the reports would be more regular.

Mr. Fennell (Registrar) then stated that it was no part of his duty to furnish such reports, and that he would undertake no longer to supply them, and was proceeding to read a statement to the meeting, when

Mr. Park objected to Mr. Fennell being heard; there was no accusation against Mr. Fennell.

After Mr. Holmes and Mr. Brunker had made a few remarks,

Mr. Wells asked why the reports were discontinued in the *Chemist and Druggist*.

It was explained that owing to some reports being omitted, and others sent late for publication, that the editor did not care to continue inserting them.

Mr. Allen read a letter which he had received from the editor of the *Chemist and Druggist*, in which he stated that the reports were so obviously prepared for publication, and so carefully deprived of all general interest that he did not care to insert them, but was willing to publish proper reports of the Society's proceedings if supplied to him.

The meeting then adjourned.

MEETING OF THE COUNCIL.

October 6, 1880.

Present, Professor Tichborne, President; Aquilla Smith, M.D., Vice-President; Sir G. B. Owens, M.D.; Messrs. Allen, Bennett, Brunker, Collins, Goodwin, Grindley, Hayes, Oldham, Payne and Simpson.

The minutes of the meeting of September 1 having been read and signed.

A letter from the Editor of the *Chemists' Journal* was read and considered. The Registrar was directed to forward a Calendar and acknowledge his letter.

Read a letter from Mr. Robert Barklie, F.C.S., of Belfast, requesting information as to why his school had not been sanctioned by the Privy Council, and asking the Council to accept his certificate for the present session.

The Registrar was directed to inform Mr. Barklie that the Council have already taken steps towards having the matter arranged.

Messrs. Pring, Payne and Whittaker, of Belfast, were appointed to visit the school and report to the Council.

A request from Mr. Bacon of Londonderry for a new certificate in lieu of one which was torn in transit through the post. The Registrar to inform him that a new one would be sent upon the Council receiving the damaged certificate.

Mr. Edwards Daniel Elmes, Carrickmacross, having been proposed by Mr. Oldham and seconded by Mr. Holmes, was elected a member of the Society.

The report of the Preliminary examination was handed in by Dr. Collins, which showed that twelve were examined, ten of whom passed, two being rejected.

On the motion of Sir G. B. Owens, seconded by Dr. Aquilla Smith:—

> "That the necessary advertisements be inserted this month in the *General Advertiser* for the election of new Examiners."

After a division the motion passed.

A copy of 'Materia Medica and Pharmacy,' Handsell Griffiths's, edited by Geo. F. Duffey, Esq., M.D. Dublin, was presented to the Library by the Editor.

It was proposed by Mr. G. H. Grindley and seconded by Mr. Goodwin:—

> "That the thanks of the Council be conveyed to Geo. F. Duffey, Esq., M.D., for the volume."

The motion passed unanimously.

The meeting then adjourned.

The examination for the licence of pharmaceutical chemists had not concluded when the Council rose.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The annual meeting of the thirty-first session was held at the Royal Institution on Thursday evening, September 30, the President, Dr. Charles Symes, in the chair.

The minutes of the previous meeting were read and confirmed, and several donations of books and periodicals announced.

Messrs. F. Burd and W. P. Evans were elected members.

The Honorary Secretary (Mr. Michael Conroy, F.C.S.) then read the annual report of the Council as follows:—

Annual Report.

"In presenting the thirty-first annual report of the procedings of the Association, your Council has pleasure in congratulating you upon its continued prosperity.

"During the session the list of members has been thoroughly revised. Three members and 9 associates have been elected; 3 members and 2 associates have resigned, leaving the number at present on the list 163, comprising 19 honorary members, 113 members, and 31 associates.

"The retirement of Mr. John Abraham from your Council owing to failing health was the cause of a unanimous expression of regret. Mr. Abraham had been a member of your Council from the foundation of the Association, and was for four sessions a very able

President. Our library and museum give evidence of the substantial help afforded by him to the Association; and in electing him an honorary member, your Council hope he may be spared many years to continue his interest in its proceedings.

"Mr. George Webb Sandford, late President of the Pharmaceutical Society of Great Britain, has also been elected an honorary member, in recognition of his unwearied exertions to improve the legal status of pharmacists.

"Your Council regret that death has removed one of our most valued and esteemed honorary members, Mr. W. W. Stoddart, F.I.C., F.C.S., etc. He was elected in 1870, shortly after the visit of the British Pharmaceutical Conference to Liverpool. The ability and courtesy with which he conducted its proceedings on that occasion materially assisted in making it one of the most successful meetings of that body. His untiring efforts to advance chemical, pharmaceutical, and general scientific research are well known. The loss thus sustained has been duly acknowledged in a letter of condolence to his widow and family.

"Eleven ordinary meetings have been held during the session, at which important papers have been read and other subjects discussed. The miscellaneous communications at these meetings have been of considerable interest and of material help to the proceedings. In thanking those members who have rendered this assistance, your Council hopes for a continuance of the same during the coming session.

"The new regulations with regard to the chemistry classes of the school of pharmacy have been successful. Twenty students entered for the inorganic elementary and advanced classes and 8 for the organic class. At the examination for the President's prizes six students competed. The questions were set by Mr. Edward Davies, F.C.S., F.I.C., and the answers were adjudicated upon by Mr. A. H. Mason, F.C.S., and Mr. Alex. Watt, F.C.S., F.I.C.

"Messrs. James Wood and Isaac Fisher were declared the successful competitors, and will this evening be awarded the prizes.

"Your Council considers it desirable that in future, students who wish to compete for the prizes, must have attended at least one of the inorganic courses, as well as the organic course.

"The important aid rendered by your Association at the Associated Soirée of the Literary, Scientific, and Art Societies of Liverpool, greatly enhanced the success of that undertaking. Our exhibits, consisting of several collections of rare and costly chemicals and alkaloids, scientific apparatus, etc., were much appreciated; and our thanks are due to those firms and persons who so generously contributed objects for exhibition; also to our President and Vice-President for their able chemical lectures on the occasion.

"The fifteenth conversazione of the Association was held at the Royal Institution, and though highly successful as a scientific and instructive entertainment, your Council regrets that financially it proved a loss. The various exhibits and practical demonstrations were highly appreciated by the visitors, and your Council desires to express its obligations to the various exhibitors, and to the members and other friends for their generous aid on the occasion. In a special degree are our thanks due to Mr. Edward Davies, F.C.S., F.I.C., etc., for his exhaustive lecture on "Gases and Vapours;" to Mr. James Birchall for the complete set of historical views which he exhibited by means of the oxyhydrogen light, and the interesting description he gave thereof; also to Mr. Charles Sharp, F.L.S., and friends for providing the musical portion of the entertainment.

"Invitations having been received to send delegates to the British Pharmaceutical Conference, held this year at Swansea, the President, Vice-President, and Hon. Treasurer were appointed.

"The Librarian reports that 343 volumes have been taken out during the session, and that the library had been freely used by members for reference.

"Your Council has purchased some new standard works, which have been added to the library, and it is indebted to several scientific societies at home and abroad for the periodicals which they contribute.

"The ballot at the concluding general meeting for the appointment of President for the thirty-second session resulted in the unanimous re-election of Dr. Charles Symes.

"The following three members of the Council retire by rotation, but are eligible for re-election:—Messrs. T. F. Abraham, Shaw and Sumner.

"Mr. Alfred Redford, being no longer able to devote the time necessary for attending council meetings, has intimated his desire to withdraw his name from the list of those eligible for re-election. Your Council regrets the loss of the valuable help of one of its earliest and most esteemed members, and has felt it its duty to acknowledge the able and willing manner in which he has devoted himself for many years to the interests of the Association, in the respective positions of Member, Councillor, Vice-President and President, by electing him an Honorary Member."

The Hon. Treasurer (Mr. Robert Sumner) presented a report of the finances of the Association, which showed a slight deficit due to the loss upon the conversazione, and also to the purchase of some new books for the library.

After the reading of the reports, the President moved:—"That the reports as read be adopted, and together with a list of members and abstract of proceedings of the past session, be printed and circulated among the members."

The motion was seconded by Mr. R. M. Sumner and carried unanimously.

Mr. R. Sumner moved:—"That the best thanks of this meeting be given to the donors to the library and museum, and to the authors of the papers, during the past session."

Mr. A. Kehlstadt, Ph.D., seconded the motion, which was carried unanimously.

Mr. R. Parkinson moved:—"That the best thanks of this meeting be given to the officers and Council for their services during the past session."

Mr. E. F. Morton seconded the motion, which was unanimously carried.

The President's prizes of books, offered to the two students in the chemistry class who should pass the best written examination, were then awarded to the successful competitors, Messrs. James Wood and Isaac Fisher, the former receiving the first prize.

The meeting next proceeded to the election of four members of the Council by ballot. Messrs. T. F. Abraham, Charles Sharp, F.L.S., John Shaw and Robert Summer were declared duly elected.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A lecture was delivered at the rooms of the above Association, 4, Halford Street, September 29, on "Heat," by Mr. Plant.

The lecturer, who illustrated what he had to say by copious diagrams and experiments, began by explaining the nature and sources of heat, in which division of the subject he explained the material and kenetic theories of heat, and pointed out the reasons for adopting the latter in preference to the former, which is now generally rejected. He then graphically explained the results of subjecting a body to heat, expansion, rise of temperature, and change of state. He then performed experiments illustrating thermometry, the construction and use of the thermopile, fusion, evaporation, and the use of hygrometers. He showed how ebullition always took place where the tension of the vapour was greater than the atmospheric pressure. He then passed on to explain what was meant by latent and specific heat, calorimetry, radiant heat, and the way it was transmitted through space, also the difference between luminous and dark heat, and the unequal distribution of heat in the solar and electric spectra, giving a list of substances by means of which luminous heat could be separated from dark heat. When dealing with specific heat the lecturer showed an interesting experiment to illustrate the specific heat of various metals. Five small metallic disks of equal weight of copper, iron, lead, zinc and tin were heated together in a bath of oil to a temperature of about 200° C., and were then placed upon a cake of white wax, with the following result: the iron, having the greatest specific heat, soon penetrated through the cake of wax, the zinc and copper were next, whilst the lead and tin penetrated but a short distance into the wax, and remained imbedded there.

A vote of thanks brought a very instructive evening to a close.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION.

A meeting of the Law and Parliamentary Committee of this Association was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on September 29, 1880, at one p.m.

Mr. Thomas Barclay, President, in the chair.

Present, Messrs. Andrews, Bell, Churchill, Cross, Jervis, Southall, and the Solicitor of the Association.

The minutes of the previous meeting of the Committee were read and approved.

The Secretary reported having received communications from Messrs. Hampson, Holdsworth, Maltby, Symes and Williams, regretting their inability to attend.

The President said the first matter on the agenda was to decide on the course to be adopted for giving effect to the following resolution passed by the Executive at its last meeting:—"That the Law and Parliamentary Committee be directed to address the Government, with a view of obtaining such an amendment of the Jury Act as may provide that the exemption from service on juries enjoyed by pharmaceutical chemists should be extended to all registered chemists and druggists."

The Secretary said that probably the intention of the Executive would be best met by a memorial to the Home Office. He then read the following draft memorial which he had prepared:—

"To the Right Honourable Sir William Vernon Harcourt, M.P., Her Majesty's Principal Secretary of State for Home Affairs.

"*The Memorial of the Chemists and Druggists' Trade Association of Great Britain.*

"Respectfully showeth:—

"That your memorialists have had under their consideration the question of the liabilty of registered chemists and druggists to serve on juries.

"That the principle of the exemption from jury service of members of certain professions, on account of the nature of the duties appertaining to their professions, is of very ancient date, and has on several occasions been recognized by Parliament.

"That since the year 1513, surgeons have been so exempt.

"That in the year 1694, this exemption was extended to apothecaries.

"That by the Juries Act of 1862, this principle was further extended to certain chemists and druggists, that is to say, to those duly registered as pharmaceutical chemists; these were, by that statute, included in the lists of persons entitled to exemption from jury service.

"That this privilege was granted to pharmaceutical chemists, not because they were pharmaceutical chemists as such, but because it was considered desirable in the public interest that the business of a chemist and druggist should have the close personal supervision of the proprietor, and the exemption was limited to pharmaceutical chemists because they were at that time a registered body, and consequently it was seen that no difficulty would be experienced in limiting the privilege to those only who were legally entitled to it; whereas had the whole body of chemists and druggists been granted such immunity, it would at that time have been found impossible to limit the exemption to the legitimate members of the trade, as no register of chemists and druggists other than the register of pharmaceutical chemists was then in existence.

"That by the Pharmacy Act, 1868, this state of things is amended, and provisions are therein made for the appointment of a registrar whose duties are laid down in the 13th section of that Act, which are as follows:—

"XIII. The Registrar shall, in the month of January in every year cause to be printed, published, and sold a correct register of the names of all pharmaceutical chemists, and a correct register of all persons registered as chemists and druggists, and in such registers respectively the names shall be in alphabetical order according to the surnames, with the respective residences, in the form set forth in schedule (B.) to this Act, or to the like effect, of all person appearing on the Register of Pharmaceutical Chemists or on the Register of Chemists and Druggists, on the thirtieth day of December last preceding, and such printed Register shall be called 'The Registers of Pharmaceutical Chemists and Chemists and Druggists,' and a printed copy of such Register for the time being, purporting to be so printed and published as aforesaid, or any certificate under the hand of the said Registrar, and countersigned by the President and two members of the Council of the Pharmaceutical Society shall be evidence in all courts, and before all justices of the peace and others, that the persons therein specified are registered according to the provisions of the Pharmacy Act or of this Act, as the case may be, and the absence of the name of any person from such printed Register shall be evidence, until the contrary shall be made to appear, that such person is not registered according to the provisions of the Pharmacy Act or of this Act.'

"Your memorialists therefore humbly pray that you will exert your influence on Her Majesty's Government with a view to induce them at the earliest opportunity to extend to all registered chemists and druggists the privilege of exemption from jury service as enjoyed by a portion only of that body.

"Signed on behalf of the Chemists and Druggists' Trade Association of Great Britain.

President.
Vice-President.
Secretary.

"*Office of the Association,*
"*Birmingham, October* , 1880."

It was moved by Mr. Andrews, seconded by Mr. Jervis, and unanimously resolved:—"That the draft memorial now read be approved, and that the Secretary be instructed to forward a copy of the same, duly signed, to the Home Office."

The Committee then discussed the expediency of endeavouring to amend the Pharmacy Act in view of the recent decision of the House of Lords in the case of the Pharmaceutical Society *v.* The London and Provincial Supply Association; when it was moved by Mr. Jervis, seconded by Mr. Cross, and unanimously resolved:—"That this Committee heard with profound regret the decision of the House of Lords in the case of the Pharmaceutical Society *v.* The London and Provincial Supply Association, Limited, but learned with satisfaction that the Pharmaceutical Council had referred the decision of this case to the Sub-Committee appointed by them to consider desirable improvements in the Pharmacy Act, and trust that the result of this deliberation will lead to such proposed amendments of the Act as this Association can assist in carrying through Parliament."

The Secretary was instructed to forward a copy of this resolution to the Secretary and Registrar of the Pharmaceutical Society.

A letter was then read expressing the thanks of the Stockport Chemists' Association for the defence of three of its members in the recent prosecution for the sale of sweet spirit of nitre.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

(*Concluded from page* 287.)

The next paper read was entitled—

DETERMINATION OF THE STRENGTH OF ALCOHOLIC SOLUTIONS OF CHLOROFORM.

BY J. C. THRESH, F.C.S.

In examining a solution of chloroform in spirit of wine it is evident that unless the density of the alcohol used to dissolve the chloroform is accurately known, the specific gravity of the solution affords no indication whatever of its strength. When, therefore, I set about the task of reporting upon commercial chloric ethers, I found that first of all it would be necessary to devise some process for estimating the chloroform, as my search in text-books and dictionaries for such a process was in vain.

Fortunately, however, a method was devised which, when put to the test of actual experiment and slightly modified, left nothing to be desired, neither on the score of simplicity nor accuracy.

The requisites are an accurately graduated tube, about ·5 metre in length and 10 to 12 millimetres in diameter, or a 50 c.c. burette, graduated in one-tenth c.c. and provided with a stopcock, a dilute sulphuric acid, made by diluting 1 part of oil of vitriol with 6 parts of water, and a supply of petroleum ether (the gas oil or gasoline of commerce), tinted rose colour by immersion in it for a minute or two of a piece of alkanet root.

When a dilute alcohol, of, say, specific gravity ·900, is poured into the burette, its volume accurately noted, and a quantity of the gasoline added and the mixture agitated, when the whole has been allowed to stand for some time so that complete separation has taken place, it will be found, providing the temperature has not varied, that the dilute spirit occupies exactly its original volume; it has either yielded nothing to the gasoline, or, as is improbable, the petroleum ether has taken up exactly as much spirit as the spirit has dissolved of petroleum ether. If now, however, the experiment is repeated, substituting a mixture of chloric ether and water for the dilute spirit, it will be found that the aqueous solution has decreased in volume to an extent proportional to the percentage of chloroform present.

As thus performed the results are not entirely satisfactory, since the mixture has to stand a considerable length of time before the surface of demarcation between the two fluids becomes perfectly distinct, and both being colourless and of nearly the same refractive index, there is a little difficulty in taking the reading correctly. Both these obstacles are overcome by substituting dilute sulphuric acid for the water and tinting the petroleum ether with a colouring matter insoluble in dilute alcohol.

To obtain the utmost possible accuracy the analysis is conducted as follows, first assuming that chloroform does not constitute more than 15 per cent. of the mixture.

Having secured the stopcock of the burette, pour in the dilute acid until the column reaches approximately the 30 c.c. graduation, then introduce with a pipette 20 c.c. of the chloroform solution, cork tightly, and shake vigorously until thoroughly mixed. Now fix in a stand and allow it to rest for about half an hour, or until all air bubbles have disappeared, and the mixture, which upon agitation rises several degrees in temperature, has again acquired the temperature of the room. Tap gently if necessary to cause any floating globules of chloroform to sink to the bottom, then very carefully pour on about 10 c.c. of the coloured gasoline. This must be poured very carefully down the side of the tube so as not to mix in the least with the acid solution. Now re-insert the cork, fix the tube in a perfectly upright position and read off the height of column of colourless fluid. In my experiments I have always read from the lowest point of the slightly convex base of the coloured liquid, and to obtain the utmost accuracy have fixed the tube with the line of demarcation of the two fluids exactly level with the eyes and between the latter and a fine line in the same plane made upon the window. Then, by aid of a small hand lense, such as is used for viewing prints, etc., a difference in the length of the column corresponding to one-fortieth of a c.c. can be read without difficulty. In fact the expansion of the column of fluid produced by holding the tube in the warm hand for a minute or two can easily be detected. The tube is next shaken thoroughly for two or three minutes and again placed in its support, until the mixed fluids have completely separated. This does not take many minutes, but before reading off the reduced column of dilute spirit it is best to allow the tube to remain for about half an hour, so as to be certain that it has the same temperature as the apartment, and if this temperature is not the same as at the time of the first reading a correction, to be described subsequently, must be made, if the greatest accuracy is desired.

To determine approximately the expansion co-efficient of a mixture of chloroform spirit and water, several readings were taken during one experiment, with the tube immersed up to near the line of demarcation in a larger tube containing water at known temperatures. The mean apparent coefficient of expansion for 1° C. was ·0005.

When, therefore, the first reading, taken before agitation with the gas oil, is "a" and the second reading, taken after agitation, is "b" cubic centimetres, if the temperature varied at the times when the observations were taken "t" degrees, then the required quantity is—

$$\left\{ a—b\ (1 \pm t\ \cdot0005). \right\}$$

+ or — according as the temperature has decreased or increased.

In the following tabulated experimental results, the first seven determinations were made without noting the temperatures.

Per cent. of Chlorof. by volume, added.		Per cent. of Chlorof. found.	
1·	per cent.	1·	per cent.
7·	,,	7·25	,,
3.	,,	2·75	,,
5·	,,	5·	,,
2·	,,	2·	,,
5·	,,	4·5	,,
11·66	,,	12·	,,
11·66	,,	11·87	,,
2·15	,,	2·05	,,
3·85	,,	3·75	,,
8·09	,,	8·15	,,
9·87	,,	9·7	,,
33·3	,,	33·3	,,

In consequence of the errors in 6th and 7th determinations being more than ·25 per cent., I was led to make the experiments for determining the effect of temperature changes, and where necessary the correction was made in all subsequent experiments. As an increase of temperature of 2·5° C. will cause an error of ·5 per cent., it is obvious that except when a mere approximation is required, thermometer readings must be taken and corrections made.

In the last experiment only 10 c.c. of the chloroform solution were employed, and 20 c.c. of gasoline were added instead of 10. In the only experiment made with a solution containing over 50 per cent. of chloroform, the result was much too low, and it was obvious that the details would have to be considerably modified to make the method practically applicable for such solutions.

This paper was followed by a—

REPORT ON COMMERCIAL SPECIMENS OF SAL VOLATILE AND CHLORIC ETHER.

BY J. C. THRESH, F.C.S.

In preparing this paper for the present Conference I have had two objects in view; first, to ascertain definitely what were now being retailed and dispensed for chloric ether and sal volatile, in the hope that by reventilating this question in conference, something practical may be suggested for establishing uniformity; and second, to examine and report upon specimens of such preparations as were sent by manufacturers when æther chlor. and sp. ammon. co. were ordered.

For the first purpose a circular letter was sent out to about one hundred chemists, including the heads of most of the best known dispensing establishments, the subject matter of which ran as follows:—

"I am preparing a short paper for ensuing Conference on 'Sal Volatile and Chloric Ether,' and shall esteem it a favour if you will furnish me with a reply to the following query:—'What are you in the habit of dispensing and retailing when chloric ether (æth. chlor. or sp. æth. chlor.) and sal volatile (sp. ammon. co. or sal volatile) are prescribed or asked for?'"

In reply to this query, taking first the chloric ether question, twenty-seven firms said that both in dispensing and retailing the sp. chlorof., B.P., was used for chloric ether and sp. æther. chlor.; eleven firms used Duncan's chloric ether only; one used Duncan's sp. chlorof., B.P., or a solution of one part of chloroform in nine of spirit, according to circumstances; another "a special distilled product;" another "a distillate from chlorinated lime and alcohol;" another, "æther chlor. P.L.," the existence of which, no doubt, most of you were previously ignorant of; another uses sp. chlorof., B.P. for sp. æther. chlor., but a solution of chloroform (1 in 10) for æther chlor., whilst fourteen always employ a solution of chloroform in alcohol, the strengths varying from 1 in 7½ to 1 in 10 by volume; finally one firm replied that they dispensed chloric ether *not* sp. chlorof. B.P., the "not" being underlined.

It appears, therefore, that in about half the number of cases, chloric ether or sp. æther chlor. is understood to be represented by the B.P. sp. chloroformi, whilst in the other half stronger solutions of chloroform are supposed to be what the prescriber requires. As will be seen from analyses of some of the distilled chloric ethers, the variation in chloroform strength in the preparations dispensed for "chloric ether" is from 2 per cent. to 12·35 per cent.

For sal volatile and sp. ammon. co., forty-four firms replied that both in dispensing and retailing they invariably employ the B.P. sp. ammon. arom.; six use the sp. ammon. co. of the 1836 P.L.; one the sp. ammon. co. of 1787 P.L.; six use special preparations of certain makers; one a "sp. ammon. arom., sp. gr. ·918;" and one firm replied that they always dispensed sal volatile *not* sp. ammon. arom., B.P., but no intimation as to nature or maker was vouchsafed. Many chemists, whilst invariably using the sp. ammon. ar., B.P., for dispensing, when sal volatile or sp. ammon. co. is prescribed, yet retail special preparations as sal volatile.

It appears, therefore, that in the very great majority of cases the B.P. preparation has superseded all other forms of sal volatile.

The samples of chloric ether and sal volatile examined were all obtained either from manufacturers or large wholesale houses, with perhaps three exceptions which were obtained from retail houses.

In response to my inquiries for specimens of the articles sent out when chloric ether and sal volatile were ordered, all the firms to whom I wrote were kind enough to send me two or more samples, in many cases together with replies explaining what course they usually followed under the circumstances. Many, for chloric ether, supplied Duncan's preparation; others "special distilled products;" others, the B.P. sp. chloroformi; and others, solutions of chloroform in spirit, stronger than the B.P. preparation. The specific gravity was determined by aid of a balance and 10 gram sp. gr. bottle, the temperature at each observation being recorded. The sp. grs. of two samples were then determined at temperatures varying from 14° to 22° (the extremes between which all had been taken), and it was found that a difference of one degree Centigrade affected the sp. gr. by (very approximately) ·001. In the table appended, therefore, all the densities have been corrected for 15° C., and expressed to the nearest third decimal. It will be seen upon comparing the two columns that the specific gravity is alone no criterion whatever as to chloroform strength; for example, one specimen, density ·893, contained 3 per cent. chloroform, whilst another, sp. gr. ·894, contained 7¾ per cent. The density of the sp. chlorof. in no case reached ·871 as indicated in B.P.; but this I attribute to the fact that a s.v.r. of 60 o.p. is much more generally used than the 56 o.p. spirit of the British Pharmacopœia.

The results obtained by actual analysis therefore corroborate the statement elicited by the circular letter. There is, however, one little matter for surprise, and that is the small percentage of chloroform contained by the distilled "chloric ethers." There seems to be an impression abroad that this preparation, though more miscible with water than the B.P. sp. chloroform, yet is much richer in chloroform. This is undoubtedly a fallacy, the preparation which so many understand to be intended when "chloric ether" is prescribed, containing only from 2 to 3 per cent. of chloroform, although judging from its specific gravity (which has deceived so many), it would contain 7 to 9 per cent.

In the following table, in the first column, is placed the name of the article as taken from the label on sample bottle, the word "special" signifying that the label also intimated that the preparation was a speciality of the firm whose name it bore.

I perhaps ought to add that the chloroform was estimated by the method described in the paper just read, and that in taking burette readings I did not attempt to read off to less than $\frac{1}{20}$th of a c.c., corresponding to nearest ¼ per cent.

Tabulated Results of Analyses of the Chloric Ethers of Commerce.

	Sp. Gr. at 15° C.	Percentage by volume of Chloroform.
Chloric Ether, Special .	·878	2·5
Sp. Æth. Chlor..	·893	3·
Sp. Chlorof.	·862	5·
Æther Chlor.	·885	7·
"	·861	4·5
Sp. Chlorof. B.P. . . .	·865	5·
Æther Chlor. Dest. . .	·879	2·
Æther Chlor.	·872	7·
Chloric Æther		9·5
Sp. Chlorof.	·865	4·5
Chloric Ether, Special .	·887	2·5
" " . .	·894	7·75
Æther Chlor. "	·922	12·25
"	·894	8·5
Dist. Æth. Chlor. . . .	·918	3·
Æther Chlor.	·903	9·25
Sp. Chlorof.	·861	4·75
Æther Chlor.	·899	9·25
"	·865	4·25
Sp. Chlorof.	·864	5·

Turning now to the sal volatile question I found that, with perhaps one exception, every wholesale house made a sp. ammon. co. besides the B.P. sp. ammon. aromat., and in response to my application for a sample of what they usually sent out when sp. ammon. co. or sal volatile was ordered, in most cases samples both of the B.P. and the special preparations were sent me.

Several firms offered to give me any further information which I might require, and in correspondence with some of them I found that the process of the B.P. was not considered so satisfactory as it should be, yielding a very variable product.* When working with quantities, if the distillation is stopped when the distillate has the correct sp. gr., a little ammonia is left in the retort, which is easily driven over if the distillation be continued a very little longer. It will be seen in the sequel results obtained working on a small scale do not confirm this.

The whole of the samples were examined in the following manner:—First, the sp. gr. was determined by aid of the balance and 10 grs. sp. gr. flask, and the temperature noted. The contents of this flask were then poured into a flask of about 200 c.c. capacity in which had been placed 40 c.c. of a solution of hydrochloric acid, each c.c. of which contained ·01825 gram HCl, corresponding to ·0085 gram NH_3 (half a molecule). The mixture was slightly diluted, boiled for about a minute, tinted with neutral alizarin, and the free acid determined volumetrically by a solution of soda, corresponding in strength with the acid solution. The number of c.c. of alkali required to impart a red tint was registered. Twenty c.c. were then poured into another flask, holding up to a fiducial mark on the neck exactly 100 c.c., containing excess of a solution of barium chloride. The flask was then filled to the mark with water, vigorously shaken and placed aside from six to twenty-four hours or until the precipitate had so far subsided as to allow 50 c.c. of clear liquid to be drawn off by a pipette.

To this a little alizarin was added, slight excess of acid solution run in from a burette, and the excess titrated back with the standard soda.

Then if 'a' represent the number of c.c. of soda solution required in the first instance to neutralize the excess of acid added to the 10 c.c. of sample, 'b' the c.c. of acid required to neutralize the free ammonia in the second experiment, and 'd' the specific gravity of the spirit of ammonia at time of measurement, we have—

$$\cdot085\ \frac{b}{d} = \text{per cent. free } NH_3$$

$$(40 - a)\ \frac{\cdot085}{d} = \text{per cent. } NH_3 \text{ free and combined.}$$

$$(40 - a - b)\ \frac{\cdot240}{d} = \text{per cent. } (NH_4)_2\,CO_3.$$

That the combined ammonia in the sp. ammon. ar. is in the state of normal carbonate appears most probable from the fact that it must of necessity contain less CO_2 than the original carbonate from which it was distilled, since, as previously pointed out by J. Miller,† when the mixture of ammonia spirit, etc., in the retort is heated, long before distillation commences, brisk evolution of CO_2 ensues, little or no ammonia passing over at same time, as is proved by passing the gas first through solution of barium chloride and then through baryta water. The former remains perfectly clear for some time after the latter has copiously precipitated. I attempted to determine the CO_2 in a sample of spirit, sp. gr. ·873, distilled by myself and containing 1·365 per cent. of combined ammonia, by treating with excess of acid and absorbing the gas evolved with soda lime. The CO_2 obtained was ·325 gram, the theoretical quantity obtainable where the ammonia combined in form of normal carbonate is ·308 gram. As the result, ·325, would, on account of difficulty of preventing some free NH_3 and possibly also of alcohol passing into soda lime tube, be most probably too high, I think it confirms the conclusion that the spirit contains the normal carbonate.

The subjoined tables record results obtained in analyses of forty samples of sal volatile.

Sp. Ammon. Arom. B.P.

	Sp. Gr.	NH_3 free p. c.	$(NH_4)_2CO_3$ p. c.	Total NH_3
1. . .	·877	·601	1·337	1·067
2. . .	·869	·988	·248	1·076
3. . .	·872	1·297	·528	1·482
4. . .	·878	1·613	none	1·613
5. . .	·885	1·043	1·918	1·721
6. . .	·877	1·253	1·400	1·749
7. . .	·870	1·329	1·352	1·807
8. . .	·868	1·534	·772	1·807
9. . .	·880	1·165	1·876	1·830
10. . .	·871	1·481	1·486	2·009
11. . .	·894	1·492	1·584	2·054
12. . .	·865	1·941	·443	2·098
13. . .	.866	1·306	2·270	2·110
14. . .	·877	1·049	3·701	2·360
15. . .	·887	·978	3·950	2·376
16. . .	·869	1·614	2·320	2·436
17. . .	·873	1·325	3·824	2·678
18. . .	·874	1·777	2·659	2·718
19. . .	·875	1·435	3·995	2·849

Specimens not B.P.

	Sp. Gr	Free NH_3 p. c.	$(NH_4)_2CO_3$ p. c.	Total NH_3 p. c.
Sp. am. arom., Old form	·871	2·165	none	2·165
Sp. am. arom., Old form	·891	2·156	·161	2·213
Sp. am. arom., Old form	·916	1·624	1·395	2·096
Sp. am. arom., Special	·904	·999	1·803	1·634
„ „ „	·911	·981	.448	1·140
Sp. am. co., P.L. (1836)	·906	1·335	1·805	1·974
„ „ (1787)	·840	·678	·657	·911
„ „ . .	·920	·444	1·043	.813
„ „ . .	.863	·560	2·111	1·308
„ „ Special	·879	1·286	2·703	2·031
„ „ „	·925	1·057	·200	1·121
„ „ „	·911	1·008	none	1·008
Sal Volatile	·911	·923	·553	1·119
„ „	·871	·839	·383	·976
„ „ Special .	·916	·779	3·903	2·162
„ „ „ .	·954	·142	4·481	1·699
„ „ „ .	·885	1·370	2·007	2·113
„ „ „ .	·880	1·371	1·745	1·970
„ „ „ .	·910	1·009	3·982	2·326
Sp. sal volatile . . .	·840	1·311	1·883	1·981
Aromatic sal volatile .	·882	1·319	2·556	2·224

These results are far from satisfactory. That the products sent out as special preparations should have varied one can understand; but why the article sent out by some of the largest distillers and wholesale houses as a B.P. product should vary to such an extent is simply unaccountable.

Mr. Martindale has asserted* that on the large scale it is impossible for the distillate to contain more than 1·7 per cent. of ammonia without being deficient in carbonic acid, but as several of the samples examined contained more than this amount of ammonia, and yet were richer in carbonate than samples containing less ammonia, I ventured to write to the distillers of sample No. 18, asking if the sample was prepared according to the B.P. directions, etc. In reply I was informed that such was the case, and that they usually found the residual liquor in the retort to contain a little carbonate of ammonia; but only in about proportion of 1 *oz. to every 6 gallons of spirit distilled*. Sample No. 14 was distilled in the laboratory of a well-known member of the Conference, by the B.P. method, and yet is rich in both ammonia and carbonic acid.

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* Thought by one firm to possibly be due to "exceedingly uncertain composition of the carbonate of ammonia of commerce." By another, "to impossibility of condensing all the ammonium carbonate (or carbamate) which first distills without risking an explosion, by its blocking up the worm of condenser."

† *Pharmaceutical Journal*, 3rd series, i., 742.

* *Pharm. Journ.*, 3rd series, i., 704.

To ascertain, if possible, how the loss could occur I distilled a small quantity in a retort, connected with a glass worm, the free end of which simply passed into the neck of the flask. Soon after the retort was first heated, CO_2 began to be evolved, and effervescence continued probably until the liquid commenced to boil, then a moist crystalline deposit formed in neck of retort, condensing worm, and side of flask; finally, the spirit distilled over, and towards the end of the operation carried over with it most of the crystalline matter deposited in the worm. The product in the flask, when the requisite quantity had been collected, contained a considerable quantity of crystalline matter which, however, was entirely dissolved after a time, when occasionally agitated. The results of the analysis of this sample are given in No. 17. A second quantity was then distilled, and a syphon attached to the worm so as to keep the latter full of fluid, after a sufficient quantity had once distilled over to fill it, by this means at the last no trace of crystalline matter was left in condensing tubes. Care was also taken to prevent any loss of free ammonia. The results of the analysis of this sample are give in No. 19. In neither distillation did more than a trace of ammonia remain behind in the retort. It would appear, therefore, that when every care is exercised in making this preparation to condense all the ammonia, the amount of free ammonia in the product is approximately equal to the ammonia in combination. On the assumption that the combined ammonia exists in state of neutral carbonate, as appears almost certainly to be the case, the following equation will represent at least the initial and final products of the reaction:—

$$H_2O + 2N_4H_{16}C_3O_8 + 4NH_4HO = 3(NH_4)_2CO_3 + 3CO_2 + 6NH_4HO.$$

That sp. ammon. ar. will be deficient in ammonium carbonate, if after distillation the product is not by agitation or otherwise caused to take up the crystalline deposit which is formed, or if the condensing arrangement is such as not to completely condense the very volatile crystalline matter which first comes over, is evident. Possibly also where a length of time is required to raise a large quantity of fluid to the boiling point, further dissociation of the carbonate may take place, and loss of CO_2 ensue; but in this case we should expect to find most of the ammonia in the distillate, whereas, those samples noted for their poverty in carbonate are not rich in free ammonia.

If the equation above given correctly represents the reactions which take place, then a typical specimen of aromatic sp. of ammonia should contain 1·419 per cent. of free ammonia, and 1·424 per cent. of combined ammonia corresponding to 4·007 per cent of the neutral carbonate. On the small scale it is undoubtedly possible to produce a spirit differing very little from this, and if on the large scale the process really does yield a distillate varying to the extent indicated in the analyses, then either some other process for convenience of manufacturers should be devised for producing a more reliable article, or it should be made in smaller quantities at a time; but as many firms send out an article rich both in carbonate and free ammonia, one cannot understand why all should not do the same.

In conclusion, I would remark that any misunderstanding in prescribing and dispensing as to what is intended when sp. ammon. co., sal volatile, or æther. chlor. and sp. æther. chlor. are prescribed would be entirely obviated, were these names placed as synonyms under head of sp. ammon. ar. and sp. chloroformi respectively, in the next edition of the B.P.

The PRESIDENT said he should regret that these valuable papers should be hastened over, but he feared there would not be time to discuss them at length.

Dr. SYMES, having had some correspondence with Mr. Thresh on this matter, felt some little interest in it. With regard to sal volatile, he thought the total amount of ammonia was really the great point of importance. But the proportion of caustic ammonia to carbonate of ammonia present was by no means unimportant. Although the total amount of ammonia in two samples might be the same, the flavour, taste and character of the two would be quite different if one had a much larger proportion of caustic ammonia than the other. His experience was that if the Pharmacopœia process was followed it was a satisfactory one for preparing sal volatile, though he had some difficulty sometimes in getting the whole of the deposit left in the receiver to dissolve, and the hint given by Mr. Thresh was therefore valuable. With regard to chloric ether, he thought they all pretty well understood that the spirit of chloroform of the B.P. was introduced for the purpose of replacing the unsatisfactory and uncertain chloric ether which previously existed. Before that time chloric ether was charged a very high price, and was supposed to be very special in its character, because it was distilled, and was in some respects superior to all others, but he got into difficulties by using it, because he found that it was much weaker than that usually prepared by admixture. He was quite at a loss to understand from the specific gravity of the chloric ether why it should not contain more chloroform. The facts proved to be that the spirit was weaker; it would not be 19 spirit and 1 of chloroform, but perhaps 17 spirit and 2 of water and 1 of chloroform that would account for the specific gravity. This great difference in usage in chloric ether was a very strong argument for carrying out the idea which he had put forth on the previous day of having some kind of authority who should revise and render uniform these very unsatisfactory preparations.

A vote of thanks was passed to Mr. Thresh for his papers.

The next paper was a—

REPORT ON THE STRENGTH OF COMMERCIAL SPECIMENS OF AQUA LAURO-CERASI.

BY JOHN WOODLAND, F.L.S., F.C.S., ETC.

Having obtained samples of this drug from different pharmacists, the following table will show the results of twelve estimations of hydrocyanic acid contained in them:—

No. of Sample	Percentage of acid.	No. of Sample.	Percentage of acid.
1	·034	7	·0408
2	·037	8	·0292
3	·0291	9	very slight trace
4	·052	10	·034
5	·051	*11	none
6	·024	*12	none

* Numbers 11 and 12 samples contained not a trace of hydrocyanic acid, and were evidently but an admixture of essence of almonds (*sine* prussic acid) and water, the odour being very different to that of the other samples, and alcohol was proved to be present. In performing these estimations I used both nitrate of silver solution, or Liebig's process, and mercuric chloride with ammonia, or Hannay's process, with similar results. I also tried the method recommended by Vielhaber ('Year-Book of Pharmacy,' 1879, p. 24), but did not obtain such satisfactory results. In order to ascertain if there is any

other constituent of cherry-laurel water, besides hydrocyanic acid, that would react with nitrate of silver, and so vitiate the results obtained in volumetric estimation, I distilled one of the samples with ferrous sulphate and slaked lime, the distillate from which was not affected by the volumetric solution. The varying percentages shown in the above table indicate the instability of this preparation, the strength decreasing as the age increases, in what proportion I have, as yet, been unable to determine, but intend during the coming year to perform experiments which will form the subject of a future paper. Through the kindness of Mr. Umney in supplying me with recently distilled samples of cherry-laurel water from the fresh and dried leaves, I have been able to ascertain the percentages of hydrocyanic acid contained in them. In the sample prepared with fresh leaves I found ·0524; in that distilled from the dried leaves ·0204. I performed the experiment with the dried leaves to ascertain if in the process of drying the active principles (which, when treated with water yield hydrocyanic acid as one of the products) were entirely or partially destroyed, and if the latter to what extent. Wishing to use a test for the presence of hydrocyanic acid in cherry-laurel water which would be less tedious than those generally used for the detection of small quantities of hydrocyanic acid, a weak solution of mercurous nitrate in dilute nitric acid was adopted, which in the presence of a cyanide gives a greyish-brown precipitate, even in the presence of chlorides, bromides, iodides or phosphates. The test is not so delicate as the Prussian blue and sulphocyanide tests, but is sufficiently so for the purpose to which it was applied; a sample of cherry-laurel water not giving a reaction with the mercurous nitrate solution would certainly not owe its efficacy to hydrocyanic acid. Although mineral acids render weak solutions of hydrocyanic acid more stable, no foreign acid was found in any of the samples examined. A very good test for the detection of sulphuric or hydrochloric acid in the presence of hydrocyanic is the addition of dilute solution of oxyacetate of lead to the suspected sample when if no mineral acid be present the liquid remains clear, sulphuric or hydrochloric acid producing a precipitate.

Mr. Umney said Mr. Woodland had done good service in calling attention to cherry-laurel water. He thought it was high time it was expunged from the Pharmacopœia altogether. Those who knew what an uncertain preparation cherry-laurel water was would discard it. It was introduced no doubt to satisfy a little contention between the Edinburgh and the Dublin physicians, when the 1864 Pharmacopœia was framed. The Dublin men used to colour theirs with tincture of lavender, and the Edinburgh men distilled without colouring, and in this form it had been retained in our British Pharmacopœia. He remembered that in February, 1869, he read a paper showing how uncertain was the distillate, and how uncertain it was when prepared from leaves of different ages, and uncertain also when the leaves were freshly gathered or kept a few days, showing also that after some two or three months' keeping the quantity of prussic acid decreased to an enormous extent. His experience as a manufacturer told him that cherry-laurel water was very little required, and it was very difficult for British pharmacy to keep it in a uniform state. The French Codex prescribed that after it was distilled it was to be examined and brought to a suitable strength by the aid of a nitrate of silver solution, but the British Pharmacopœia took no notice of anything of that sort. Altogether he thought the sooner they saw the last of it the better.

A vote of thanks was passed to Mr. Woodland for this communication.

The last paper read at this meeting was a—

REPORT ON THE STRENGTH AND PURITY OF ALKALINE SOLUTIONS OF POTASH AND AMMONIA AS MET WITH IN PHARMACY.

BY JOHN WOODLAND, F.L.S., F.C.S., ETC.

Having during laboratory practice frequently noticed the presence of impurities in both liquid and solid samples of caustic potash, I was (on seeing in the list of subjects for papers, issued by the Secretaries of this Conference, that information regarding the purity and strength of solutions of potash and ammonia is required) induced to examine a few samples found in ordinary retail commerce, with the view of ascertaining if the same impurities exist in liquid potash, and as regards the chief ones to what extent, also to determine the strength and purity of liquid ammonia. The results of the examination of ten samples of liquid potash are as follows:—

No. of solution.	Specific Gravity.	Percentage of Alkali.	Percentage of Chloride of Potassium.	Other Impurities.
1	1·06	5·91	·324	·3 per cent. of alumina, traces of calcium, sodium, silica, carbonates and sulphates.
2	1·06	5·94	·238	Traces of alumina, lime, silica and carbonates.
3	1·054	5·05	·123	Traces of alumina, lime, carbonates, and sulphates.
4	1·045	4·625	·104	·24 per cent. of alumina, ·44 per cent. of lead oxide, traces of lime, silica, sodium, carbonates and sulphates.
5	1·06	5·73	·273	5·2 per cent. carbonate of potash, traces of alumina, soda and silica.
6	1·056	5·59	·114	·58 per cent. of lead oxide, traces of alumina, lime, soda and carbonates.
7	1·051	5·66	·165	Traces of alumina, lime, carbonates and sulphates.
8	1·051	5·405	·26	·35 per cent. of alumina, traces of lime, carbonates and sulphates.
9	1·052	5·412	·19	·28 per cent. of alumina, traces of lime, carbonates and sulphates.
10	1·048	4·73	·224	Traces of alumina, lime, soda, silica, carbonates and sulphates.
*11	1·046	4·095	·23	Traces of alumina, lime, silica and carbonates.

From these experiments the average specific gravity is 1·0537, that of the B.P. solution being 1·058; the average percentage of alkali is 5·4052 or 24·917 grains in an ounce, the strength of a B.P. solution being 5·84 percentage of alkali, or 27 grains in an ounce, and the average percentage of chloride is ·2015.

The presence of lead in two of the samples indicates want of care in storage. In nearly every case when purchasing the samples, I noticed that the solutions were poured from white (instead of, as the B.P. orders, green glass) bottles, and if I remember rightly(?) the two samples containing lead were poured from *new* white glass bottles recently labelled. Since performing the above experiments, I have tested two samples of liquid potash which have been kept in *old* white glass bottles for the space of from three to six months, and no trace of lead could be found in either; but on testing a sample that had been kept in a *new* white glass vehicle for three weeks the presence of lead was very evident. Hence I infer that during a certain time the silicate of this metal is being gradually removed by the action of the alkali on the inner surface of the glass until no more is left; when the bottle is fit to contain the alkali without danger of its being contaminated. The test applied for the detection of alumina is based upon that used for the detection of alum in bread. An alkaline infusion of logwood in solution of ammonia is prepared (1 of logwood to 20 of the solution). After acidification of the liquid potash this ammoniacal infusion is added in excess and the liquids heated, when if a trace of alumina be present a dark precipitate appears.

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* This solution included with the others of potash was solution of caustic soda supplied in place of the former, which was asked for.

From experiments performed upon solutions of ammonia, both strong and dilute, it was found (as the following table will show) that they are as a rule free from salts of other metals although the strength and specific gravity vary to a slight extent. Six samples of dilute solution of ammonia were obtained from retail pharmacies and yielded the following results:—

No. of Sample.	Specific Gravity.	Percentage of Ammonia Gas.	Impurities.
1	·958	10·01	Traces of sulphate and chloride.
2	·959	10	Traces of sulphate and chloride.
3	·961	9·75	Traces of sulphate.
4	·946	11·04	Traces of zinc, sulphates and chlorides.
5	·959	9·98	Traces of sulphate and chloride.
6	·956	10·23	Traces of sulphate and organic matter.

Five samples of strong solution of ammonia were examined with the following results:—

No. of Sample.	Specific Gravity.	Percentage of Ammonia Gas.	Impurities.
1	·888	34·02	Traces of chloride.
2	·884	36·3	Traces of organic matter and chloride.
3	·880	37·85	Traces of chloride and sulphur.
4	·892	32·2	Traces of sulphate.
5	·888	34·02	Traces of chloride.

The solutions containing organic matter gave a slight reddish-brown colour with nitric and a pink with sulphuric acid, showing the impurity to be of a tarry nature; but such small traces were present that volumetric estimation by permanganate of potash was not resorted to.

A vote of thanks was passed to Mr. Woodland for this paper.

PLACE OF MEETING IN 1881.

The **PRESIDENT** said the next business was to settle the place of meeting for next year.

Professor **ATTFIELD** then read a letter from Mr. Ralph Davison, of York, giving a cordial invitation to the Conference to meet there next year.

Mr. **CLARK** (York) said he had to apologize for the absence of Mr. Sowerby, who intended to be present also as a delegate. He was present at the meeting referred to in the letter just read when it was unanimously resolved to send an invitation to the Swansea meeting, and he also had an opportunity of seeing the chemists of York who were not able to be present at the meeting, and he was able to convey to the members the unanimous invitation of the York chemists. They could not offer to show any large manufactories, such as the members had been accustomed to see during the last two years, but they had one manufactory, that of glass bottles, which would be interesting, because it was established by a retail chemist in York, Mr. Spence.

Professor **ATTFIELD** moved that the thanks of the meeting be given to the chemists of York for their cordial invitation, and that their offer be accepted. York had supported the Conference from its earliest days and some members residing at York had always attended the meetings.

Mr. **MASON** seconded the motion, which was carried unanimously.

ELECTION OF OFFICERS.

Professor **ATTFIELD** said the Executive Committee had very carefully considered the question of what officers they would recommend for election for the ensuing year, and a printed list had been circulated showing the result of their deliberations. It was too late to explain many of the points which the Committee had considered, but he could assure the meeting that the names were the result of prolonged discussion; at the same time it was open to any of the members to suggest any alteration in the list.

The **PRESIDENT** then read the following names, who, on being put to the vote, were unanimously elected:—

President.

RICHARD REYNOLDS, F.C.S., Leeds.

Vice-Presidents.

Professor ATTFIELD, F.R.S., etc., London.
R. DAVISON, York.
N. M. GROSE, Swansea.
C. UMNEY, F.C.S., London.

Treasurer.

C. EKIN, F.C.S., Bath.

General Secretaries.

F. BADEN BENGER, F.C.S., Manchester.
M. CARTEIGHE, F.C.S., London.

Local Secretary.

JOSEPH SOWRAY, Petergate, York.

Other Members of Executive Committee.

R. DRESSER, York.
T. GREENISH, F.C.S., London.
J. HUGHES, Swansea.
A. H. MASON, F.C.S., Liverpool.
S. PLOWMAN, London.
C. SYMES, Ph.D., Liverpool.
W. A. TILDEN, D.Sc., F.R.S., Birmingham.
J. C. THRESH, F.C.S., Buxton.
J. R. YOUNG, Edinburgh.

Auditors.

J. T. WILLIAMS, Swansea.
J. CLARK, York.

Mr. **BRADY** then moved:—

> "That the non-resident members of the British Pharmaceutical Conference hereby tender their cordial thanks to the Local Committee, and especially to Mr. N. M. Grose, Mr. J. Hughes and Mr. J. T. Williams, for the admirable and successful manner in which their various arrangements connected with the Swansea meeting had been carried out."

He said he need add no words of his own to the sentiment which was so well expressed in the resolution.

Mr. **SAVAGE** said the acclamation with which the resolution had been received was sufficient evidence of the satisfaction which had been given. He had attended a great many Conferences and though it would be invidious to make any comparisons where all had tried to do their best, he might say that in no place had they met with a more cordial recepiton, or a greater desire to do the best they could for the interest of the Association.

The resolution having been carried unanimously,

Mr. **Grose** on behalf of the Committee said he tendered their most heartfelt thanks for the unanimous and hearty manner in which the meeting had received the resolution just passed. He did not think it was required, for they had only done their duty as every Englishman and every Welshman would like to do. They felt honoured at having entertained so many eminent scientific luminaries of the day. Although the illustrious visitor who had been present for an hour or two from the other side of the Atlantic had left, still Swansea was proud that he had attended its Conference.

Mr. **James Hughes** said he could only endorse the sentiments of his friend and *confrére*, Mr. Grose, who had done so much to lighten his duties as Secretary.

Mr. **Plowman** then moved a vote of thanks to Messrs. Vivian and Sons for their kindness in allowing the members to look over their copper works. He was sure he should express the feelings of all present when he said that the largest amount of instruction and entertainment was felt by all who visited the works.

Mr. **Ellinor** seconded the motion, which was carried unanimously.

Mr. **Davies** then moved that the best thanks of the Conference be given to the proprietors of the Landore tin plate works for the facilities given to the members present of inspecting their works. He was sure those who went over these fine works were charmed alike with both. Every one seemed willing to give all the information in his power, and all arrangements appear to have been made to afford a full view in every department of each of these large works.

Mr. **Ward** seconded the motion, which was carried unanimously.

Mr. **Chipperfield** proposed a hearty vote of thanks to the President for the very courteous and able manner in which he had conducted the business of the Conference. Mr. Southall, in occupying that chair, had followed on in an illustrious line of ancestry, but he was quite sure they would all agree that the dignity of the office had not suffered at his hands. He could only express a hope that in years to come the chair would be filled as ably as it had been on that occasion. He had much pleasure in meeting their worthy President on that the seventeenth year of their history, and he could only express a hope that he might be spared to meet him on the thirty-fourth.

Mr. **Hughes**, as a Welshman, begged to second the proposal, and to say a word or two of gratitude to those who had come to the Principality to enlighten them as to what they ought to do. He must crave permission to express his feelings in his native language. This he proceeded to do amidst great applause.

The resolution was then put by Mr. **Schacht** and carried unanimously.

The **President** thanked the members very much for the kind manner in which the resolution had been proposed and carried. He had felt it to be a great honour to occupy the important position of President of the Conference and trusted the Conference had not suffered by his presidency, and he would remind them that when he undertook the duty it was on the full understanding that it was for one year only, and he should be followed by a gentleman more fitting than himself, and who had been a mainstay of the Conference, and it would be a great pleasure to him to give up the office to his friend Mr. Reynolds.

The proceedings were brought to a termination by the presentation to Professor Attfield, which has been already reported.

Parliamentary and Law Proceedings.

Proceedings under the Pharmacy Act.

The case of the Pharmaceutical Society of Great Britain *v.* Piper, instituted in the Bloomsbury County Court, in which the plaintiffs sued the defendant for a £5 penalty incurred by his having kept open shop for the sale of poisons, viz., having taken order for a poison and delivered it bearing a label of a chemist at a distance, has been terminated by the defendant paying into Court the amount of the penalty and costs.

The case of the Pharmaceutical Society *v.* Harrod, instituted in the Brompton County Court, in which the plaintiffs sued the defendant for a £5 penalty incurred by his having kept open shop for the sale of poisons, viz., having taken order for a poison and delivered it bearing a label of a neighbouring chemist, has been terminated by the defendant paying into Court the amount of the penalty and costs.

Dispensing Memoranda.

[447]. When acetate of morphia is dissolved in water for hypodermic use, a gradual and troublesome deposit of small crystals ensues; but if the solution be made in a flask or beaker, and heated to the boiling point, the deposit is at once determined. If the solution be then filtered, it will remain tolerably clear. Using Smith's morphia, I have for some years made large quantities of morphia solution for hypodermic use by the above simple method, which has proved quite satisfactory. Where not objected to, I prefer before boiling to add a few fragments of camphor, to prevent decomposition on keeping.

Scarboro. J. **Whitfield.**

[449]. The first two ingredients are probably nostrums concerning which further information could be found in the advertising pages. It would simplify matters greatly were prescribers to bracket the name of the makers with the special article ordered.

W. R. K.

[451]. How is the following prescription to be dispensed?—

℞	Hyd. Chlor.	gr. v.
	Ext. Opii	gr. ij.
	Aq.	℥ij.

Ft. lotio. To be dropped into the eyes.—H. O. T.

Is chloral or calomel meant?

J. G. P. S.

[452]. Would any reader inform me how to dispense the following?—

℞	Ext. Lupuli.	ʒj.
	Ext. Taraxaci	ʒss.
	Aq. Puræ	ad ℥vj.

M. Ft. mist.

I found that the water would only dissolve part of the ext. lupuli, leaving a green spirituous extract.

H. O. J.

[453]. Can any reader inform me what is intended when lin. plumbi co. is prescribed?

G. W.

[454]. I have lately had occasion to make several quanties of syr. ferri phosph., B.P., at the end of the formula for which it says: "The product should measure 12 fluid ounces." I have never yet found it measure more than 10½ fluid ounces. Can anyone account for the difference? Should the bulk be made up, and if so, by what, "acid phosph. dil." or "aqua"?

R. J. **Latham.**

[455].
℞ Ung. Rumic c. Sulph. . . . . . . ℥ij.

Will some reader kindly favour me with formula for above

UNGUENT.

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[456].
℞ Sp. Æther. Nit. . . . . ℥ss.
Pot. Iod. . . . . ʒj.
Dec. Sarsæ Co. Conc. . . . . . . ℥iij.
Aq. . . . . ad ℥x.
Cap. ʒj. q.q. 4th hora.

Will you please to say whether, in your opinion, the sp. æther. nit. should be neutralized with pot. carb., so as to prevent the decomposition of pot. iod.? or if you believe it to be the intention of the prescriber to give small doses of free iodine?

W. J. SMITH.

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[457].
℞ Sodæ Hypophosphitis . . . . ʒij.
Sodæ Bicarb. . . . . ʒiss.
Liq. Strychniæ . . . . ♏xxiv.
Tr. Quiniæ . . . . ʒiv.
Aquam . . . . ad ℥xij.
Sig. A tablespoonful three times a day.

Will this form an incompatible mixture, *i.e.*, will the strychnia be thrown down by the sodæ bicarb., and if so, would it be dissolved by the water present? I may say I put a "shake the bottle" label on for fear.

W. J. SMITH.

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[458]. "Jacque" would like to know if plumbi glycerid. is the same as plumbi glycerol. recommended by Mr. B. Squire; if not, what is the formula for the glycerid.?

Notes and Queries.

[678]. CORN CAUSTIC.—I have had an application for corn caustic (liquid), no or little smell, brown colour, so described to me, and as very good. Can any chemist give me the recipe for such a preparation? Does not blacken the skin.

16, *Fonthill Road, N.* B. T. KIMBER.

[679]. QUININE SNUFF.—"Cymru" would feel obliged if some gentleman would give him a formula for "quinine snuff." It is used as a remedy for hay fever.

[680]. AQUEOUS TINCTURE OF OPIUM.—Will some reader supply me with a good process for making an aqueous tincture of opium, B.P. strength, that will keep?

SPATHULA.

[681]. METALLIC CEMENT.—"K." would feel obliged if any reader can give him a recipe for a cement suitable for fastening brass (or copper) labels to tin boxes; or can anyone tell him what is used in France for fastening the brass labels to the ends of the sardine boxes, as such would be likely to answer his purpose?

Obituary.

Notice has been received of the death of the following:—

On the 23rd of September, 1880, Mr. Thomas Iliffe, Chemist and Druggist, Nuneaton. Aged 71 years.

On the 24th of September, 1880, at Norwood, Mr. Thomas Arthur Whitehouse, Chemist and Druggist, Bristol Road, Birmingham. Aged 26 years.

On the 23th of September, 1880, Mr. George Shield, Pharmaceutical Chemist, High Street, Arbroath. Aged 60 years. Mr. Shield was a Member of the Town Council and filled the office of Provost from 1876 to 1879. He had been a Member of the Pharmaceutical Society since 1852 and was its Local Secretary for Arbroath.

On the 30th of September, 1880, at New Church, Mr. Howell David Hinds, Chemist and Druggist, High Street, Wrexham. Aged 45 years. Mr. Hinds had been an Associate of the Society since 1871.

On the 1st of October, 1880, Mr. George Johnson, Chemist and Druggist, High Street, Stamford. Aged 43 years.

On the 10th of October, 1880, Mr. Alfred Coates, Pharmaceutical Chemist, Bakewell. Mr. Coates had been a Member of the Pharmaceutical Society since 1870

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

DR. DOWN ON PROPRIETARY MEDICINES.

Sir,—I have just read with pleasure the eloquent introductory address delivered by J. Langdon Down, M.D., F.R.C.P., and was very much impressed by the able words therein; but, as in a portion of his address he indulged in a gentle denunciation of proprietary medicines, which have hitherto formed a portion of the trade of all pharmacists, will you allow me to say a few words in answer to that portion of his address?

Dr. Down, with all the leading philosophic spirits of the age, is committed to the doctrine of evolution. He says that "the medicine man of pre-historic times has become differentiated into the physician, surgeon, dentist, veterinary practitioner and pharmacist." And then true to the doctrine of evolution, he boldly asserts that each member of the commonwealth becomes higher, more evolved, more useful to himself and to the common good in proportion to the perfection of the differentiation." And again, "every indication of multiplicity of function in any member of the body is a mark of retrogression, and every instance of minute adaptation to ends is a mark of evolution, and an evidence of progress." All this is correct. Herbert Spencer could not have stated it more clearly, but later on we find that the great peril to pharmacy is the growing tendency to the sale of proprietary articles and secret remedies, and why? Because this portion of their business can be as easily transferred to the perfumery departments of a linendraper's shop, to the Italian warehouseman or the bookseller. This is undeniably, and perhaps unfortunately true; but it must not be forgotten that this specialization of the amœboid pharmacist, which causes one to produce fluid magnesia, another pancreatic emulsion, others tonga, pyretic saline, phosphorized cod liver oil, sanitas, Condy's fluid, phosphorized cod liver oil emulsion, fruit salt, chlorodyne, etc., where there is a minute adaptation of machinery and special knowledge to ends, is a mark of evolution, and therefore evidence of progress. What is not evidence of progress but evidence of a tendency to parasitism is where the pharmacists, the proprietors of the various specialties, are unscrupulous and use language in their prospectus calculated to mislead the unwary, and do not adhere to what they strictly know is proved to be true.

The great argument against the use of proprietary medicines is that the patient is frequently incompetent to form a correct diagnosis of his malady, so that incipient enteric fever and a popliteal aneurism may be mistaken for much more simple ailments. But why should the old lady who has had rheumatism all her life, and by the acute sensations can form a much clearer diagnosis of her complaint than her medical man, call in a physician when she can get some simple remedy which she has hitherto found efficacious? Shall she always be scared by the dread of popliteal aneurism or disease of the hip joint? Again, a man has a headache; the cause he knows full well to be the previous night's indulgence: he takes citrate of magnesia or some simple effervescing saline as a refresher. Need he always have before his eyes the spectre, enteric fever? Evidently if all patients were so nervous as to seek the physician for every supposed simple ailment, in a few instances diseases, which now prove fatal, would be cured; but their number would not be sufficient to warrant the suppression of the proprietary articles, considering the public inconvenience which would arise.

As a rule, the pharmacist has a very good notion of the composition of the proprietary medicines which he sells, and his own self interest will prevent him recommending a specialty when he has something equally good of his own he can sell instead; or, when by sending the patient to a doctor he can get a prescription to dispense. The physician is not expected to prescribe proprietary medicines, and, indeed, this would be impolitic if he or his dispenser can concoct something better or equally good with no great expenditure of time. This course is frequently, but not always possible; but when Dr. Down denounced the pestilent flood of American and English specifics, the anathema fell alike on the evil and the good, and it must be remembered that some have become household friends in the English family, and by no means deserve such hasty condemnation.

In conclusion may I specially draw your readers' attention to that important portion of his address where he refers to the study of botany and zoology, and a knowledge of which he says will place pharmacists in a position for understanding those questions of biological discussion which are ever forcing themselves on the attention of the cultivated beyond the profession of the pharmacist, and their ignorance of which would surely tend to their disadvantage?

S. F. ELLIMAN.

THE INTRODUCTORY ADDRESS.

Sir,—Your report of the address of Dr. Langdon Down, on opening the session in Bloomsbury Square, has afforded me much pleasure and will, I am sure, be very much appreciated by every member of the Society, for the very able and comprehensive view which his practical knowledge of the trade enabled him to take of our present and future prospects. And whilst expressing sympathy with us under our present difficulties, he foreshadowed hopeful things for the future. His retrospect of the past was a fitting testimony to the value of our founders, and an encouragement to their successors, with a suitable caution to avoid the general tendency of the age, co-operative stores, as a mark of retrogression. In this age of severe competition it is a matter of great difficulty to know what course to adopt when you find that your neighbour, the grocer, is underselling you in many articles that used to be considered as belonging to your special province; it is, therefore, satisfactory to find that Dr. Down points out a course of action eminently calculated to raise the standard of our calling, at the same time somewhat difficult to attain. However, it is evident that renewed effort in the way indicated by Dr. Down must be followed, and the chemist's trade raised beyond the reach of co-operative stores and grocers. Meanwhile an evolution is taking place and we may hope that the fittest will survive. The difficulties of a good preliminary education have to be encountered, and the inducements for parents to apprentice their sons to a trade that has little beyond its respectability to recommend it are small. Another difficulty presents itself in country districts where the population is sparse. Druggists must combine other trades with their own to enable them to live, and a youth cannot have the necessary experience (supposing that he has passed his Preliminary) to pass his Minor: it is, therefore, of the first importance that he should be able to enter a school where pharmacy and prescriptions are taught. This will now be more fully met in Bloomsbury Square than it ever has been, and the recent decision of the Council will meet an important requirement and the very high estimate of Dr. Down will be sustained, although in rural districts I am afraid it will be a long time before counter-practice is done away with, and not until the country medical practitioner can see his way to depute the dispensing of his medicines to the local chemist.

Dr. Down's general remarks and advice to the students are worthy of being separately published and circulated amongst those more immediately concerned; at any rate, I thank him very much for the valuable suggestions contained in his address.

A COUNTRY M.P.S.

THE TEACHING OF DISPENSING.

Sir,—As a member of the Pharmaceutical Society, it is with very deep regret I see that Professor Redwood has added dispensing to the school curriculum at Bloomsbury Square. I am not ignorant of the reasons which have led to this alteration, and I make this effort to try and carry a point I have much at heart. My fellow members will, I am sure, agree with me that the cardinal virtues of a chemist are method and accuracy. Where can these be cultivated a sufficient length of time except in the pharmacy?

The school in Bloomsbury Square as I knew it twenty years ago, with the ten months' course of lectures, was as nearly perfect as one could desire, and young men going there with a good practical acquaintance of their business received the finishing touches which made them fit successors of our Deane, Squire, Morson, Cracknell, etc. Where are we now? Cabinet makers have a very clever process of making one wood look like another; it is called veneering. Common deal has a layer of Spanish mahogany on it. And that is exactly what we propose to do with young men wishing to be chemists. We desire to veneer with a semi-scientific glamour a soft material. Considering the hard battle these young men will have to fight in after life, are we acting justly, fairly or honestly by them? They have to wean medical men from prejudice and win their confidence; is that the buckler for the fight?

Ignorance disparages, and I fear chemists as a rule have not estimated the practical knowledge of medical men sufficiently highly. The successful ones are very keen-witted; the action of medicine is for ever under their immediate eye; that is the fierce light that beats on a chemist's reputation. If the successful practitioner is satisfied, the public will follow him like sheep. To secure this we must multiply our teachers, and this can be accomplished very easily. It is not considered a hardship in the mercantile marine that a mate or captain should be tested in seamanship and referred to the sea for twelve months, while for his purely scientific course three months' return to his logarithms, etc., is sufficient for failure in navigation.

Continentalism is, to my mind, scientific slovenliness; we must improve on their model.

Divide the Minor examination into two parts, practical and scientific, then parents will have some security their money is not wasted. Men will be chary of taking pupils who cannot educate them, that is, teach them dispensing and make them conversant with the various processes in use for making galenicals, and the very little chemistry required to make the Pharmacopœia intelligible. This practical examination would qualify pupils as assistants, a sad want. The division would enable the scientific portion to include an elementary knowledge of light, heat and electricity, without which no man of ordinary culture is equipped, and therefore no master is fitted to hold his own nor dare to call himself a chemist.

This plan would make every pharmacy where pupils are taken a help-meet to Bloomsbury Square, and if it acts as a barrier to such numbers overcrowding a poor calling, when so many others are flourishing, it will be a real kindness to them.

If a candidate fails in the practical examination, send him back in disgrace to the shop, for twelve months, from whence he came, or turn him over to another and let his parents settle the affair with the master; if the lad fails in his scientific examination, three months is ample.

GEORGE MEE.

79, Grosvenor Road, Highbury New
Park, London, N.

THE DANGER OF CONCENTRATED SOLUTION OF CAMPHOR.

Sir,—Many instances are known to medical men of the great danger resulting from the administration of homœopathic solution of camphor, and the public should be warned, as well as the more learned vendors of drugs, that it is not safe in all hands as a remedy.

The solution is usually about six or seven times the strength of spirit of camphor of the Pharmacopœia.

I am not prepared positively to state that any adult has been wholly poisoned by camphor; but children have lost their lives through its agency.

Not long since I witnessed its most injurious effects in an adult; but the case of Mr. James Coll, who died on the 19th ult. at Bridgwater, should be a warning to all using such remedies.

That in the solid state camphor is not so readily absorbed as when in solution, is abundantly known to all; but the practice of giving large and repeated doses at short intervals by unqualified persons is to be deprecated.

If alcohol has been partaken of the absorption will be very much facilitated, and I think this explains the toxic effect, and the very rapid symptóms developed in the case of Mr. Coll.

That camphor is cumulative need not be discussed at length in your pages; but there was no time for elimination between the first dose and the last, and at least 30 drops were taken within an hour. I fail to see that it was satisfactorily proved by Mr. Parsons that Mr. Coll died from what we are to "understand as *delirium tremens*," and if we read aright, camphor had nothing to do with the death "in any shape or form."

If a man was verging on *delirium tremens*, surely he would have had some other symptoms than indistinctness and mumbling in conversation.

Again, I never knew a man on the border of fatal *delirium tremens* able to write a letter and go to the post office with it. Up to the time of his taking the camphor, his conduct was surely not that of a person who in a few hours would die from the effects of chronic alcoholism. I am aware that it has been stated a single debauch has induced "the trembles."

Although I have had many cases through my hands, up till now I have not met with such an instance, and I adduce this as there was no evidence to show Mr. Coll was a "fast liver," or that he was upon this occasion wholly under the influence of liquor.

Every symptom described is in perfect keeping with what is observed in camphor poisoning, and if delirium, fatal *delirium tremens* was hastened,—even suppose it to be dormant, for the sake of argument,—was it not accelerated, and does it not stand out as clear as noon-day, that after the doses of camphor it did set in with fatal effect? If such be the case, and if it admits of no doubt, surely the camphor acted at least as an exciting agent, if not under the circumstances as the real cause of the collapse.

In such cases as cholera and diarrhœa Dr. Rubini of Naples was very stringent in his directions as regards the administration of camphor. It is against the practice of giving large and frequent doses that attention should be directed; and it ought to be borne in mind that camphor has a very different action in some individuals to what it has in others.

I hope, therefore, that those who sell it will be careful not to give it without distinct instructions as to its use, for it is clearly a medicine that in some cases is administered by the public with good intention, but fraught with peril, as I have more than once seen.

Northallerton. HENRY BROWN.

THE ESTIMATION OF MINUTE QUANTITIES OF ARSENIC.

Sir,—A paper read before the British Pharmaceutical Conference is published in your issue of the 2nd inst. by Mr. F. W. Fletcher, on a method, which he claims as a novel one, for the estimation of minute quantities of arsenicum. To Mr. Fletcher, no doubt, all honour is due for the originality, so far as he is concerned, in having devised that process, but unfortunately for him he cannot claim to be the originator of it. If he will refer to the *Chemical News*, vol. xxvii., p. 74, he will find that A. Houzeau, there publishes practically the same process as far back as 1873, and I have used that process constantly for some years with satisfactory results.

Royal Institution, Manchester. W. THOMSON.

Sir,—In the discussion at the Conference, as reported in the Journal for October 2, that followed the reading of the paper by Fletcher on an indirect method of estimating minute quantities of arsenic, Mr. Allen, in correction of the remarks of Dr. Attfield, made the following statement:—

"Professor Attfield suggested that it was not certain metallic silver was not thrown down in some cases by the hydrogen, but Dr. Russell showed that only perfectly neutral nitrate of silver was apt to be precipitated by a current of true hydrogen, and that the slightest trace of acid prevented such action; therefore Mr. Fletcher had only to take the precaution of having it faintly acid and there would be no fear of any precipitation of metallic silver."

This is almost a complete inversion of Russell's results.

What Russell does say (*Journal of the Chemical Society*, vol. xxvii, page 5):—

"A neutral solution of silver nitrate becomes acid as soon as the silver separates out; and it has always been found that the silver is precipitated in larger crystals and brighter in appearance from acid than from neutral solutions."

On page 8, where the effect of free acid is examined, Russell states:—

"From a solution containing 7 per cent of HNO_3 and saturated with 10 grams of silver nitrate, hydrogen precipitates in eighteen hours 0·1275 gram of silver, very nearly as much as would have been precipitated from a neutral solution. Even in a solution containing as much as 17·5 per cent. of HNO_3 silver is precipitated by hydrogen."

Russell finds that (page 4) a dilute solution is less readily precipitated than a saturated one, and in the latter it is nearly half an hour before there is any change.

Manchester. W. H. DARLING.

W. B. Darroll.—We do not think you would be eligible as the regulation as to eligibility expressly states that candidates "must have been not less, or been engaged not less, than three years in the pharmacy of a registered pharmaceutical chemist or chemist and druggist."

B. T. Kimber.—We are sorry to differ from you as to the relative value of the matters referred to.

X. (who should have sent his name and address).—See the paper on quillaia bark, by Mr. Collier, in the *Pharmaceutical Journal* for September 20, 1879, p. 234.

"*Coccus.*"—Probably the purple colour was due to the salicylic acid having come into contact with iron during the making of the preparation.

"*Pharmacy.*"—We know of no recent work on the subject. You might, perhaps, consult Messrs. Pontifex and Wood, of Shoe Lane, with advantage. See a paper by Mr. Corder, *Pharmaceutical Journal*, [3], vol. vii., p. 349; and another by Mr. Schacht, in vol. viii., p. 225.

A. J. H.—Try the recipe given in the Journal for December 9 last, vol. x., p. 443. We cannot ask for imitations of particular preparations.

"*Croton.*"—There seems always to have been a doubt in the minds of the discoverers as to whether they were dealing with croton chloral or butyl chloral, since, although they temporarily inclined on theoretic grounds to the opinion that it was the former, the hydrogen found in analysis was always in excess. The doubts were strengthened by the nature of the decomposition and addition products obtained from it, and the discovery of monochlorcrotonaldehyd among the bye-products eventually led to the conclusion that it was formed by the addition of two atoms of chlorine to that substance, thus becoming trichlorbutylaldehyd as represented by the equation:—

$$C_4H_5ClO+Cl_2=C_4H_5Cl_3O.$$

The paper in which these results were published is printed in the *Berichte*, vol. viii., p. 1561. See also a paper on the Chlorine Derivatives of Alcohol, in *Pharmaceutical Journal*, [3], vol. viii., pp. 549 and 566.

Chemicus.—We are not aware that there has been any relaxation of the law on the subject.

J. N.—The preparation is one sent out by Messrs. Corbyn.

J. G. Willson is recommended to submit his question to the Registrar.

R. Bayle.—Please send particulars as to date.

A. Manning.—Your letter has been handed to the Secretary, to whom all notices as to the dispatch of Journals should be sent.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Fennell, Siebold, Hankey, Pretender, J. A. H., M. O. P., Ph. C.

THE EXHIBITION AT BRESLAU.

A very interesting feature in connection with the recent meeting of the Deutsche Apotheker-Verein in Breslau was, as in former years, the Pharmaceutical Exhibition. This was held on the premises of the Concert House, in the Gartenstrasse, in which the meetings of the Association took place. One portion of the exhibits was displayed in a long gallery running along one side of the principal concert room; another portion was shown in three large rooms in the building that were entirely devoted to the purpose; whilst a third portion was accommodated under a colonnade in the gardens attached to the establishment. Altogether there were about ninety exhibitors.

The display, being this year more scattered, was hardly so effective in appearance as that at Hanover last year. Moreover, two sections which were there well represented,—the pharmaceutical apparatus and the archæological literature of pharmacy,—were on this occasion much less conspicuous. Neither was any display of microscopes or other similar apparatus noticed, and again there was a complete abstention on the part of chemical manufacturers. But there were many objects of interest to pharmacists shown, quite sufficient to well repay the trouble involved in a visit, and the exhibition, closely associated as it was in one of its departments with opportunities for the renewal of friendship and the drinking of lager beer, was certainly not the least attractive portion of the meeting.

Perhaps the feature that would first strike an English visitor would be the prominent position assumed in the exhibition by the exhibitors of natural mineral waters and of wines for medical and pharmaceutical uses. Of the mineral waters there were several displays, the largest one being a collective exhibition by five Breslau firms, which included waters from about sixty different springs, and the literature describing their composition and alleged properties formed when collected a considerable bundle. Some of these waters are well known in this country, others are not, and as inquiries respecting these natural waters, especially those that are less known, are not infrequent, a few details gathered from these pamphlets and other sources may not be out of place as indicating the bottled mineral waters principally in use in Germany.

Aachen (Aix-la-Chapelle, Rhenish Prussia). — Sulphuretted saline.

Adelheidsquelle (from Heilbrunn, Bavaria).—Contains iodine and bromine in combination with sodium.

Assmannshausen (Nassau).

Bilin (Bohemia).—Antacid table water.

Charlottenbrunn (Silesia).—Mild chalybeate.

Colberg. Cudowa (Pomerania).—Brine.

Driburg (Westphalia).—Strong chalybeate.

Eger Franzenbad (Bohemia).—Alkaline sulphates and chlorides with carbonate of iron.

Elster.

Ems (Nassau).—Saline and gaseous.

Fachingen (Nassau).—Contains soda (in large quantity), lithia, strontia, lime, magnesia, iron and manganese as carbonates; soda, lithia, lime and alumina as phosphates; chlorides of sodium and potassium; fluoride of calcium; silica and sulphate of soda.

Flinsberg (Silesia).

Friedrichshall (Saxe-Meiningen).—Bitter water. Containing large quantities of sulphates of soda, magnesia and lime, chlorides of sodium and magnesium, and some carbonate of magnesia.

Geilnau (Nassau).—Alkaline.

Giesshubel (Bohemia).—Gaseous aperient dinner water.

Gleichenberg (Styria).—Contains alkaline chlorides and carbonates, carbonate of iron and carbonic acid.

Goczalkowitz.

Hall.—Brine.

Homburgh.—Aperient. Three-fourths of the solid constituents consist of chloride of sodium, the next important in quantity being chloride of magnesium.

Hunyadi Janos (Hungary).—Bitter aperient water, containing large quantities of the sulphates of soda and magnesia, and chloride of sodium.

Iwonicz. Jastremb. Kainzenbad.

Karlsbad (Bohemia).—Strongly purgative, containing much sulphate, carbonate, and chloride of sodium.

Kissengen (Bavaria).—Similar to Friedrichshall, but claimed to contain more free carbonic acid.

Kösen (Saxony).—Contains much chloride of sodium (more than five-sixths of the total solid ingredients) as well as the sulphates of lime, potash, soda, and magnesia.

Krankenheil (Bavaria).—Alkaline, carbonate, sulphates and chlorides.

Kreuznach (Rhenish Prussia).—Bromo-iodurretted brine, containing a considerable proportion of chloride of calcium and some chloride of lithium.

Krynica.

Landeck (Silesia).—Saline, containing, together with a small quantity of free carbonic acid, some sulphuretted hydrogen and nitrogen.

Langenau (Silesia).—Containing carbonate of iron and the alkaline earths.

Lippspringe (Westphalia).—Saline water, containing besides free carbonic acid a considerable quantity of nitrogen.

Marienbad (Bohemia).—Alkaline water, rich in sulphate, carbonate, and chloride of sodium.

Neuenahr (Rhenish Prussia).—Similar to Apollinaris.

Pullna (Bohemia).—Bitter saline, containing principally the sulphates of soda and magnesia, together with some potassium bromide and lithium.

Pyrmont (Waldeck).—Chalybeate and brine.

Rehme (Westphalia).—Brine.

Reinerz (Silesia).—Contains principally carbonates of lime, soda, and magnesia, ferrous and manganous carbonates, and traces of ferrous arsenite and carbonate of lithia.

Roisdorf (Rhenish Prussia).—Table water, containing chloride of sodium, and the carbonates of soda, magnesia, and lime.

Saidschutz (Bohemia).—Bitter water, containing chiefly sulphate of magnesia.

Salzbrunn (Ober-Silesia).—Carbonated alkaline water, containing also a considerable proportion of sulphate of soda.

Schwalbach (Nassau).—Chalybeate.

Selters (Nassau).—Same as Seltzer.

Soden (Nassau).—Containing the chlorides of sodium and potassium, and ferrous carbonate.

Spa (Belgium).—Chalybeate.

Tarasp (Switzerland).—Containing principally the sulphates of soda and potash, carbonates of soda, magnesia and lime, protoxide of iron, and chloride and some iodide of sodium.

Vichy (France).—Alkaline and chalybeate.

Victoria (Buda Pesth, Hungary).—Bitter water.

Wildungen (Waldeck).—Alkaline gaseous water.

Wittekind (near Halle).—Brine.

Besides the bottled waters there were a considerable number of products, many of them in the shape of residues either deposited naturally or obtained artificially by evaporation. Amongst these were evaporated residues and mother liquors from the Kaiserquelle, Marienbad, Saidschutz, Vichy, Giesshubler and other springs, some rather crystalline carbonate of magnesia and "pastilles digestives" from Bilin water, and a soap said to contain iodides and bromides made with water from the Goczalkowitz spring, near Pless. From Franzenbad was shown a ferruginous peat for baths and a ferruginous ochre (hydrated red oxide) for use in gas purification.

The attention given to the wines seemed to indicate that they occupy a more important place in German pharmacy than in English. Tokay was conspicuous, almost suspiciously so, considering the small quantity that is said to cross the Hungarian borders, otherwise than to Russia, where it is almost exclusively consumed. Greek wines also seemed to be in favour. A specialty of Messrs Duhr and Co., of Cologne, consisted in small bottles of wines, ranging upwards from a few ounces. They also showed a medicinal "champagne," warranted free from added carbonic acid.

In the Colonnade were three fine collections of vegetable drugs, exhibited by Herr Grund, of Breslau, Messrs. Wolff and Rasim, of Breslau, and Herr Kathe, of Halle, and it would be difficult to award among these the palm for greatest merit. Herr Grund exhibited cinchona barks in unusual variety, but the specimens were unequal in quality; the Ledgeriana was shown in dark brown thin smooth quills. Another notable feature in this display was the gums. One specimen marked "Gummi arabicum Gezyrrhi" was extremely white and brilliant, and others approached it in beauty of appearance. One specimen, however, bearing the anomalous title "Gummi arabicum australischer" was frankly marked "werthloss." Gum benzoin from Siam was there in large and beautiful fragments, and the Sumatra and Palembang varieties in square blocks. This Palembang benzoin, it will be remembered, contains no cinnamic acid; it is now worked for benzoic acid, of which it contains about 10 per cent. There were also some fine white tears of olibanum and some too that had a purplish tint. Then there were flores pyrethri rosei and flores chrysanthemi (wild from Monte Nero and the Herzegovina and cultivated from Civita Vecchia and Ragusa) and the powders prepared from them. Sarsaparilla from Honduras, Vera Cruz, Guatemala and the Rio Negro, were exhibited in original packages, the latter being in hanks not unlike in shape to parallel eel pots. There was also an original package of curari, consisting of a tier of five small pots. A large collection of sponges attracted attention by their size and beauty, the African varieties from Mandrucha and Bengaso being especially noticeable. Some of the sponges were of a delicate primrose colour, and with respect to the bleached sponges it was stated that they had been treated with permanganate of potash and not with oxalic acid.

The collection of Messrs. Wolff and Raisim included, among other things, some fine specimens of coto and paracoto barks. There were also samples marked "cort. quebracho blanco" and "cort. quebracho colorado," but the former was more fibrous and otherwise differed in appearance from other specimens of the true quebracho blanco bark. The kind presentation by the firm of a sample of this as well as of the red bark to the Museum of the Society will allow of comparison being made, and perhaps throw some light upon its origin.

Some of the specialties of Herr Kathe were noticed in the account of the exhibition in Hanover last year. Among other noticeable features in this year's exhibition were flores pæoniæ; folia salviæ; folia piperitæ and crispæ, used for making infusion or "tea"; the rhizomes of *Iris tornata*, cut into slices with a hole in the centre, for children; a cake of resina draconis, about 11 inches in diameter and 3 inches thick; liquorice root cut into flakes, and the rhizome of *Filix mundata*. Herr Kathe also exhibited some large pieces of *Aspidosperma Quebracho blanco* bark, one of which was kindly presented to the Museum of the Pharmaceutical Society.

Herr Müller of Ober-Glogau limited his display to single chamomile flowers.

The display of pharmaceutical preparations, although not very extensive, was interesting, and some of them were particularly noticeable because of the greater relative importance that they seem to enjoy in Germany as compared with this country. This is especially true of what may be called pharmaceutical confectionery, and of such preparations those of santonin were amongst the most common, occurring generally in the form of a conical troche, containing a definite quantity (about 0·03 gram) of santonin. Whether this conspicuousness of santonin is dependent upon, or simply concurrent with, the national consumption of "schinken" and sausage is perhaps fair matter for conjecture. Another preparation that assumed considerable prominence is sal ammoniac in the form of tablets. There were also some very nice looking samples of liquorice extract in thin pipes and in threads. Other articles were malt pastilles and bon-bons, flesh-peptone chocolate, and some good looking gum pastilles, not coated but made uniform throughout. As might be expected, Silesia being the home of the beet, some very fine specimens of sugar were shown, both in lumps and as an impalpable powder, and the exhibition by Herr Eulner, of Berlin, of a sugar for pharmaceutical purposes that was warranted to be "free from ultramarine" showed that the importance of such an impurity, as pointed out by Dr. Symes, is thought worthy of recognition.

Capsules were also well represented, and the exhibit of Herr Pohl, of Schonbaum, near Danzig, was again worthy of special mention, not only on account of the variety, but also for the beauty and elasticity of the capsules and perles. Here were capsules containing in each 0·05 gram to 0·25 gram of quinine; others containing 7·5 grams of castor oil in neat boxes each holding four capsules; others were filled with sandal wood oil, or with cod liver oil containing 1 to 3 per cent. of iron in the form of benzoate, or with apiol, which last are said to be exported principally to India for use in kidney diseases.

The plasters formed another portion of the exhibition worthy of notice, especially for the nattiness and convenience of the form in which they were presented. Tin boxes appear to be utilized freely for this purpose, and these would contain in some instances a dozen small circular mustard papers; in others there were rolls of diachylon or salicylated or other plasters, varying from about a quarter of an inch in width and in the smaller sizes retailable at a very small price. In connection with this subject must be mentioned the beautiful cardboard and white birch and beech wood boxes for various purposes shown by Herr Siegemund, of Berlin, on whose counter a trophy representing Liebig's Hohe formed a conspicuous object, and by Herr Schmitz of Neusalz-on-the-Oder. Some of the cases, again, were devoted especially to antiseptic dressings, and one very beautiful transparent material for this purpose was shown under the name of "hyaloderma."

The odour from the perfumery exhibits was very perceptible to the nose, but they included nothing of very special interest. The essential oil of yiang-ylang (*Unona odoratissima*), the preparation of which at Manilla, in the Phillipines, is chiefly in the hands of Germans, was shown at the stall of Herr Reymann, of Breslau, together with the oil of champaca flowers. Here was also to be seen a curiosity in the shape of a delicately fine handkerchief woven from the leaf fibres of the pineapple. Herr Hausfield demonstrated the excellence attained on the continent in the manufacture of glycerine soaps, the importation of which into this country has, however, received a severe check in consequence of the presence of alcohol in the soap. One specimen of glycerine soap appeared as a clear liquid. Other soaps shown by the same exhibitor were "sulphur soap," apparently containing some sulphuret, borax, and beech tar soap. Carmine was shown in boxes of which it only covered the bottom, and there was a scented cinchona water.

Of course the ubiquitous firms of Park, Davis and Co., and Cheeseborough were represented, and Seabury and Johnson's plasters and "Sanitas" were among the other exhibits familiar to the English visitor, the last mentioned being in Germany apparently under the auspices of Messrs. Sarg and Co. There was also a "petrolina" from New York, bearing the alternative title of "petroleum jelly," a name which was long since appropriated and criticized in this country. A large collection of homœopathic remedies was also shown. Among the other miscellaneous preparations worthy of mention were pencils of nitrate of silver, enclosed in cedar wood, like the ordinary black lead pencils, each containing 2·5 grams of nitrate, and some "molken pastilles," requiring only to be dissolved in boiling milk for the production of curds and whey. As mentioned before, the display of apparatus was small, Oberdorffer's well-known presses, and those of one or two other makers, and an Otto's gas engine forming the principal features. There was a good display of glass bottles from Silesian factories, and also of porcelain vessels for chemical and pharmaceutical purposes from the Royal Saxon Porcelain Works, at Meissen. Finally there were two or three dispensing counters and poison cupboards exhibited, the latter being remarkable for the faith which they evidenced in the efficacy of the symbols of a death's head and cross-bones, stencilled inside and outside on every panel, as an aid to careful dispensing.

THE ALKALOIDS OF DITA BARK.[*]

BY O. HESSE.

Apothecary Grippe, of Manilla, prepared from dita bark, the bark of *Alstonia scholaris* (syn. *Echites scholaris*), a substance that he named "ditain," which he represented to be obtained in the same way as quinine is from cinchona bark. This alleged method of preparation appears to have given rise to the idea with some that this ditain was a peculiar vegetable base, notwithstanding that from the communications of Hildwein[†] and Gorup-Besanez,[‡] it became evident that the preparation in question was nothing but an extract. However, Gorup-Besanez separated from 30 grams of ditain, according to Stas's method, a very small quantity of a strong non-volatile and crystallizable alkaloid, though this was not sufficient for further examination.

Before, however, Gorup-Besanez directed the attention of chemists to ditain, Julius Jobst and the author undertook an examination of dita bark itself. This investigation led to the discovery of an alkaloid precipitable from solutions of its salts by ammonia, which they named "ditamine," and another substance presenting much similarity to the alkaloids, inasmuch as it formed a compound with oxalic acid, but differing in that it did not pass into ether and similar solvents when treated with an excess of ammonia. Other attempts made to isolate this substance were unsuccessful, and the naming of it was deferred until further experiment should disclose its nature.

Meanwhile, dita bark, as appears from a later paper by Harnack,[*] was worked upon by E. Merck, who succeeded in preparing from it a crystallizable base, which in 1876 he showed at the Exhibition of Scientific Apparatus, at South Kensington. Harnack examined this substance, which Merck considered to be pure ditamine,[†] and found that in the supposed ditamine there was present the hydrochlorate of an active vegetable base, which having obtained from ether in crystals he named "crystallized ditaine." Harnack further came to the opinion, like Merck, that dita bark contained no basic substance besides this alkaloid.

Hereupon in a paper entitled 'Historische Notiz über Ditain,' Husemann[‡] declared that ditaine had long before been prepared by Scharlee, and named "alstonine." This led the author of the present paper (Hesse) to make some remarks upon the subject[§] and as Harnack's investigation was then unknown to him and Husemann in his paper had treated Gruppe's and Harnack's "ditains" as identical, he thought Harnack's investigation had been carried out with dita extract. This error induced Harnack to publish an extract from his paper in the Journal of the German Chemical Society (xi., 2004), in which he stated that dita bark contained only one alkaloid, namely, "crystallized ditain," and he considered, therefore, that Hesse's communication, according to which dita bark contained two alkaloids, ditamine and echitamine, was due to imperfect observation.

In the present paper, therefore, Hesse describes exhaustively these two alkaloids, together with a third, "echitenine." The last named has been known to him some time, but a communication respecting it has been delayed until it was ascertained whether this alkaloid was actually contained in the bark, or was first formed during the preparation of the other two.

Ditamine.

Ditamine is very easily prepared by the process described by Jobst and Hesse,[‖] which consists, after a preliminary treatment of the bark with petroleum spirit, in supersaturating an alcoholic extract of dita bark with soda, shaking out the alkaloid with ether and obtaining it from the ethereal solution in the usual way. If ammonia be used instead of soda more or less of other substances separate with it, which passing also into the ethereal solution render the obtaining of the ditamine in a pure state much more difficult.

From the solution supersaturated with soda it is difficult to remove the last traces of ditamine by means of ether, and light petroleum spirit does not act more favourably, notwithstanding that it separates somewhat better from the basic solution.

The amount of ditamine in dita bark was estimated in a subsequent experiment at 0·04 per cent. In that case the powdered bark, without previous treatment with petroleum spirit, was extracted directly with hot alcohol and the extract obtained upon the evaporation of the alcohol was treated with dilute acetic acid in order to bring as much as possible of the alkaloid retained by the resinous bodies into solution. The clear filtered solution was then supersaturated with soda, shaken with ether, and the ethereal solution treated with a small quantity of acetic acid. After the acetic solution had been separated from the ether it was saturated with ammonia in excess, and the precipitated alkaloid shaken out with pure ether, which upon evaporation left it as a yellowish varnish.

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[*] Abstract of a paper in the *Annalen der Chemie*, vol. cciii., p. 144.

[†] *Pharm. Central*, 1873, No. 26; *Neues Repert.*, xxii., 561.

[‡] *Annalen der Chemie*, clxxvi., 83.

[*] *Archiv. f. exp. Path. u. Pharmakologie*, viii., 126.

[†] Merck at first designated this substance "dittamine," but appears subsequently to have chosen for it the name of "ditaine."

[‡] *Archiv f. Pharmacie*, ccxii., 438.

[§] *Berichte*, xi., 1547.

[‖] *Pharm. Journ.*, [3], vol. ii., p. 144.

According to these results it might have been expected that from ten kilograms of dita bark four grams of ditamine would be obtained. But the process followed was that first described, and only 0·4 gram of alkaloid was obtained. About nine-tenths of the alkaloid had disappeared in the process, and probably was contained in the before-mentioned resinous mass. With the small quantity of ditamine thus obtained all the statements respecting this alkaloid previously put forward by Jobst and the author were confirmed.

Ditamine dissolves very readily in dilute acetic or hydrochloric acid, as well as in dilute acids generally, and from such solutions it is precipitated by excess of ammonia in white amorphous flocks. In this it is distinguishable from echitamine, the alkaloid next described, which is not precipitated from its saline solutions by ammonia. The two alkaloids present another difference, not easily mistaken. If to a concentrated acetic solution of ditamine a few drops of strong hydrochloric acid be added it remains perfectly clear, whilst in a similar solution of echitamine a dense crystalline precipitate is soon formed, the commencement of which is promoted by stirring the liquid with a glass rod.

The small quantity of ditamine at the author's disposal did not allow of the composition of the free base being ascertained by analysis; but the platinum salt, obtained in light yellow amorphous flocks by precipitating an aqueous hydrochloric solution with platinum solution, gave figures corresponding with the formula—

$$(C_{16}H_{19}NO_2,HCl)_2+PtCl_4.$$

The free alkaloid would therefore have the formula $C_{16}H_{19}NO_2$.

Echitamine.

After the ditamine has been, in the way described, removed as entirely as possible, the remaining solution is neutralized with acetic or sulphuric acid, and carefully evaporated until it equals one-fifteenth to one-twentieth the weight of the bark used. To the solution, whilst still warm, some hydrochloric acid and chloride of sodium is added, which produces a resinous precipitate that soon becomes crystalline. The addition of sodium chloride is continued until it is observed that the precipitated resin no longer alters its form upon standing. After twenty-four hours the precipitate is collected, washed with concentrated hydrochloric acid, and purified by crystallization from boiling water. As hydrochlorate of echitamine is almost insoluble in concentrated hydrochloric acid, the crystallization from water, which, as a rule, is rather slow, may be hastened by adding hydrochloric acid to the solution. The hydrochlorate is then thrown down as a white crystalline powder.

Echitamine may also be prepared by adding fused potash to the before-mentioned basic aqueous solution that remains after the removal of the ditamine and shaking with chloroform. The chloroform takes up the alkaloid present, which is partly suspended and partly in solution, and gives it upon evaporation as an amorphous residue, which upon treatment with a little concentrated hydrochloric acid very easily yields the hydrochlorate pure.

From the pure salt the free alkaloid can easily be obtained by dissolving it in the smallest possible quantity of hot water, adding to the solution saturated solution of potash or, preferably, fused potash, and shaking out the free base, which separates in white flocks, with ether or chloroform. In either case there remains after slow evaporation an amorphous residue, which upon drying in the exsiccator at first shrivels up and then cracks. Only in very exceptional cases does this residue show here and there indications of crystallization. Upon dissolving this residue in strong alcohol, or in a mixture of equal parts of acetone and water, the pure base is obtained upon spontaneous evaporation of the solution in a chamber free from carbonic acid in thick obliquely truncated glassy prisms.

An analysis of the air-dried substance gave results corresponding with the formula $C_{22}H_{28}N_2O_4+4H_2O$. Upon placing the air-dried crystals in an exsiccator they lost one molecule of water; when further dried in a partial vacuum (about 400 mm.) at 80° C. they lost two molecules more, and the fourth molecule was given off with difficulty and after some time upon raising the temperature to 105° C. Upon exposure to moist air this anhydrous substance quickly took up one molecule of water, again forming the compound $C_{22}H_{28}N_2O_4+H_2O$. The same compound is obtained upon treating the residue left by the evaporation of the ethereal or chloroform solution with hot acetone. The basic mass at first swells up and is eventually converted into a magma of delicate white amorphous flocks, which, washed with cold acetone, dried in an exsiccator and pulverized, form a white powder, having the composition of the monohydrate.

The last traces of the last molecule of water are very persistent, and can scarcely be got rid of without decomposition taking place. Moreover, the dry residue obtained at 150° C. is almost without action upon red litmus paper, whilst that containing one molecule of water sharply colours such paper blue. It would consequently appear that this one molecule of water has a special signification towards echitamine, and that by its loss a much weaker base is formed from a strong one.

This substance formed by drying at 105° C. has, however, the peculiarity that when treated with hydrochloric or other acids the original base is again formed. This recalls in some measure the formation of chloride of ammonium when hydrochloric acid and ammonia are brought together. But when chloride of ammonia is decomposed with potassium hydrate the nitrogen base splits up into ammonia and water, whilst in the case of the organic base under consideration, when it is decomposed with potassium hydrate, the water remains combined and is only given off upon the application of heat.

$$C_{22}H_{28}N_2O_4{\cdot}HCl+KHO=KCl+C_{22}H_{28}N_2O_4{\cdot}H(HO).$$

Consequently, the author calls the compound with one molecule of water, $C_{22}H_{28}N_2O_4{\cdot}H_2O$, "echitammonium-hydroxide," yielding echitamine by the loss of one molecule of water.

Echitammoniumhydroxide.

Echitammoniumhydroxide dissolves tolerably readily in water and still more easily in alcohol, communicating to the solution a strongly basic reaction. It dissolves when freshly precipitated rather easily in chloroform and ether, but is very slightly soluble in coal benzine and nearly insoluble in petroleum spirit. When the alkaloid has assumed the crystalline form it dissolves with difficulty in ether. Both the ethereal and the chloroform solutions upon spontaneous evaporation leave the alkaloid in the amorphous condition, though sometimes the amorphous mass shows distinct traces of crystallization.

The aqueous solution of echitammoniumhydroxide throws down from solutions of cupric chloride, ferric chloride and alum the oxyhydrates, without redissolving these precipitates. In solution of acetate of lead the solution produces a voluminous precipitate of hydrated oxide of lead, which is partially redissolved in the precipitant. Echitammoniumhydroxide also displaces the ammonia from chloride of ammonium, and sets free the alkaline hydrates from solution of sodium and potassium chlorides, echitammonium chloride being formed and separating in crystals. The sodium chloride is decomposed very quickly, but potassium chloride requires some time.

When heated quickly in capillary tubes to 206° C. echitammoniumhydroxide melts and becomes coloured through the formation of a black scum. It is optically active, rotating the beam of polarized light to the left. With sulphuric acid it is coloured an intense purple red, but the colour becomes paler upon warming. Both the alkaloid and its chloride dissolve with a purple red colour in concentrated nitric acid, but after some minutes this colour disappears and the solution becomes intensely green. Bromine produces in the aqueous solution of the alkaloid a yellow flocculent precipitate that dissolves upon heating. Anhydrous acetic acid dissolves the base very readily. Upon warming the solution becomes brownish.

Echitammonium, the author thinks, is probably the most strongly basic of all the alkaloids and appears to be monovalent. It neutralizes acids completely, forming salts, some of which are crystallizable. The chloride, $C_{22}H_{29}N_2O_4Cl$ or $C_{22}H_{28}N_2O_4.HCl$, is obtained in colourless shining needles upon treating an aqueous solution of the alkaloid or one of its easily soluble salts with concentrated hydrochloric acid or solution of sodium chloride. It dissolves moderately freely in hot, but with difficulty in cold water, forming sometimes in the latter a supersaturated solution, from which the salt immediately crystallizes on the addition of a couple of drops of hydrochloric acid. It is almost insoluble in concentrated hydrochloric acid and solution of chloride of sodium. A large number of other salts, which have been prepared and examined by the author, are described in detail in the original paper. The author also describes an oxidation product, which he provisionally calls "oxyechitamine," produced when a solution of the base is allowed to evaporate while exposed to the air.

Echitenine.

Echitenine remains in the first mother liquor after the precipitation of the echitammonium chloride. It may be obtained either by precipitating with mercuric chloride and decomposing the precipitate with sulphuretted hydrogen, etc., or by saturating the mother liquor with soda, shaking with chloroform and evaporating, in either case manipulating so as to get the hydrochloric compound of the alkaloid in concentrated solution. This is done by simply evaporating the solution resulting from the decomposition of the mercuric salt, or in the other case dissolving the chloroform residue in concentrated hydrochloric acid. After standing some time the clear solution is filtered, supersaturated with soda solution and shaken with chloroform. The chloroform solution is then washed with water, treated with animal charcoal and finally evaporated, when the echitenine is left as a brownish residue. After perfect drying this residue becomes very brittle and springs in brownish lamellæ from the sides of the vessel. It retains some chloroform which is only driven off completely at a temperature of 100° C. The dry substance, when analysed, gave results corresponding with the formula $C_{20}H_{27}NO_4$.

Echitenine forms, when pulverized, a brownish strongly bitter tasting powder, which melts at above 120° C. It dissolves with a reddish-violet colour in concentrated sulphuric acid and in concentrated nitric acid with a purple colour, passing quickly into green and finally into yellow. If the powder be simply exposed to the vapour of nitric acid it becomes coloured an intensely blue-green.

Echitenine dissolves freely in alcohol, imparting to it an alkaline reaction. It also dissolves readily, especially when freshly precipitated, in chloroform and ether, less readily in water, and in petroleum spirit it is almost insoluble. Its solution in dilute hydrochloric acid gives a yellow flocculent precipitate upon the addition of potassium or sodium hydrate, as also does ammonia if the solution be moderately concentrated. Even solution of soda produces a precipitate in a concentrated solution, but not in a dilute one.

Echitenine forms true salts with acids, but they are amorphous, and with few exceptions are unsuited for investigation.

In conclusion, in comparing echitammoniumhydroxide with ditamine and echitine, the other bases accompanying it in dita bark, it is at once apparent that they contain only half the proportion of nitrogen, and the author thinks that this difference may also be partially an expression of the relation which these bases show toward acids. Though differing in this respect, they appear to belong, as indicated by the nitric acid reaction, to a common group and the author believes that they are part of a series which he represents as follows:—

Ditamine	$C_{16}H_{19}NO_2$.
?	$C_{18}H_{23}NO_3$.
Echitenine	$C_{20}H_{27}NO_4$.
Echitammoniumhydroxide .	$C_{22}H_{30}N_2O_5$.

Echitammoniumhydroxide would therefore, according to this view, be the most perfect basic product occurring in the *Alstonia scholaris*.

THE BALSAM FIR.*

In his Report† to the Regents of the University of the State of New York, Mr. Charles H. Peck, the botanist of the New York State National Museum, has the following:—

"The importance of the balsam fir, *Abies balsamea*, Marshall, as an ornamental evergreen and as a source of balsam, renders a brief account of it and its enemies desirable.

"It prefers wet or marshy soil, in cold, hilly, or mountainous regions, yet it is quite at home on comparatively dry upland, and will thrive in almost any soil. Its growth is rapid, but the tree seldom attains a very large size, the trunk rarely exceeding 1 foot in diameter at the base. Its usual diameter is 6 to 8 inches, with a height of 30 to 40 feet. It has a straight gradually tapering trunk, giving off, at intervals of 1 or 2 feet, circles of branches, each one of which is a little shorter than the one next below it. This gives to the head or spray a very regular form, resembling in outline an elongated cone. The branches are given off at a wide angle with the trunk. They are generally a little ascending, but sometimes horizontal, or slightly deflexed. The branches are numerous, and given off with considerable regularity at each node, though scattering or adventitious branches and branchlets are of frequent occurrence, both on the trunk and branches. There are usually three regular branchlets at each node, two spreading laterally (one from each side of the branch), and one extending downwards and outwards beneath the branch. The leaves have been described in some botanical works as two-ranked. They are, however, scattered on all sides of the leading shoots and branchlets, and are more or less spirally arranged in their insertion; but those on the lower side of the branchlets are so curved and directed upwards and outwards that they appear, as a whole, to be somewhat two-ranked. They are flattened like the leaves of the hemlock, but are usually longer than those of either the hemlock or spruce. The lower surface is marked by a prominent midrib and has a silvery or glaucous lustre which, combined with the deep green of the upper surface, gives to the foliage a richness and beauty unequalled by that of any other of our evergreens. They remain upon the tree four or five years, so that all the shorter branches are clad with rich, dense foliage throughout their whole extent. The cones or fruit of the balsam are produced on the upper and consequently on the shorter and younger branches. I have never seen them on branches below the middle of the tree. They stand erect on the branches and in this respect differ essentially from the pendulous cones of the spruce and hemlock. On the very short branches, near the top of the tree, they are often so close together that they appear crowded or clustered. Before maturity they are more or less tinged with bluish, or violet and purplish hues, but their beauty is generally impaired by copious exudations of resin. When quite young they are bristly with the long, slender points of the bracts, but these are at length nearly concealed by the overlapping scales. The cones have been described as 3 to 4 inches long, but I have never seen them so long. Their usual length with us is 1½ to 2½ inches. Sometimes on the mountains, small trees 4 to 6 feet high bear a few cones. This tree, like the spruce, in some situations varies considerably from the typical form. In the Catskill Mountains I have seen it dwarfed to a diffusely spreading bush, similar to the ground hemlock. Near the summit of the high peaks of the Adirondacks, it loses its beauty and thrift, and forms dense thickets, in which the trunks are but a few feet high, rapidly tapering and coated with lichens; the branches are long, straggling, crooked, and interlaced, the whole forming a hedgelike mass, through which anything larger than a rabbit would find great difficulty in passing. Starved by the lack of soil, stunted in its growth by the short, cold seasons, pressed down by the weight of accumulating snow, and bruised and cut back by masses of ice and frozen snow hurled against it by fierce blasts of wind, it can no longer attain its usual size and its natural symmetry of form. These mountain thickets of balsam fir are of interest to the botanist, because they show the hardy character of the tree, and its ability to live where few other trees can live; but they are the constant dread of tourists who visit the unfrequented peaks of the Adirondacks, for they are passed only with the utmost difficulty and labour.

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* From *New Remedies*, September, 1880.

† 'Twenty-first Annual Report on the New York State National Museum,' 8vo., Albany, 1872, p. 21.

"The wood of the balsam fir is of little value for lumber, owing to the small size of the tree. It contains resin and burns freely, but with a crackling noise. The smoke is very penetrating and irritating to the eyes. Near the summits of the mountains, however, it is almost the only available wood for camps and camp fires. The bark of this tree furnishes the well-known "Canada balsam," a clear viscid resin of considerable repute in medicine, and much used for mounting objects for the microscope. The resin is obtained from small vesicles or "blisters" in the bark. It is generally more abundant in the thrifty smooth-barked trees of low damp lands than in the stunted growths of the mountains. Because of the value of this tree as a producer of balsam, and because of its beauty and fitness to adorn parks and pleasure grounds, it ought to be cherished and preserved. But like its companion the spruce, it has its insect and fungoid foes. While at Summit, in Schoharie County, in September, I noticed in a small grove of balsams and a dozen or more of the trees had recently been killed or were then dying. The leaves had nearly all changed their colour, but for the most part yet remained on the trees. An investigation showed pretty conclusively that an insect was the cause of the death of the trees. A minute bark-mining beetle, both in its mature and in its larval state, was found between the bark and the wood. The beetle perforates the bark, excavates its furrow along the inner surface in a horizontal direction, and deposits its eggs along the sides of the furrow which is less than one-sixteenth of an inch in diameter. As soon as the eggs are hatched, the larvæ begin to mine furrows of their own at right angles to the original gallery, one part eating their way upward and another downward between the bark and the wood. These larval galleries are nearly parallel to each other and are at their beginning so minute that they are scarcely perceptible to the naked eye; but as the larva advances in its course, it increases in size and the diameter of its furrow increases in like manner. The larvæ were found (in some instances transformed to the mature beetle) each in the larger end of its own furrow. It will be observed from the direction of the original furrow how powerful an agent for mischief this minute beetle is. Its work is carried on in the most vital part of the tree. Three or four beetles attacking the trunk at or about the same height, and on different sides of the tree, would completely and effectually girdle it and destroy its life. Even a single beetle, by extending its furrow entirely around the trunk, would accomplish the same result; but no furrows were found thus extended. The length of the original furrows appeared to be less than 4 inches. The beetle itself is scarcely more than 1 line long, and belongs to the genus *Tomicus*. The species is probably undescribed. In the case of the spruce-destroying beetle more workers are necessary to kill the tree, because the main furrows are excavated longitudinally or parallel to the axis of the trunk, while in the case of the balsam-destroying beetle the original furrow is excavated at right angles to this axis, and therefore cuts off or destroys the vital action over a much broader space.

"The destruction of the balsams was not limited to the single grove in which it was first observed. In several places along the road between Summit and Jefferson dead and dying balsams were noticed, but the affected trees were not very numerous, and it would not be a difficult matter, with prompt and united action, to arrest the progress of the mischief. If each man, on whose land the balsams grow, would, as soon as signs of the presence of the trouble are manifest, cut the affected trees, strip off the bark and burn it, he would, by so doing, destroy the colonies of larvæ, and prevent the further spread of the mischief. It is not at all probable that trees once attacked and showing signs of death can be saved, and it would be far better to cut them down immediately than allow them to remain as nurseries for these tiny marauders."

CINCHONA CULTIVATION IN BENGAL.*

The report of the Government cinchona plantation in British Sikkim for the year 1879-80 has been received, from which it appears that the season was unusually favourable for planting operations, and about three-quarters of a million of young trees were planted out, of which 644,222 were *Succirubra*, covering an area of a little above 196 acres, against 353,415 planted over an area of 120 acres in the previous year. During the year, 276,700 trees of this species were put out on the new plantation of Sittong, covering an area of nearly 101 acres; 258,620 were planted on the old plantation of Rishap and Mungpoo, though on virgin soil, and 108,900 replaced those that had to be uprooted for the bark crop. In addition to these, a good many young plants were utilized in filling up gaps as they occurred in the older parts of the plantation.

In the resolution recorded upon the proceedings of last year, it was stated that the Lieutenant-Governor, in view of the more extensive cultivation of *Cinchona Calisaya*, had authorized Dr. King to proceed to Java and ascertain the condition under which the Dutch have successfully grown that variety of cinchona. Dr. King accordingly visited the plantations in Java during the year. The result of his visit to that island was embodied by him in an interesting report received by Government on the 22nd November last, and forwarded to the Government of India on the 15th December, 1879. The report shows that, in respect of soil and climate, the Java plantations have great advantages over those of Sikkim, but on the other hand labour is much cheaper in British Sikkim. The conclusions arrived at by Dr. King were that efforts should be made to graft *Ledgeriana* and approved varieties of *Calisaya* on *Succirubra* stocks; that attention should be directed towards propagating the best varieties of *Calisaya*; that trial should be given to the Java plan of shaving the bark of cinchona trees; and that a more suitable locality for cinchona cultivation than Sikkim should be sought for in Burma, the Andaman Islands, and the Khasi Hills. The Dutch method of shaving the bark of living trees has already been tried at Mungpoo, but there has been as yet no time to judge of the results.

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* From the *Journal of the Society of Arts*.

The entire produce of the plantations for the year was 361,590 lbs. of dry bark, against 261,659 lbs. in 1878-79; of this, 29,520 lbs. were yellow, and the rest red bark. The new plantation of Sittong grew its first crop during the year, and of the bark gathered, 15,850 lbs. represented the yield of that plantation. The aggregate yield of bark in former years amounted to 1,134,901 lbs., so that the total produce of the plantations since their opening, including the crop of the past year, has been 1,496,491 lbs.

The total expenditure on the plantation amounted to Rs.69,973 0 4, of which Rs.15,204 4 6 represented the capital expenditure on the new plantation at Sittong, and Rs.54,768 11 10 the working expenses of the old plantations.

The superintendent reports that there is a considerable demand for seed of *Cinchona succirubra* among the coffee-planters of Ceylon, who sow it broadcast between the trees on their plantation, as also for seed of *Cinchona Calisaya*; but it has been found impossible to meet the demand for the seed of the latter variety to the full extent, as the bulk is required for the Government plantation.

The total out-turn of the febrifuge factory for the year just passed was 9434 lbs. 13 oz., against 7007 lbs. in the previous year. The demand of that year, however, amounted to 7955 lbs. 7 oz., which Mr. Wood, the quinologist, was able to meet from the large stock that he had on hand at the commencement of the year. The febrifuge factory has been extended during the year, and is now on a sufficiently large scale to meet all probable current demands, and at the same time to maintain a sufficient reserve stock of the alkaloid as now manufactured.

The total expenditure on the plantation from its commencement (including compound interest at 4 per cent.) is a little less than 10 lakhs of rupees. The cash transactions for the year therefore show a profit of rather more than 5½ per cent. on the capital. But this does not represent the whole of the gain for the year, for the stock in hand has been increased in value by Rs.42,775, which is equal to another 4 per cent. on the capital. The amount of febrifuge used in substitution of quinine in Government hospitals and dispensaries during the past year was 5400 lbs. Calculating the average price of quinine in Calcutta at 90 rupees (a rather low estimate), the saving effected by this substitution during the year has been very nearly four lakhs of rupees, and the total saving since the factory commenced working aggregates 11½ lakhs of rupees or more than the plantations have cost since their opening.

The Lieutenant-Governor regrets the loss of the valuable services of Mr. Wood, who resigned his appointment of quinologist during the year. The thanks of Government are also given to Dr. King, whose management of his department leaves nothing to be desired.

THE APPLICATION OF CHEMISTRY TO AGRICULTURE.*

BY J. H. GILBERT, PH.D., F.R.S., V.P.C.S., F.L.S.

(*Continued from page 256.*)

In connection with this question of the characters of growth under the influence of continuous light, compared with those developed with alternate light and darkness, the recent experiments of Dr. Siemens on the influence of electric light on vegetation are of considerable interest.

In one series of experiments, he kept one set of plants entirely in the dark, a second he exposed to electric light only, a third to daylight only, and a fourth to daylight, and afterwards to electric light from 5 to 11 p.m. Those kept in the dark acquired a pale yellow colour, and died; those exposed to electric light only, maintained a light green colour, and survived; those exposed to daylight were of a darker green colour, and were more vigorous; and, lastly, those submitted to alternate daylight and electric light, and but a few hours of darkness, showed decidedly greater vigour, and, as he says, the green of the leaf was of a dark rich hue. He concluded that daylight was twice as effective as electric light; but that, nevertheless, "electric light was clearly sufficiently powerful to form chlorophyll and its derivatives in the plants."

In a second series of experiments one group of plants was exposed to daylight alone; a second to electric light during eleven hours of the night, and was kept in the dark during the day; and a third to eleven hours day, and eleven hours electric light. The plants in daylight showed the usual healthy appearance; those in alternate electric light and darkness were for the most part of a lighter colour; and those in alternate daylight and electric light far surpassed the others in darkness of green and vigorous appearance generally.

I have carefully considered these general descriptions with a view to their bearing on the question whether the characters developed under the influence of electric light, and especially those under the influence of almost continuous light, are more prominently those of assimilation or of growth; but I have not been able to come to a decisive opinion on the point. From some conversation I had with Dr. Siemens on the subject, I gather that the characteristics were more those of dark colour and vigour than of tendency to great extension in size. The dark green colour we may suppose to indicate a liberal production of chlorophyll; but if the depth of colour was more than normal, it might be concluded that the chlorophyll had not performed its due amount of assimilation work. In regard to this point, attention may be called to the fact that Dr. Siemens refers to the abundance of the blue or actinic rays in the electric arc, conditions which would not be supposed specially to favour assimilation. On the other hand, the vigour, rather than characteristic extension in size, would seem to indicate a limitation of what is technically called growth, under the influence of the almost continous light.

Among the numerous field experiments made at Rothamsted, we have many examples of great variation in depth of green colour of the vegetation growing on plots side by side under known differences as to manuring; and we have abundant evidence of difference of composition, and of rate of carbon-assimilation, coincidently with these different shades of colour. One or two instances will strikingly illustrate the point under consideration.

There are two plots side by side in the series of experiments on permanent grass land, each of which received during six consecutive years precisely the same amount of a mixed mineral manure, including potass, and the same amount of nitrogen in the form of ammonia salts. After those six years, one of the two plots was still manured in exactly the same way each year; whilst the other was so, with one exception—namely, the potass was now excluded from the manure. Calculation shows that there was a great excess of potass applied during the first six years; and there was no marked diminution of produce during the five or six years succeeding the cessation of the application. But each year subsequently, up to the present time, now a period of fourteen years, or of nineteen since the exclusion of the potass, the falling off in produce has been very great.

The point of special interest is, however, that all but identically the same amount of nitrogen has been taken up by the herbage growing with the deficiency of potass as by that with the continued supply of it. The colour of the vegetation with the deficiency of potass has been very much darker green than that with the full supply of it. Nevertheless, taking the average of the eight years succeeding the first six of the exclusion of the potass, there has been nearly 400 lbs. less carbon assimilated per acre per annum; and in some of the still later years the deficiency has been very much greater than this.

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* Presidential Address delivered before the Chemical Section of the British Association, Swansea, 1880.

We have here, then, the significant fact that an equal amount of nitrogen was taken up in both cases, that chlorophyll was abundantly produced, but that the full amount of carbon was not assimilated. In other words, the nitrogen was there, the chlorophyll was there, there was the same sunlight for both plots; but the assimilation-work was not done where there was not a due supply of potass.

Again, in the field in which barley has now been grown for twenty-nine years in succession, there are two plots which have annually received the same amount of nitrogen —the one in conjunction with salts of potass, soda, and magnesia; and the other with the same, and superphosphate of lime in addition. The plot without the superphosphate of lime always maintains a darker green colour. At any given period of growth the dry substance of the produce would undoubtedly contain a higher percentage of nitrogen; but there has been a deficient assimilation of carbon, amounting to more than 500 lbs. per acre per annum, over a period of twenty-eight years. Here again, then, the nitrogen was there, the chlorophyll was there, the sunlight was there; but the work was not done.

It may be stated generally that, in comparable cases, depth of green colour, if not beyond a certain limit, may be taken to indicate corresponding activity of carbon assimilation; but the two instances cited are sufficient to show that we may, so far as the nitrogen, the chlorophyll, and the light are concerned, have the necessary conditions for full assimilation, but not corresponding actual assimilation.

It cannot, I think, fail to be recognized that in these considerations we have opened up to view a very wide field of research, and some of the points involved we may hope will receive elucidation from the further prosecution of Dr. Siemens's experiments. He will himself, I am sure, be the first to admit that what he has already accomplished has done more in raising than in settling important questions. I understand that he proposes to submit plants to the action of the separated rays of his artificial light, and the results obtained cannot fail to be of much interest. But it is obvious that the investigation should now pass from its present initiative character to that of a strictly quantitative inquiry. We ought to know not only that, under given conditions as to light, plants acquire a deeper green colour, and attain maturity much earlier than under others, but how much matter is assimilated in each case, and something also of the comparative chemical characters of the products. As between the action of one description of light and another, and as between the greater or less continuity of exposure, we ought to be able to form a judgment whether the proper balance between assimilation on the one hand, and growth and proper maturation on the other, has been attained; whether the plants have taken up nitrogen and mineral matter, and produced chlorophyll, in a greater degree than the quantity and the quality of the light have been able to turn to account; or whether the conditions as to light have been such that the processes of transformation and growth from the reserve material provided by assimilation have not been normal, or have not kept pace with the production of that material.

But one word more in reference to Dr. Siemens's results and proposed extension of his inquiries. Even supposing that by submitting growing crops to continuous light by the aid of the electric light during the night, they could be brought to maturity within a period shorter than at present approximately in proportion to the increased number of hours of exposure, the estimates of the cost of illuminating the vegetation of an acre of land certainly do not seem to hold out any hope that agriculture is likely to derive benefit from such an application of science to its needs. If, however, the characters of growth and of maturation should prove to be suitable for the requirements of horticultural products of luxury and high value, it may possibly be otherwise with such productions.

The above considerations obviously suggest the question: What is the office of chlorophyll in the processes of vegetation? Is it, as has generally been assumed, confined to effecting, in some way not yet clearly understood, carbon assimilation, and this done, its function ended? Or is it, as Pringsheim has recently suggested, chiefly of avail in protecting the subjacent cells and their contents from those rays of light which would be adverse to the secondary processes which have been distinguished as growth?

Appropriate as it would seem that I should attempt to lay before you a *résumé* of results bearing upon the points herein involved, so numerous and so varied have been the investigations which have been undertaken on the several branches of the question in recent years, that adequately to discuss them would occupy the whole time and space at my disposal. I must therefore be content thus to direct attention to the subject and pass on to other points.

It has been shown that the plant may receive abundance of nitrogen, may produce abundance of chlorophyll, and may be subject to the influence of sufficient light, and yet not assimilate a due amount of carbon. On the other hand, it has been seen that the mineral constituents may be liberally provided, and yet, in the absence of a sufficient supply of nitrogen in an available condition, the deficiency in the assimilation of carbon will be still greater. In fact, assuming all the other necessary conditions to be provided, it was seen that the amount of carbon assimilated depended on the available supply of nitrogen.

In a certain general sense it may be said that the success of the cultivator may be measured by the amount of carbon he succeeds in accumulating in his crops. And as, other conditions being provided, the amount of carbon assimilated depends on the supply of nitrogen in an available form within the reach of the plants, it is obvious that the question of the sources of the nitrogen of vegetation is one of first importance. Are they the same for all descriptions of plants? Are they to be sought entirely in the soil, or entirely in the atmosphere, or partly in the one and partly in the other?

These are questions which Mr. Lawes and myself have discussed so frequently that it might seem some apology was due for recurring to the subject here, especially as I considered it in some of its aspects before this Section at the Sheffield Meeting last year. But the subject still remains one of first importance to agriculture, and it could not be omitted from consideration in such a review as I have undertaken to give. Moreover, there are some points connected with it still unsettled, and some still disputed.

It will be remembered that De Saussure's conclusion was that plants did not assimilate the free or uncombined nitrogen of the atmosphere, and that they derived their nitrogen from the compounds of it existing in the atmosphere, and especially in the soil. Liebig, too, concluded that plants do not assimilate nitrogen from the store of it existing in the free or uncombined state, but that ammonia was their main source, and he assumed the amount of it annually coming down in rain to be much more than we now know to be the case.

Referring to our previous paper for full details respecting most of the points in question, I will state, as briefly as I can, the main facts known—first in regard to the amount of the measurable, or as yet measured, annual deposition of combined nitrogen from the atmosphere; and secondly as to the amount of nitrogen annually assimilated over a given area by different crops—so that some judgment may be formed as to whether the measured atmospheric sources are sufficient for the requirements of agricultural production, or whether, or where, we must look for other supplies!

First, as to the amount of combined nitrogen coming down as ammonia and nitric acid in the measured aqueous deposits from the atmosphere.

Judging from the results of determinations made many years ago, partly by Mr. Way, and partly by ourselves, in the rain, etc., collected at Rothamsted; from the results of numerous determinations made much more recently by Professor Frankland in the deposits collected at Rothamsted, and also in rain collected elsewhere; from the results obtained by Boussingault in Alsace; from those of Marié-Davy at the Meteorological Observatory at Montsouris, Paris; and from those of many others made in France and Germany—we concluded, some years ago, that the amount of combined nitrogen annually so coming down from the atmosphere would not exceed 8 or 10 lbs. per acre per annum in the open country in Western Europe. Subsequent records would lead to the conclusion that this estimate is more probably too high than too low. And here it may be mentioned in passing that numerous determinations of the nitric acid in the drainage water collected from land at Rothamsted, which had been many years unmanured, indicate that there may be a considerable annual loss by the soil in that way; indeed, probably sometimes much more than the amount estimated to be annually available from the measured aqueous deposits from the atmosphere.

It should be observed, however, that the amount of combined nitrogen, especially of ammonia, is very much greater in a given volume of the minor aqueous deposits than it is in rain; and there can be no doubt that there would be more deposited within the pores of a given area of soil than on an equal area of the non-porous even surface of a rain-gauge. How much, however, might thus be available beyond that determined in the collected and measured aqueous deposits, the existing evidence does not afford the means of estimating with any certainty.

The next point to consider is—What is the amount of nitrogen annually obtained over a given area, in different crops, when they are grown without any supply of it in manure? The field experiments at Rothamsted supply important data relating to this subject.

Thus, over a period of 32 years (up to 1875 inclusive), wheat yielded an average of 20·7 lbs. of nitrogen per acre per annum, without any manure; but the annual yield has declined from an average of more than 25 lbs. over the first 8, to less than 16 lbs. over the last 12, of those 32 years; and the yield (it is true with several bad seasons), has been still less since.

Over a period of 24 years, barley yielded 18·3 lbs. of nitrogen per acre per annum, without any manure; with a decline from 22 lbs. over the first 12, to only 14·6 lbs. over the next 12 years.

With neither wheat nor barley did a complex mineral manure at all materially increase the yield of nitrogen in the crops.

A succession of so-called "root crops,"—common turnips, Swedish turnips, and sugar beet (with 3 years of barley intervening after the first 8 years)—yielded, with a complex mineral manure, an average of 26·8 lbs. of nitrogen per acre per annum over a period of 31 years. The yield declined from an average of 42 lbs. over the first 8 years, to only 13·1 lbs. (in sugar beet) over the last 5 of the 31 years; but it has risen somewhat during the subsequent 4 years, with a change of crop to mangolds.

With the leguminous crop, beans, there was obtained, over a period of 24 years, 31·3 lbs. of nitrogen per acre per annum without any manure, and 45·5 lbs. with a complex mineral manure, including potass (but without nitrogen). Without manure the yield declined from 48·1 lbs. over the first 12 years to only 14·6 lbs. over the last 12; and with the complex mineral manure it declined from 61·5 lbs. over the first 12, to 29·5 lbs. over the last 12, years of the 24.

Again, an ordinary rotation of crops of turnips, barley, clover or beans, and wheat, gave over a period of 28 years an average of 36·8 lbs. of nitrogen per acre per annum without any manure, and of 45·2 lbs. with superphosphate of lime alone, applied once every four years, that is for the root crop. Both without manure, and with superphosphate of lime alone, there was a considerable decline in the later courses.

A very remarkable instance of nitrogen yield is the following—in which the results obtained when barley succeeds barley, that is when one gramineous crop succeeds another, are contrasted with those when a leguminous crop, clover, intervenes between the two cereal crops. Thus, after the growth of six grain crops in succession by artificial manures alone, the field so treated was divided, and, in 1873, on one half barley, and on the other half clover, was grown. The barley yielded 37·3 lbs. of nitrogen per acre, but the three cuttings of clover yielded 151·3 lbs. In the next year, 1874, barley succeeded on both the barley and the clover portions of the field. Where barley had previously been grown, and had yielded 37·3 lbs. of nitrogen per acre, it now yielded 39·1 lbs.; but where the clover had previously been grown, and had yielded 151·3 lbs. of nitrogen, the barley succeeding it gave 69·4 lbs., or 30·3 lbs. more after the removal of 151·3 lbs. in clover, than after the removal of only 37·3 lbs. in barley.

Nor was this curious result in any way accidental. It is quite consistent with agricultural experience that the growth and removal of a highly nitrogenous leguminous crop should leave the land in high condition for the growth of a gramineous corn crop, which characteristically requires nitrogenous manuring; and the determinations of nitrogen in numerous samples of the soil taken from the two separate portions of the field, after the removal of the barley, and the clover, respectively, concurred in showing considerably more nitrogen, especially in the first 9 inches of depth, in the samples from the portion where the clover had been grown, than in those from the portion whence the barley had been taken. Here, then, the surface soil at any rate, had been considerably enriched in nitrogen by the growth and removal of a very highly nitrogenous crop.

Lastly, clover has now been grown for twenty-seven years in succession, on a small plot of garden ground which had been under ordinary garden cultivation for probably two or three centuries. In the fourth year after the commencement of the experiment, the soil was found to contain, in its upper layers, about four times as much nitrogen as the farm-arable-land surrounding it; and it would doubtless be correspondingly rich in other constituents. It is estimated that an amount of nitrogen has been removed in the clover crops grown, corresponding to an average of not far short of 200 lbs. per acre per annum; or about ten times as much as in the cereal crops, and several times as much as in any of the other crops, growing on ordinary arable land; and, although the yield continues to be very large, there has been a marked decline over the second half of the period compared with the first. Of course, calculations of the produce of a few square yards into quantities per acre can only be approximately correct. But there can at any rate be no doubt whatever, that the amount of nitrogen annually removed has been very great; and very far beyond what it would be possible to attain on ordinary arable land; where, indeed, we have not succeeded in getting even a moderate growth of clover for more than a very few years in succession.

One other illustration should be given of the amounts of nitrogen removed from a given area of land by different descriptions of crop, namely, of the results obtained when plants of the gramineous, the leguminous, and other families, are growing together, as in the mixed herbage of grass land

It is necessary here to remind you that gramineous crops grown separately on arable land, such as wheat, barley, or oats, contain a comparatively small percentage of nitrogen, and assimilate a comparatively small amount of it over a given area. Yet, nitrogenous manures have generally a very striking effect in increasing the growth of such crops. The highly nitrogenous leguminous crops (such as beans and clover), on the other hand, yield, as has been seen, very much more nitrogen over a given area, and yet they are by no means characteristically benefited by direct nitrogenous manuring; whilst, as has been shown, their growth is considerably increased, and they yield considerably more nitrogen over a given area, under the influence of purely mineral manures, and especially of potass manures. Bearing these facts in mind, the following results, obtained on the mixed herbage of grass land, will be seen to be quite consistent.

A plot of such mixed herbage, left entirely unmanured, gave over twenty years, an average of 33 pounds of nitrogen per acre per annum. Over the same period another plot, which received annually a complex mineral manure, including potass, during the first six years, but excluding it during the last fourteen years, yielded 46·3 pounds of nitrogen; whilst another, which received the mixed mineral manure, including potass, every year of the twenty, yielded 55·6 pounds of nitrogen per acre per annum. Without manure, there was some decline of yield in the later years; with the partial mineral manuring there was a greater decline; but with the complete mineral manuring throughout the whole period, there was even some increase in the yield of nitrogen in the later years.

Now, the herbage growing without manure comprised about fifty species, representing about twenty natural families; that growing with the limited supply of potass comprised fewer species, but a larger amount of the produce, especially in the earlier years, consisted of leguminous species, and the yield of nitrogen was greater. Lastly, the plot receiving potass every year yielded still more leguminous herbage, and, accordingly, still more nitrogen.

The most striking points brought out by the foregoing illustrations are the following:—

First. Without nitrogenous manure, the gramineous crops annually yielded, for many years in succession, much more nitrogen over a given area than is accounted for by the amount of combined nitrogen annually coming down in the measured aqueous deposits from the atmosphere.

Second. The root crops yielded more nitrogen than the cereal crops, and the leguminous crops very much more still.

Third. In all cases—whether of cereal crops, root crops, leguminous crops, or a rotation of crops—*the decline in the annual yield of nitrogen, when none was supplied, was very great.*

How are these results to be explained? Whence comes the nitrogen? and especially whence comes the much larger amount taken up by plants of the leguminous and some other families, than by the gramineæ? And lastly, what is the significance of the great decline in the yield of nitrogen in all the crops when none is supplied in the manure?

Many explanations have been offered. It has been assumed that the combined nitrogen annually coming down from the atmosphere is very much larger than we have estimated it, and that it is sufficient for all the requirements of annual growth. It has been supposed that "broad-leaved plants" have the power of taking up nitrogen in some form from the atmosphere, in a degree or in a manner, not possessed by the narrow-leaved gramineæ. It has been argued that, in the last stages of the decomposition of organic matter in the soil, hydrogen is evolved, and that this nascent hydrogen combines with the free nitrogen of the atmosphere, and so forms ammonia. It has been suggested that ozone may be evolved in the oxidation of organic matter in the soil, and that, uniting with free nitrogen, nitric acid would be produced. Lastly, it has by some been concluded that plants assimilate the free nitrogen of the atmosphere, and that some descriptions are able to do this in a greater degree than others.

We have discussed these various points on more than one occasion; and we have given our reasons in concluding that none of the explanations enumerated can be taken as accounting for the facts of growth.

Confining attention here, to the question of the assimilation of free nitrogen by plants, it is obvious that, if this were established, most of our difficulties would vanish. This question has been the subject of a great deal of experimental inquiry, from the time that Boussingault entered upon it, about the year 1837, nearly up to the present time. About twenty years ago it was elaborately investigated at Rothamsted. In publishing the results of that inquiry, those of others relating to it were fully discussed; and although the recorded evidence is admittedly very conflicting, we then came to the conclusion, and still adhere to it, that the balance of the direct experimental evidence on the point is decidedly against the supposition of the assimilation of free nitrogen by plants. Indeed, the strongest argument we know of in its favour, is, that some such explanation is wanted.

Not only is the balance of direct experimental evidence against the assumption that plants assimilate free or uncombined nitrogen, but it seems to us that the balance of existing indirect evidence is also in favour of another explanation of our difficulties.

I have asked what is the significance of the gradual decline of produce of all the different crops when continuously grown without nitrogenous manure? It cannot be that, in growing the same crop year after year on the same land, there is any residue left in the soil that is injurious to the subsequent growth of the same description of crop; for (excepting the beans) more of each description of crop has been grown year after year on the same land than the average yield of the country at large under ordinary rotation, and ordinary treatment —provided only, that suitable soil conditions were supplied. Nor can the diminishing produce, and the diminishing yield of nitrogen, be accounted for on the supposition that there was a deficient supply of available mineral constituents in the soil. For, it has been shown that the cereals yielded little more, and declined nearly as much as without manure, when a complex mineral manure was used, such as was proved to be adequate when available nitrogen was also supplied. So far as the root crops are concerned, the yield of nitrogen, though it declined very much, was greater at first, and on the average, than in the case of the cereals. As to the leguminosæ, which require so much nitrogen from somewhere, it is to be observed that on ordinary arable land the yield has not been maintained under any conditions of manuring; and the decline was nearly as marked with mineral manures as without manure. Compared with the growth of the leguminosæ on arable land, the remarkable result with the garden clover would seem clearly to indicate that the question was one of soil, and not of atmospheric supply. And the fact that all the other crops will yield full agricultural results even on ordinary arable land, when proper manures are applied, is surely very strong evidence that it is with them, too, a question of soil, and not of atmospheric supply.

But we have other evidence leading to the same conclusion. Unfortunately we have not reliable samples of the soil of the different experimental fields taken at the commencement of each series of experiments, and subsequently at stated intervals. We have nevertheless, in some cases, evidence sufficient to show whether or not the nitrogen of the soil has suffered diminution by the continuous growth of the crop without nitrogenous manure.

(To be continued.)

The Pharmaceutical Journal.

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SATURDAY, OCTOBER 23, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

OPPORTUNITIES FOR PHARMACEUTICAL STUDY.

At this period of the year the reports of the proceedings of provincial associations connected with pharmacy commonly contain some reference to the provision made in different localities for enabling pharmaceutical students to obtain a knowledge of chemistry and botany, as supplementary to the practical training in the recognition of drugs and in the art of dispensing which results from their daily occupation, and though there are cases in which the endeavour to direct the attention of apprentices and junior assistants to the importance of studying those branches of science has not been sufficiently appreciated, it is satisfactory to note that there are signs of a gradual improvement in this respect.

Last week the report of the Liverpool Chemists' Association made mention of the success that has attended the new regulations affecting the chemistry classes of the school of pharmacy carried on under its direction. No less than twenty students have entered for the inorganic elementary and advanced classes, besides eight who have entered for the organic class. In connection with this school, it appears that prizes are offered by the President, and we learn that six students competed for them at the late examination, two of the number being successful in obtaining an award. We are glad also to notice that the Council of the Association intends in future to make attendance at two of the courses a condition of qualification for competitors in the examination, and we hope that it will be found possible, after a time, to introduce practical laboratory work as well as attendance at courses of lectures.

In the report of the Bristol Pharmaceutical Association, published in the present number, we have further evidence of the existence of opportunities for the study of those sciences without a knowledge of which no one can expect to obtain the legal qualification for carrying on business as a pharmacist, or to succeed in the practice of the art to which his energies are to be devoted after having done so. No object can be more worthy the efforts of such a body as the council of a pharmaceutical association than that of impressing upon apprentices and assistants, not only the desirability, but the imperative necessity of giving serious attention to the study of chemistry and botany, as being the means by which their chief capital in the future conduct of their business is to be acquired. At the present time such advice is especially requisite, and from no one can it come with more cogency than from experienced members of the trade who have themselves learnt to appreciate the benefits resulting from thorough scientific training. We think, therefore, the Council of the Bristol Pharmaceutical Association has done well to exercise its influence in this direction, and through the mouth of its chairman, Mr. Schacht, to point out to the young men more or less under its control the fact that the future welldoing of all pharmacists depends entirely upon the amount of knowledge, skill and integrity they bring to bear on the fulfilment of their duties.

As regards the possession of the requisite knowledge, the statistics we published last week in the reports of the visitors appointed by the Privy Council to attend the examinations conducted under the Pharmacy Act furnish sad evidence that it is too often entirely wanting. The large proportion of failures in the Minor examination admits of no other interpretation, and those failures would be disgraceful to the existing condition of pharmaceutical education in this country if there were not good reason to believe that very many of the candidates who present themselves in the examination room have never given their attention to the subjects they are required to show a knowledge of in such a manner as to make them able to acquit themselves creditably before the examiners.

Mr. Schacht's reminder that the duties of the pharmacist necessitate acquirements beyond those to be gathered in the shop is, therefore, one eminently suited to the present occasion, and he has rendered good service by declaring, with the authority that appertains to his official position, that it behoves young men intending to enter upon a pharmaceutical career to equip themselves with all the mental training and knowledge they can gain by careful systematic study of the sciences connected with their art, since otherwise their best intentions and their cleverest manipulations would bring them only to the tail end of the race.

In speaking last week of the numerous failures in the examinations, we referred to the remark of Dr. Maclagan that they were in excess of the experience of other examining bodies, and since that time we have been made acquainted with the results of the pharmaceutical examinations of the past year in Germany, which contrast in a very marked manner with those obtaining here. The number of candidates for examination by the German Commission was 156, and of this number no less than 147 passed, 36 of them being characterized as "sufficiently instructed," 90 of them as "good," and 21 as "very good." It must be remembered also that the examination in Germany is decidedly of a higher character than that of the "Minor" in this country, and still the failures in England were no less than 49 per cent., while those in Scotland amounted to 45 per cent.

It is sad to contemplate the probable fate of those who constitute this large class of unsuccessful candidates, and to learn from their number how general is the disregard of scientific study among those who look forward to a pharmaceutical career. It is equally disheartening to reflect that these failures have not at the present day such an excuse as might have been urged in former times. There is no lack now-a-days of opportunities for study, but the want is rather in appreciation of its necessity, and perhaps we should add in the disposition to enter upon it. At Bristol, for instance, pharmaceutical students have, as Mr. SCHACHT points out, the choice of two organizations at which they can cultivate their scientific inclinations and obtain the instruction they stand in need of for passing their examination with credit and qualifying themselves for the efficient performance of their duties. At the University College of Bristol and at the Trade and Mining School they have opportunities for instruction during the day and in the evening. Courses of lectures on chemistry are given there which cover the whole range of the science. For those who choose to devote their time to practical work in the laboratory provision is also made under the guidance of competent teachers. Instruction in botany by means of lectures and practical demonstrations is also to be obtained and the library of the Bristol Pharmaceutical Association, enriched by grants from the Pharmaceutical Society, offers facilities for private study to those who desire to avail themselves of its resources.

Hence it will be seen that in the city of Bristol the means exist for acquiring the knowledge which young pharmacists manifest such a striking want of when they present themselves for examination, and in other parts of the country there is as much, if not more opportunity for engaging in systematic scientific study that would speedily make failure in examination the exception rather than the rule. Among the places where such opportunities exist we may mention Leeds, as the seat of the Yorkshire College, on the staff of which is a pharmacist who we are sure would gladly see its ample resources made available for educational purposes by young men who aspire to become pharmacists themselves. Of more modest pretension than the institutions we have mentioned are the local schools connected with pharmaceutical associations, in many provincial towns and specially intended for pharmaceutical study, though in most cases the good intentions of their founders have not been responded to by such an attendance of students as would suffice for their maintenance. In view of these various provisions for study let us hope with Mr. SCHACHT that the young pharmacists of the present will show themselves as fully alive to the advantage as to the difficulties of the time, and by availing themselves of the one do their best towards encountering the other.

REVISION OF THE GERMAN PHARMACOPŒIA.

A COMMISSION is at the present time sitting in Berlin, charged by the Imperial Government with the revision of the German Pharmacopœia. The Commission consists of thirty members, being a larger number than originally intended, and also than sat on the Commission which drew up the first edition in 1872. Of the thirty members, five (Messrs. HOUSSELLE, KERSANDT, REINHARDT, KERSCHENSTEINER and KOCH) are medical officials; six (Messrs. BINZ, EULENBERG, FLÜCKIGER, GAETHGENS, HUSEMANN and ROSSBACH) are pharmacologists; six (Messrs. von FEHLING, HILGER, OTTO, POLECK, REICHARDT and JAFFÉ) are chemists, the last being a Professor of Medical Chemistry; seven (Messrs. FRANTZEL, von GERHARD, JÜRGENSEN, NOTHNAGEL, SALZER, VOLKMANN and von ZIEMSSEN) are clinical physicians; and six are pharmacists. Besides these, the Prussian War Office has deputed two military physicians and a military dispenser to attend the sittings. Dr. SCHMIDT, Professor of Pharmacy at Halle, is acting as Secretary to the Commission. In respect to nationality, Prussia has eleven representatives on the Commission, Bavaria six, Wurtemberg three, Kingdom of Saxony one, Baden one, Alsace-Lorraine one, Grand Duchy of Saxony two, Mecklenburg two, Brunswick, Oldenburg and Hamburg each one. Hesse is not represented on the Commission.

According to the *Pharmaceutische Zeitung* considerable surprise exists in pharmaceutical circles at the omission of the names of two well-known pharmacists, Messrs. BILTZ and HIRSCH, who were active members of the Committee which recently reported to the German Pharmaceutical Association on the subject. It must be confessed, however, that chemistry and pharmacy are well represented on the Commission, and to an extent in striking contrast to that which obtains in respect to the British Pharmacopœia. But the present arrangements for the production of the British Pharmacopœia have become a reproach and a source of considerable dissatisfaction to the pharmacists of this country, a dissatisfaction that is justified as well as intensified by the fact that the three other most important pharmacopœias in the world, those of the United States, France and Germany, are at the present time being revised by committees in which pharmacists are properly represented.

BRITISH PHARMACEUTICAL CONFERENCE.

GRANTS IN AID OF RESEARCH.

THE Executive Committee will meet on Wednesday, the 27th inst., to consider applications for grants. Applications should be addressed to the Secretary of the *Conference* at 17, Bloomsbury Square, W.C.

DEATH OF PROFESSOR WAGNER.

DR. RUDOLF WAGNER, whose 'Handbook of Chemical Technology' has probably become known to many of our readers through the English translation by Mr. CROOKES, died suddenly on the 5th inst., in his 58th year. Dr. WAGNER was at the time of his death Professor of Technological Chemistry in the University of Wurtzburg.

Provincial Transactions.

BRISTOL PHARMACEUTICAL ASSOCIATION.

A general meeting was held at the Museum and Library, Queen's Road, Bristol, on Friday October 8, Mr. G. F. Schacht, President, in the chair.

The Chairman said one of the objects the Council had in view in calling the members together was to place clearly before them, and more especially before the younger members, the opportunities for professional and scientific education by which they were surrounded, and they had asked him to do this in some simple and informal manner.

He now, therefore, begged the attention of those present to the statement he had to make, and urged them to give it their serious consideration, for he believed the future well-doing of all pharmacists, whether young or old, depended entirely upon the amount of knowledge, skill and integrity they brought to the fulfilment of their duties.

He might, perhaps, in addressing his friends and neighbours, assume both the integrity and the technical skill, without which no one would have a right even to hope for any success in any department of industry whatever; but he must remind them that the duties of the pharmacist necessitated acquirements beyond those to be gathered in the closet and in the shop, and it behoved them to equip themselves with all, both of mental training and of knowledge, that they could gain by careful systematic study of the sciences connected with their art; otherwise their best intentions and their cleverest manipulations would bring them but to the tail end of the race.

There had been a time when those who thus thought had found in the neighbourhood of Bristol some difficulty in directing students to good opportunities for pursuing their work, but he was happy to say no such difficulty existed now. Indeed, pharmaceutical students had now the choice of two organizations at which they might cultivate their scientific inclinations, namely, the University College, Bristol, and the Trade and Mining School, Bristol, and at the former they had the further choice of day or evening instruction.

In the subject of chemistry the course of day lectures at University College covered the whole science in four terms, that is, the inorganic portion occupied the first and second terms and the organic the second and third.

Laboratory instruction was continued throughout the whole session for those who could devote their time to such work.

The subject was also systematically treated in courses of evening lectures, which extended over two terms, and there existed, moreover, an evening laboratory course, which he thought many young pharmacists might attend with much advantage, both to themselves and their employers.

The chemical department of the College was under the direction of Dr. Ramsay and Mr. Orm Masson, and he could assure them both these gentlemen were able chemists and good teachers.

They had also, as he had already stated, full courses of lectures and laboratory teaching at the Trade and Mining School, and he had every reason to believe the instruction given there was of high order.

With regard to botany—the other science upon which the art of pharmacy rested—full courses of lectures, both day and evening, and botanical walks were organized at both these institutions, and the teacher, Mr. Leipner, was highly esteemed both for his knowledge and the happy faculty he possessed of imparting it to others.

It was his agreeable duty also to remind them that through the generous assistance of the Council of the Pharmaceutical Society of Great Britain, they possessed a very good library of scientific books, which under certain simple regulations they were at liberty to carry away to their homes for private study. He was glad to see that a fair demand for these books existed, and that they were a good deal consulted. He was sure that the knowledge of this fact would much gratify those whose kindness had supplied them.

In addition to this bit of property, they were the owners of a very respectable nucleus of a pharmaceutical museum, and they had right of access (in virtue of their connection with the Bristol Pharmaceutical Association) to all the treasures, both literary and scientific, contained in the noble institution in which they were at that moment assembled.

It would be thus seen that though they possessed no independent school of pharmacy of their own, they were surrounded by ample outside opportunities for both elementary and advanced scientific study; and it rested with themselves alone to show whether the labour with which these advantages had been secured had been wisely bestowed or wasted.

For his own part, the Chairman said, he was full of hope that the young pharmacists of the present time were as fully alive to the advantages as they were to the difficulties of the day; and were resolved as a matter of course to play off the one against the other.

The further meetings of the Association were discussed and arranged, and a few other business details having been approved, the proceedings terminated.

LIVERPOOL CHEMISTS' ASSOCIATION.

The first general meeting of the thirty-second session was held at the Royal Institution, on Thursday evening, October 14, the President, Dr. Symes, in the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were elected members:—Messrs. Thomas Edwards and Gordon Pennicook.

The President next delivered his inaugural address as follows:—

INAUGURAL ADDRESS.

This evening we inaugurate the thirty-second session of the Liverpool Chemists' Association and enter on a new year of work, with its demands, responsibilities and privileges.

As a rule, I believe, the first two of these are dominant in our minds, whilst we are very apt to be forgetful of the last; indeed, those who do not join our ranks, or joining, do not attend our meetings, seem to doubt whether there are any privileges connected with us as a society, and possibly also the necessity for our existence as such. Certain is it, however, that the Association could not have attained its present position without considerable labour on the part of its promoters and supporters for a long period of time, and those who join in later years inherit that position and the property acquired, as well as the privilege of meeting here to discuss and further develop the sciences which constitute and are related to the calling of the chemist and pharmacist.

It is not easy to find a new theme for an inaugural address, to deliver before the members of this Association; for about a quarter of a century the ground has been so well trodden that it yearly becomes more difficult to make a selection. I shall, probably, best consult the interest of those who practise pharmacy, as well as my own taste, on the present occasion, if I deal with a subject which has naturally occupied much of my attention of late, viz., the present position and future prospects of pharmacy in this country.

The 'Historical Sketch of the Progress of Pharmacy in Great Britain,' by Bell and Redwood, is an interesting description of what its title indicates; but it concludes at an important epoch in our history, and might, with advantage have been continued to the present date. The past is necessarily connected with and exercises its influence on both the present and the future, and I therefore feel justified in making some few remarks on the passing of the Pharmacy Act, in 1868, an Act which has recently been much abused, and I believe misinterpreted, but which at the time was considered to be the consummation of the desires of the founders of the Pharmaceutical Society, and of all who felt a deep interest in pharmacy.

At that time three distinct interests existed. The Government was desirous of introducing a bill which, if passed, would place restrictions on the sale of poisons to the public, believing, no doubt, that such restrictions, with the pains and penalties which would be incurred by their violation, would be the best safeguard against accidental or criminal poisoning. The Pharmaceutical Society strove to show that more good was to be expected from the better education of and an improved position for those who should be allowed to deal in such deadly substances, and with this in view, pressed for measures which were calculated to accomplish such results, and to protect the interests of the trade, or rather what might be regarded as its professional and responsible interests. A third party, more numerous than the Society, known as the outside body, and largely represented by the United Society of Chemists and Druggists, were anxious to defend their vested interests and to insist that any measures which were to become law should be framed on a sufficiently broad basis to recognize such interests to the fullest extent. After a long and sharply contested struggle a compromise was arrived at between the three parties, and the results were embodied in the Act already mentioned. A poison schedule had been drawn up, and an attempt had been made to introduce some very absurd regulations for the keeping and sale of poisons, under police inspection; but these were withdrawn on the understanding that the Pharmaceutical Society would substitute others of sufficiently comprehensive and practical nature to embrace the requirements of every pharmacy. Education was provided for by compulsory examination, all outside interests were duly considered, and as an equivalent for the exactions made, an exclusive right in the use of certain titles and in dealing in poisons was created on behalf of pharmacists and chemists and druggists. In fact pharmacy became, to a certain extent, recognized as a profession related to that of medicine, and, similarly, certain privileges were accorded to it.

This is a point of special interest at the present moment, for none of us who watched the passing of the Act, or who took an active part therein, entertained the least misgiving as to whether it gave us perfect security and protection in these particulars. We felt satisfied in our own minds as to what was the intention of the legislature; and yet we have recently been told by the highest legal authority in the land that something very different was really intended, and that we are mistaken in our assumption as regards protection.

Subsequently the Pharmaceutical Society was called on by the Privy Council to fulfil the last condition (or what was assumed to be a condition), viz., to make the proposed regulations for the keeping and selling poisons. This caused considerable excitement and opposition on the part of chemists throughout the country, the resistance being so strong and the majority against such regulations so considerable that they were never enforced.

The Act of 1868, with some slight alterations made by a short Act in 1869, is the Pharmacy Act of the present day, in which most of us have lost some faith under its recent interpretation. Indeed, many tell us that it has always been a burden without adequate compensation, and that both pharmacy and pharmacists would have been better without it. But is this really so? That it has imposed some restrictions there can be no doubt, but that it has conferred some benefits I think is equally certain. We have better definition, more complete organization, better individual qualification and consequently an improved position as a body. These are material advantages, and although we have recently seen an important corporate right considerably modified to our disadvantage, still we have a remedy against unregistered individuals and firms who attempt to practise pharmacy. Serious as is the position now with regard to corporate bodies, it must be evident to any one who gives the matter a moment's thought that it would be considerably worse had we no Pharmacy Act at all. Then, unqualified individuals would be far more difficult to deal with than corporate bodies, for although less powerful they might with a little tact assume most of the characteristics of being qualified and so deceive the public; whereas now, if people go to stores for their medicines they do so with their eyes open, and it would be too absurd to assume that to any large extent an intelligent public will entrust their prescriptions to stores or that such institutions could conduct the pharmacy of Great Britain satisfactorily. Much of the prosperity of this country and the excellency of its products depend on the specialty of function or division of labour whereby each class of individuals acquire skill in their special work. Now such huge bazaars are clearly antagonistic to the progressive spirit of the age, are retrograde in their tendency, and they must necessarily disappear when the sensation in their favour begins to wane; which sooner or later it must do as regards pharmacy, if not with other branches of trade which they profess to exercise.

It would be useless to deny that the result of the recent action has been a defeat and disappointment to us, and I would not for a moment attempt to persuade you that the Pharmacy Act has accomplished all we can desire, or that it is a perfect piece of legislation. Neither would I be understood to underestimate the strength of our opponents, or to advocate inaction on our part. But what I am desirous of doing is to place the matter fairly before you; the facts as they really are, when seen from different points of view; and having arrived at these, having realized our position, to consider what is to be done or what can be done to remedy the present state of things.

The various remarks at trade meetings, and correspondence in our journals bear evidence that there are differences of opinion on this point. Many tell us that pharmacy is in a rapid state of decay, and that unless "immediate steps" be taken to stem the tide in its downward course pharmacists will soon all be ruined; but few venture to say what these "immediate steps" are to be. Of these some agree that a new Act will accomplish the desired result, while others tell us that "to expect the Government to recognize the claims of a party to protection when the principles of free trade are so generally recognized is altogether absurd." Probably the best course for action lies somewhere between these two extremes. Pharmacy is undoubtedly suffering from outside competition, but no help will come purely on that account; the stern realities of business admit of but little sentiment, and to get anything bearing the semblance of protection we must show that all we ask is for the benefit of the public, in fact that it is the interest and welfare of the public we wish to protect rather than those of ourselves. Let us take, for example, the patent medicine question, not the prices at which the articles are sold, but from another point of view. We should, I think, have no difficulty in demonstrating to the satisfaction of the legislature that it would be for the benefit of the public that poisonous patents should be labelled as such by the makers; but this alone would not serve our purpose, we should further desire that the sale of such articles should be restricted to registered persons. But, we should be asked, What is the difference whether a bottle, say, of chlorodyne is sold by a pharmacist or a grocer so long as it is supplied on the same condition that any harmless article would be? Are the public better protected in the one case than in the other? If you chemists have the exclusive right to sell poisonous patents, are you prepared to carry out the same regulations in the selling of them as you now do with the scheduled poisons which they may contain? "You cannot have the rose without the thorn." Now, gentlemen, what should we say to this proposal which is obviously only fair and reasonable? Should we willingly accept these conditions and be perfectly satisfied that the protection of the public, the additional labour to the seller and the monopoly were all evenly balanced? I fear the approval would not be general and that many would desire the latter without the trouble that the former would involve. It seems to me that in seeking a new Act we must be prepared for something of this kind, for the Privy Council have already taken cognizance of the great facilities which now exist for obtaining poisons under cover of the patent stamp. Our periodicals assert the facts that to fall to the level of the outside competitors would be retrograde, and ruinous to the prospects of pharmacy in this country, whilst to seek protection for the benefit of ourselves only is sure to prove a failure. The *Pharmaceutical Journal* is regarded by many as taking too high a standpoint for the average druggist. Having read carefully its leaders on this question, however, I have satisfied myself that they contain many remarks well worth our consideration, but it will be unnecessary to quote them here. The *Chemist and Druggist* is a journal specially devoted to what are commonly recognized as "trade interests," and it does not seek by sensational articles and empty declamations to gratify those who, feeling themselves sadly wronged, look for some simple or royal road by which all will be set right to their entire satisfaction; on the contrary it diagnoses the malady, probes deeply into the wound, weighs the merits of various proposed palliatives, and finally provides a remedy, which having little of suavity about it will be nauseous to many and palatable only to few; *chacun à son goût*, still none will doubt but it is honestly given. The *Chemists' Journal*, with undoubtedly good intent but less deliberation, insists that something must be done to remedy the present state of things; but the precise nature of that something remains to be explained in a future article. If it is really practical and more easy of accomplishment than the task which at present lies before us we shall be glad to know its details at an early date.

Calm reflection will probably show us that the recent reverse is not an unmitigated evil; it will probably have some lessons for us well worth learning. We know now how little parental protection we are to expect from the state. We have been told that "few interests are worth protecting which cannot protect themselves," and this is certainly suggestive. It calls for our best energies to render ourselves worthy a higher position than the one we now occupy. Unity of purpose and action are demanded. Before the Act of 1868 passed there was division in our own camp; but now there is a common enemy without it is most desirable that we should merge all minor differences in the one general purpose, ever remembering that "unity is strength," and that it is largely in our hands to determine within certain limits what the future of pharmacy shall be. True it is that in the all-wise disposal of things, matters sometimes take a different course from that which we intended them to do, but it is our constant experience that no good solid efforts in the direction of right are ever lost. Temporary defeat and disappointment should merely stimulate to renewed efforts; should cause us to learn the lesson they teach, but leave us undaunted still. The French nation is probably now in a condition of greater prosperity than at any other period of her history, and yet this state of things is the sequence of the most ignoble defeat it ever suffered. Might not this too suggest a lesson and be an incentive to us to strengthen our position by higher attainments and better organization, the former to lift pharmacy from the last traces of the mire which still adhere to it, and the latter to place it in its true position as an important but distinct branch of the medical profession?

This evening we formally open a new session of our school of pharmacy. The Liverpool Chemists' Association, like the parent Society, regards education as one of its important functions; it recognizes most fully that this is one of the special means by which both chemists and pharmacists must hope to attain to higher ground. It is surrounded by many difficulties, but none of them too great to surmount; amongst these, I may say it would be gratifying to find more young men coming forward anxious to join our classes, the fees are nominal and the excellence of the instruction beyond doubt. It cannot be supposed, however, that attending lectures will alone give a sound knowledge of the subjects taught; the information thus gained must be supplemented by home study—steady, persistent study, resisting manfully the pleasurable allurements which so often tempt the student from the path of duty, and keeping steadily before the mind the high aim and object of the undertaking.

The subject of education is receiving special attention just now at Bloomsbury Square, and a committee has been appointed to inquire into the relation to each other of pharmaceutical education and examination. I have on former occasions pointed out that passing examinations should not be the sole, or even the chief object of study. Whether the student enters on his career with a view of pursuing pure chemistry or pharmacy, he does so with a view of earning his living thereby and of benefiting in some way the profession he has chosen. But neither of these objects is accomplished by examination; it is only one of the tests of fitness to enter on the business of life and to protect the public from such evils as may arise from ignorance. I say one of the tests advisedly, for a comparatively ignorant man with a good memory might be coached to pass almost any examination; but who would think of regarding such passing as evidence of proficiency?

To acquire permanent knowledge the period of study must be more extended than is often the case at present. Young men not infrequently give years of their time to pleasures or idleness, and then seek to gain the knowledge necessary to pass the dread ordeal by a hurried process, by overgorging the mind with undigested facts. Would any sane individual attempt to administer food to the body in the same unreasonable manner?

Professor Attfield has treated this subject very fully in a pamphlet on "Pharmaceutical Education," and concludes that one of the remedies for the present state of things is to insist on a curriculum of systematic training and study. He is supported in this view by many who should be capable of offering an opinion, and although no one will assume that certificates of having attended certain courses of lectures in chemistry or laboratory practice would be proof that the student who had done so was a good chemist; still, it would be evidence that a certain period of time had been devoted to assumed or real study, that the student had in fact given up the time necessary to have acquired the knowledge he possessed in a substantial manner, whether he had really done so or not. I know there is a feeling abroad that a curriculum would be an obstacle in the way of many young men who would otherwise enter on the calling of pharmacy, and that it would be a hardship to the students who do so enter. Such conclusions are probably the result of sentiment rather than of careful reasoning. Certainly it would be easier for the earnest, honest student to give evidence that he was building up a solid structure of useful knowledge by this slower process, than for him to declare his proficiency solely by a single crucial test, and it is equally certain that the result would be more satisfactory to the examiners. Provincial schools like this, with efficient teachers, would be duly recognized, and certificates of having attended their courses of lectures would be accepted by the Board of Examiners. A new relationship would spring up and greater uniformity in teaching would exist between the central school or schools and those scattered about the country; new life and energy would be infused into our teaching, and an increased number of students would necessarily result. If a moderate curriculum could be introduced and some process of affiliation by the parent Society be adopted, I know of no other means which would equally advance the interest and prosperity of provincial schools of pharmacy.

With these remarks then I commend the students to their work, and I ask the members and associates of the society to unite their best endeavour to make the session on which we now enter a successful one.

On the motion of Mr. A. H. Mason, F.C.S., seconded by Mr. Edward Davies, F.C.S,, a unanimous vote of thanks was passed to the President for his address, and the meeting closed.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first meeting of the third session was held on Wednesday evening, October 13, in the rooms of the North British Branch. Mr. J. D. Robertson, President, in the chair. There was a very large attendance.

The minutes of last meeting having been read and confirmed,

The Secretary made a statement regarding some of the subjects which had occupied the attention of the Committee during the recess, and intimated that the subject for the apprentices' prize this session was "Iron," and that essays must be given in to the Secretary on or before January 1, 1881.

The President then proceeded to deliver the opening address. He referred to the high honour conferred upon him by being elected President, and promised to do his utmost to meet the wishes and further the interests of the Association. In the course of a spirited and most interesting address he touched upon many subjects of great importance to pharmacists generally, and especially to assistants and apprentices. Referring to the Preliminary examination he gave it as his opinion that this examination ought to be passed before entering the trade, and that employers ought to exercise more discretion in selecting apprentices. He did not believe in the necessity for a compulsory curriculum, and thought that cramming did not exist to such an extent as many seemed to imagine. As to whether the calling of a chemist ought to be looked upon as a trade or a profession he quoted a number of eminent authorities on the subject, the preponderance of authority being in favour of regarding it as partaking of both characters. He condemned the dispensing of prescriptions by medical men, but would excuse them doing so in country places where, unfortunately, they could not depend on having their instructions faithfully carried out by the local chemist. In regard to counter prescribing he was not prepared to defend it except in its simplest range, but thought it would be absurd and unreasonable to prohibit chemists absolutely from recommending remedies in simple ailments. Referring to Edinburgh he said they knew little of the difficulties which beset chemists in some other places, the trade being a pure drug trade, and the doctors leaving to the pharmacists the dispensing of their prescriptions, with one or two glaring exceptions. In conclusion, he referred more particularly to the object and work of the Association, and appealed to individual members to do their utmost endeavour to promote its welfare and assist in carrying on the work of the Association.

On the motion of Mr. W. Aitken, seconded by Mr. C. P. Henry, a cordial vote of thanks was awarded to Mr. Robertson for his address.

The President having intimated that the next meeting would take place in November, when a paper would be read by Mr. Boa, on "Chloral and Croton Chloral," the meeting was brought to a close.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

A Sample of Cayenne.*

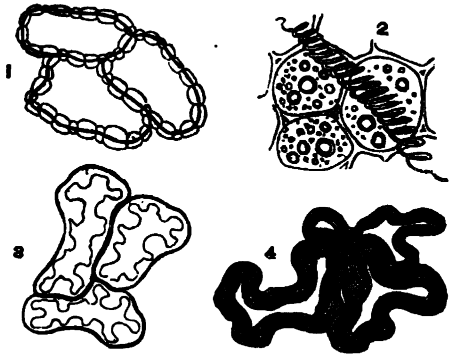
BY THOMAS GREENISH, F.C.S.

A short time since a sample of cayenne was placed in my hands by Mr. Holmes with a request that I would submit it to microscopical examination. It had been sent to him as an article which had recently made its appearance in commerce.

The sample possessed all the external characters of the true cayenne, and such a one as is grown in Natal, ground in the colony, and sent in that state to this country. It had an oily appearance which seemed artificial, and communicated to the paper in which it was folded, together with the oil, a reddish colour; the oil which permeated the paper was a fixed oil.

There are two distinct cayennes grown in Natal, one is a brilliant red, and the other yellowish and corresponding to the Nepaul pepper; they are both, and more especially the former, extremely pungent. This sample, however, although possessing, to the naked eye, all the external characters of the Natal red pepper was entirely devoid of pungency.

At first it was thought probable that some other pod than that of the capsicum had been ground and forwarded to this country for the purpose of adulterating the genuine article; to determine this point with certainty, a portion of it was subjected to careful histological examination, and the cellular structure compared with that of true Natal samples which I had previously examined.



Characteristic Cells of the Capsicum Fruit.

The annexed drawing shows the characteristic cells of the capsicum fruit, isolated, and mounted separately for the purpose of reference on such an occasion as the present, where they were required for comparison with those of the sample. The cells, fig. 1, are the external cells of the capsicum pod; usually they possess more or less of a beaded appearance as represented in the drawing. Within them are parenchymatous cells, fig. 2, traversed by spiral vessels, The surface of the internal coat is covered by the cells, fig. 3. The irregularities seen on the internal surface of individual cells and so conspicuous in fig. 1 and 3, as compared with the parenchymatous cells (fig. 2), are caused by the irregular deposition of the secondary matter, assuming very different and interesting forms, a circumstance frequently observed in histological investigation.

With the pod must necessarily be ground the seed which it contains, and hence is met with in an examination of the powder a remarkably characteristic cell, serpentine in form and with its secondary deposit in regular laminæ (fig. 4), which are rendered conspicuous by the appropriate reagents.

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* Read August 25.

Having given considerable attention to the anatomical examinations of different capsicums, without meeting with one that was not more or less pungent, the question arose, how has this sample been deprived of its pungency, so as still to retain its colour?

In the first place, heat was employed to drive off the acrid principles of the capsicum, but this was not successful; decomposition occurred just when volatilization was taking place; this may possibly have been due to the fact that the pungent principle resides in a resin as well as a volatile oil. Diluted spirit was then tried and by this agent the acrid matter was removed without, or with very little, loss of colour, leaving a marc devoid of pungency, and possessing much the appearance of the sample in question.

From subsequent information it is believed, that the more brilliant samples of cayenne, but deprived of pungency, or perhaps a bye-product of some manufacture, are used for giving the special plumage to canaries, and that the sample in question was most probably one intended for this purpose, and not an adulterant of commercial cayenne.

The investigation of this subject has afforded me the opportunity of describing the structural details of the capsicum fruit, and will propably be accepted as another illustration of the value of histological investigation in determining, by anatomical detail, the true from the false in materia medica specimens or any product of the vegetable kingdom which may be submitted to the pharmacist.

The **President** said this paper had both practical and scientific value. He should like to ask Mr. Greenish what he considered the very brilliant colour in the first sample was due to, whether there had been any fixed oil added which drew out the colour

Mr. **Brady** said there was a red pepper commonly used in some parts of southern Europe, notably in Hungary, very similar in colour and appearance with the sample produced. He had seen it brought into the market at Pest in large quantities in linen bags. He believed it was the produce of a capsicum, although he had never traced the species, but it had so little strength that it might be used, a teaspoonful at a time, as a condiment. A very similar pepper was used in Algeria.

Mr. **Naylor** said he had met with a sample of cayenne pepper very closely resembling the one handed round, but it possessed a much more pungent taste. It was forwarded with a request to obtain a quantity of it; but though it was sent to the wholesale houses and no opportunity was missed, he was unable to get a further supply, and he had not to this day been able to make out what pepper it really was.

Mr. **Chipperfield** asked what was cayenne pepper? He took it that it was capsicum ground before it was dried, and it must also have some salt mixed with it, or else it would not keep good for any length of time. For instance, they all knew practically that pulv. capsici did not keep very long, and those who were not frequently in the habit of using it when they want to make up a prescription often found it was mouldy and bad. He therefore took it that it was owing to the salt being added to the capsicum or chilli that the pepper would keep so long. They always found cayenne pepper red, but Nepaul pepper was not so deep a colour, being almost yellow. Chillies themselves were of all colours—green, a beautiful red, and sometimes a beautiful yellow, but they never found pepper made either from the green or from the yellow ones. He often had them himself in the form of West or East Indian pickles with all these beautiful colours.

Mr. **Andrews** asked if it were not possible that this pepper might have been used for the preparation of soluble cayenne pepper; whether, by means of spirit the active pungent matter had been extracted and the residue treated in some way, as he suggested, with fixed oil. He could not account for it otherwise, for there was no trace of pungency.

Mr. **Chipperfield** said he doubted if birds would care to eat the chillies after all the pungency had been taken from them.

Mr. **Cotterell** said he had a sample of cayenne pepper on one occasion two or three months, and there was a little suspicion of its having got damp; it had the flavour of the sample now produced, but although the pungency was gone it tasted of saffron, and had the colour of saffron.

Mr. **Lloyd** said the flavour appeared to him to be that of palm oil.

Mr. **Gerrard** said that during the past year he had prepared a quantity of extract of capsicum which had been applied locally for therapeutical purposes in treating skin disease, and probably in a short time a paper would appear on the subject in one of the medical journals. He found that the yield was very variable. The extract was prepared by exhaustion with methylated spirit, and distilling off the alcohol, when the residual extract separated into two layers, one which was evidently resinous and the other fatty. This fatty layer would crystallize, and as such a mixture was not well adapted for mixing with fats as an ointment it was necessary to add a little alcohol to cause a proper admixture of the resin and the fat. The yield of resinous matter from capsicum varied considerably, for he obtained 50 per cent. more resin from some samples than from others. In some the fatty matter was in excess, and in others the resinous matter. Until recently he had always understood that capsicum, if applied locally, would not produce a blister, and he believed Mr. Greenish himself held that opinion two or three years ago, but he had since found out the contrary, for if some of this fatty matter got on the skin it would produce intense irritation, and if it remained long enough would raise a blister.

Dr. **Symes** presumed that Mr. Greenish scarcely considered this to be a sample of Natal cayenne. He thought it had very little of the characteristics of that article. The Natal cayenne was an article of commerce fetching rather a high price, and was in demand amongst grocers. It might have been a special sample of Natal cayenne that Mr. Naylor was seeking on that occasion he referred to. It had a peculiar odour, and a very oily appearance. It was scarcely necessary that chemists should dispense cayenne pepper containing salt, because if the capsicums were carefully dried and powdered, he never found them spoil.

Mr. **Clark** said to the best of his belief capsicum pepper was not sent out mixed with salt, and as there might be public analysts in the room it might be as well to state that fact.

Mr. **Umney** said those interested in the chemistry of chillies could not do better than peruse a valuable paper by Mr. Thresh, which they had placed before them some time ago, showing there was a large quantity of fixed oil in the ordinary chillies of trade; it was owing to this fact that they saw the oily stain on the paper. Every one who had handled a parcel of cayenne must have made this observation.

Mr. **Greenish** said it was curious fact, but this appeared to be used for the plumage of canaries; whereas the principal importer in London of Natal cayenne, who prided himself on its colour and pungency, told him over and over again that bird fanciers especially asked for it. But here was a fact that bird fanciers wanted that which was pungent, and there was this which was without any pungency was used for the same purposes. He was pleased to hear from Mr. Brady that there was a Hungarian cayenne which had very little taste indeed, but this had seemingly no taste at all. Mr. Andrews had suggested that it might be a bye-product in making a soluble cayenne. He had alluded to that in the paper, but did not wish to say it had been used for that purpose. Mr. Gerrard seemed to have misunderstood him when he spoke of cayenne in a mustard plaster. What he said was that, he had examined two or three samples of mustard leaf and amongst them was an American sample in which there was no capsicum, but he did not express any opinion about the properties of capsicum to raise a blister or otherwise.

A vote of thanks was passed to Mr. Greenish for his paper.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[451]. "Hyd. chlor." is hyd. perchlor. or corrosive sublimate. It has had many synonyms, and the U. S. Pharmacopœia still designates it as hyd. chlor. corrosivum. Neither calomel nor hydrate of chloral can be meant, as no one would drop such an irritant as chloral into the eyes, and what in the name of wonder suggested to J. G. P. S. "calomel?" Formerly, Dr. Mackenzie and Dr. Smith used a lotion of hyd. chlor., the latter using 2 grains to the ounce, and the former 1 grain to 8 ounces of water, with 6 grains of sal ammoniac. The practice of using corrosive sublimate in eye affections in the form of lotion has been almost abandoned, at least in England, but there can be little doubt that hyd. chlor. in this case means hyd. perchlor., B.P.

HENRY BROWN.

[451]. I should most assuredly dispense this as follows:

℞ Hydratis Chloral. . . . . gr. v.
Ext. Opii. . . . . gr. ij.
Aq. . . . . ℥ij.

Ft. lotio. I have never heard of mercurial preparations for the eyes.

"374."

[452]. It is difficult to conceive how a "green spirituous extract" is left by treating ext. lupuli with water in the formula given by H. O. J. If the extract is made according to the B.P. directions, such is impossible, as it will mix well and smoothly with water. All the spirit is distilled off.

HENRY BROWN.

[453]. I take it that lin. plumbi co. means lin. plumbi subacetatis of the U. S. Pharmacopœia. It is thus made:—Olive oil, 8 ounces; solution of subacetate of lead, 2 ounces. When mixed, a yellowish-white emulsion is formed.

It is used for chilblains, chapped hands, bruises, etc., and is most useful in healing burns and scalds when obstinate. I have frequently employed such liniment with good results.

HENRY BROWN.

[453]. Probably by lin. plumbi co. the prescriber means glyc. plumbi subacet.

"374."

[454]. SYR. FERRI PHOSPH., B.P.—I made "syr. ferri phosph., B.P." yesterday, and it measured exactly 12 oz.

Mr. R. J. Latham must have made a mistake somewhere, as I strictly followed the B.P. directions.

J. BLAKE BENJAMIN.

[454]. There must be some error in making it, as it generally comes out tolerably exact, and what little there is short should be made up by water.

"347."

[455]. UNGT. RUMICUS C. SULPHUR.—"Unguent" will find a general formula in Stillé and Maisch. If it is not at hand, the plan of procedure is thus:—Boil yellow dock root in vinegar until the fibre is softened, then reduce it to a pulp, and mix it with sulphur and lard. No exact proportions are given. It has been used in itch and other skin diseases. Various species of rumex have been employed in medicine, both internally and externally, but all have fallen into disrepute.

HENRY BROWN.

[455]. The following are the proportions of sulphur and rumex ointment employed in making ung. rumicis c. sulph.

℞ Ung. Rumicis . . . . ℥viij.
Sulphur Sublimat. , ... ʒj.
M

Formula for Ung. Rumicis.

℞ Dock Root. . . . . 14 parts.
Lard . . . . 12 parts.
Yellow Wax. . . . . 1 part.

The root to be thoroughly cleaned and well bruised and boiled with the lard until the water is driven off.

J. H. F.

[455]. "Unguent" asks for a formula for ungt. rumic. c. sulph. Perhaps this from Quincy's 'Dispensatory' will suit him:—

Ungt. ex Oxylapatho.

Take of sharp-pointed Dock Root boiled in water and drove thro' a sieve and live Sulphur, ana ℥iss., of Hog's Lard boiled in the juice of Scabious, to the consumption of all the juice lbss., of the Unguentum Populneum, boiled in the juice of Elecampane, ℥ss., some drops of Oil of Rhodium Wood, and let these all be reduced in a mortar into an ointment, s.a.

Lewis's 'Pharmacopœia' (1748) gives the following formula for—

Unguentum Antipsoricum.

Take roots of Elecampane and those of sharp-pointed Dock, of each cut small and bruised, 3 ounces. Boil them in a mixture of 3 pints of water and 1 pint of vinegar, till half of the liquor is wasted. Strongly press and strain out the remaining half, and add to it 10 ounces of the leaves of water cresses, fresh gathered and bruised, and 4 pounds of Hog's Lard. Let them all boil again till the moisture is exhaled; then press out the ointment, and dissolve in it 4 ounces of Yellow Wax, and the same quantity of Oil of Bays. Mix the whole well together. Sulphur may be occasionally added to this ointment.

If the above are too elaborate, perhaps the following from the 'Pharmacopœa Universalis' will suit your correspondent:—

Antiherpetic Ointment.

℞ Sublimed Sulphur . . . . ʒj.
Pulp of Dock Root . . . . ʒj.
Lard . . . . ʒij.
Lemon Juice . . . . 2 spoonfuls.
Mix.

EDWARD H. STOREY.

[456]. The question of the decomposition of potass. iodid. by the free acid always present in a sample of sp. æther. nit., comparatively old, has been so often discussed in your Journal that it seems almost unnecessary again to revert to it. Undoubtedly the prescriber has no intention of giving small doses of free iodine, and if by neutralizing the acid in sp. æth. nit. a satisfactory mixture is not obtainable, the incompatibility of the two ingredients should be pointed out to him.

J. H. F.

[456]. The pot. iod. and spt. æth. nit. question again

crops up. Mr. W. J. Smith no doubt knows that unless spt. æth. nit. is freshly prepared, it will set free a portion of iodine when added to iodide of potassium. The combination has long been a favourite catch in Dublin, and the spt. æth. nit. should always be neutralized. It is not the intention to give iodine in a free state.

HENRY BROWN.

[457]. Strychnia is not thrown out of solution by sodæ bicarb. A "shake the bottle" label is not necessary.

J. H. F.

[458]. "Jacque" will find all the information he requires in the 'Pharmacopœia for Diseases of the Skin,' by Mr. Balmanno Squire. Call it plumbi glycerole, or glyceride, or glycerite, it is made by substituting glycerine for water in the preparation of "liquor" plumbi subacetatis glycerinum. It is also called "pigmentum plumbi." The ointment is made by adding ½ drachm of the plumbi subacet. glycer. to 1 ounce of vaseline.

HENRY BROWN.

[458]. Evidently the prescriber made an error, and intended to write plumbi glycerin, a term often used in place of plumbi glycerole.

"374."

[459]. Having the following prescription to dispense I was unable to make it to my satisfaction, perhaps some kind reader will be able to help me:—

℞	Phosphori	gr. j.
	Benzol Rect.	ʒij.
	Calcii Chloridi	ʒiij.
	Tr. Zingib. Fort.	ʒss.
	Aq.	ad ℥xij.

Misce. Fiat mist. sec. art. et capiat ℥ss. bis vel ter die ex cyatho aquæ c. sp. vini gallici.

VOLVOX GLOBATOR.

[460].

℞	Acid. Gallic.	ʒj.
	Acid. Sulph. Dil.	ʒj.
	Aquæ	ad ℥vj.

M. Ft. mist.

A sixth part every four hours.

This was sent out as a clear mixture, with little or no deposit, by a surburban chemist. I wrote to ask his *modus operandi*, but he merely says that it is his custom to use hot water, but that will not prevent the excess of acid crystallizing out on cooling. Could it be considered correctly dispensed? The addition of a solvent such as s.v.r. or glycerine would not be justifiable.

W. H.

Notes and Queries.

[680]. AQUEOUS TINCT. OF OPIUM.—If "Spathula" has made a good aqueous tincture of opium he might add a little salicylic acid, which might help to keep it.

"374."

[682]. INFUS. CORT. AURANTII.—Will some one please give the information how a non-alcoholic preparation of cortex aurant. can be made so as to remain perfectly bright? I have made an infusion both cold and hot, also a decoction with aq chloroformi, but in about seven days they became cloudy and threw down a deposit.

W. B. S.

[An infusion of orange peel, B.P., bottled whilst hot, and with atmospheric air excluded, may be kept for a long time without apparent change. In contact with the atmosphere it will undergo decomposition.—ED. PH. J.]

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE FUTURE OF PHARMACY.

Sir,—Pharmacy shares at present with farming great depression, and as there are now many vacant farms there will soon be also many vacant pharmacies. Everything connected with them is mouldy, even as portrayed by Shakspere in 'Romeo and Juliet' about the apothecary, and also in 'The Progress of Pharmacy,' page 24. Several members of Council speak of the "gloomy position," and Dr. Down of "great depression." Let us hope, as is usually the case, when things come to the worst that they will mend; but let us poor sufferers look to good examples and not to bad ones. There is no doubt we are besieged and hard pressed; but let us neither starve like cravens nor desert to the enemy; let us make a sally, as many a British garrison has done before, and show we have some spirit left.

Some timid chemists suggest we should fight stores with their own weapons; but, alas, we should find that store weapons would cut our own throats, and we should at best be only pulling our nose to spoil their faces. They sell our goods at cost price as a draw, having other more profitable things to recoup themselves; we have not, we cannot buy and sell and live entirely on the loss.

I hold that the true remedy is to agitate and show that we are not satisfied with the decision on our case. I call it simply wholesale confiscation and spoliation. The law gives us protection, which belief has undoubtedly been the means of inducing say hundreds, at a moderate computation, to enter the business, and I never heard of any case in which vested interests were injured without compensation; therefore, if this is to be the law let us have compensation and start afresh fairly.

The whole difficulty is about these unnatural or artificial persons. I have heard of artificial flowers and chemicals produced artificially, but I never heard of an artificial chemist before. The Lord Chancellor admits in the opening sentences of his judgment, "In a popular sense and in ordinary use the word person must be taken to mean a natural person," and continues to favour us till he speaks of an artificial person (which has been created in this case); then he says that it evidently does not apply to corporations, as they could not be admitted as members of the Pharmaceutical Society. But that is really outside the case, as it is being on the Register of Chemists, and not on the lists of members of the Pharmaceutical Society that gives qualification, and if any number of persons had been carrying on the business of a chemist before the Act which has given us the protection, undoubtedly they could have registered through any member or secretary in case of a company, and as none did claim, *ergo* there did not exist such a thing; and they cannot infringe a law, but, as other companies who wish to do a special act, must have a special Act of Parliament to give them power. I do not think the Act will bear such a strain on it as to say that because the Act does not say corporation may not, therefore they may. I take the view of our learned counsel, it is forming a company for an illegal purpose.

Dr. Down, in his most able and learned address, points out a bright future for a typical pharmacist; but in all due deference, I should call him a scientific chemist, more of whom exist at present than are actually required. The public have all that is necessary. The Society has trained and educated a vast body of intelligent and competent men, distributed throughout the length and breadth of the land at everybody's door, even in greater numbers than actually required, as many of us know, and a more faithful set of slaves does not exist, ready to be at anybody's beck and call night and day, and if it were not for these valuable reserves, there are few who would be so insane as to trust to stores, which are a long way off and only open about nine hours a day, if they did not know there was a needy class (rendered, alas, more needy through their selfishness) ready to tide them over cases of emergency.

I say that it is as absolutely necessary to have chemists' shops distributed about as it is to have gas lamps in every street, and that persons who deal in medicines should be qualified, and that no unqualified person should be allowed to sell medicine at all; thus we ought to have the trade in our own hands at remunerative prices, and let the public effect their economies in some other branch of expenditure, and as ours in any case is so small an amount, whilst the other items must furnish abundant opportunity.

HENRY LONG.

EXEMPTION FROM JURY SERVICE IN SCOTLAND.

Sir,—From an account of the proceedings of the Law and Parliamentary Committee of the Chemists and Druggists' Trade Association, reported in last week's Journal, it appears that that body purpose memorializing the Home Secretary on the subject of the exemption of chemists and druggists from jury service. This is a step in the right direction.

Registered chemists and druggists are as much entitled as their professional brethren—pharmaceutical chemists—to exemption from jury service. The proposed memorial is to be signed on behalf of the "Chemists and Druggists' Trade Association of *Great Britain.*" This, one would naturally imagine, includes Scotland. If it does, so far good. It so happens, however, that pharmaceutical chemists in Scotland are not exempt from jury service. I hope the Trade Association will excuse me if I appeal to their good offices on behalf of the entire profession in Scotland in this matter of jury service.

It is scarcely creditable to the Pharmaceutical Society that this act of justice to Scotland has been so long deferred. Might not the Society at this juncture co-operate with the Trade Association for "puir auld Scotland's sake?"

Dalkeith, N.B. JAMES STEWART,
Pharmaceutical Chemist.

[*** The writer of this letter appears to overlook the fact that the Council of the Pharmaceutical Society has already obtained recognition of the principle he contends for, and he seems also to forget that so long as there is no Jury Bill before Parliament no opportunity exists for carrying that principle into operation.—ED. PH. JOURN.]

THE ESTIMATION OF SMALL QUANTITIES OF ARSENIC.

Sir,—I am indebted to Mr. Thomson for his courteous letter referring to Houseau's process for the estimation of arsenic, published in 1873. This method, owing to its being described as *volumetric*, had escaped my notice when hunting up previous researches on the subject.

Mr. Thomson thinks that Houseau's method and my own are practically the same. In this I cannot agree with him. It is true both are based upon Soubeiran's reaction, but whilst Houzeau deduces the amount of arsenic from a volumetric determination of silver *lost*, I calculate it by a direct gravimetric estimation of silver *found*. The latter must, I think, be admitted to be the more accurate method. An example will make this clear.

Let it be assumed that the amount of arsenious acid to be determined is that taken in the first four experiments described in my paper, viz., ·00292 gram As_2O_3 equivalent to ·00221 gram As, and that 30 c.c. decinormal solution of silver nitrate are employed to absorb the gas. From the equation—

$$\underbrace{6\,AgNO_3}_{1020}+3\,H_2O+\underbrace{AsH_3}_{78}=6\,HNO_3+H_3AsO_3+3\,Ag_2$$

it will be seen that this amount would decompose $\left(\frac{1020\times\cdot00221}{75}=\right)$ ·030 gram $AgNO_3$, or $\left(\frac{\cdot030}{\cdot017}=\right)$ 1·7 c.c, of the decinormal solution. The whole success of Houzeau's method would depend upon the absolute recovery of the 30 c.c. of silver solution used, *minus* the equivalent of 1·7 c.c. decomposed by the arseniětted hydrogen. That this could be ensured seems to me very improbable. In addition to a slight loss, which must necessarily occur, in filtering and washing the precipitated silver, any one who has made use of Soubeiran's reaction will have noticed that, owing to the varying pressure, consequent upon an irregular disengagement of the hydrogen (especially noticeable when operating upon solutions containing bismuth), a portion of the silver solution is apt to get sucked back into the acetate of lead bottle. A c.c. or two might thus be easily lost, which would involve a considerable error when calculating the As from the missing silver.

The gravimetric method is not open to this objection; the liberated silver falling at once to the bottom of the bottle, and if the precaution be taken of allowing the hydrogen tube to dip only just below the surface of the solution, not a particle of silver need be lost from back pressure.

Taking also into consideration the fact that Houzeau's process involves the use of two standard solutions and an indicator, in addition to the inferiority of a volumetric as compared with a gravimetric estimation, I think the method recommended in my paper at the Conference is, on the whole, to be preferred. At the same time I gladly accord to M. Houzeau the credit of having first turned Soubeiran's reaction to quantitative account.

73, Highbury Hill, N. F. W. FLETCHER.

P.S. — Curiously enough Houzeau concludes his paper with the observation that "solutions of nitrate of silver are not, as has been stated by some chemists, reduced by a current of pure hydrogen." However this may be, Dr. Russell's experiments are sufficient to show that there would be no danger of reduction in such a dilute solution as a decinormal one.

THE SUPPLY OF CHIAN TURPENTINE.

Sir,—In the communication I sent you last week from Professor Flückiger, he suggested that Chian turpentine might be found in quantity in Algeria. I have, this week, received letters from competent authorities in that country, who have been making search for the true *Pistacia Terebinthus* trees, and they reply "that they are very scarce, and, indeed, hardly known." "The tree most resembling it, *Pistacia atlantica*, Desf., occurs there, and a sample of the resin is sent for comparison." Some true specimens of Chian turpentine are being distributed to the traders, with the hope that they may discover a supply.

Mr. C. Hanbury informs me that a correspondent states that although some more trees of *Pistacia Terebinthus* have been found in the Islands, the Government will not allow them to be touched, with the view of tapping them, for fear of destroying the trees.

London. THOS. CHRISTY, F.L.S.

SUNDAY DUTY.

Sir,—What is the meaning of the term "Sunday duty," where, of course, there are no special arrangements come to? Does it mean that during the hours an establishment is open on Sunday the assistant in charge is to supply everything inquired for, or is it intended that medicines are to be supplied only? The latter is what I have always understood. Of course supposing a man chooses to supply anything besides medicine he can do so. But does his employer expect him to do it as part of his duty?

POTASS. IODID.

E. F. C.—Recipes for glycerine jelly will be found in vol. ix., p. 463, and other places.

M. F. H.—The formula for Coffin's composition powder has been given several times in the present series; for instance, in vol. viii., p. 498.

J. P. Richards.—*Gnaphalium uliginosum* (Compositæ).

Student.—The U.S.P. formula for ung. acidi carbolici is —Carbolic acid, 60 grains; simple ointment. 420 grains.

H. Tanner is recommended to consult the advertisement sheet accompanying this Journal.

G. L.—The crystallization was due to the chemical dryness of the carbolic acid. It might be prevented by adding a few drops of water to the acid while in a liquid state.

Beta.—The minuteness of the quantity of arsenic that can be detected by Marsh's test would depend upon the delicacy with which the manipulation is carried out.

Assistants in New Zealand.—*W. G. S.* asks for information as to the class of trade in New Zealand, whether situations are difficult to obtain, and what is the salary usually obtained. Any information as to the best province to go to, necessary outfit, etc., would greatly oblige.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Edward, Cayley, Princep, Dyer, Hampson, Benjamin, Planchon, Bos, Country Major, Siphon, W. G. S.

"THE MONTH."

October is usually looked forward to as a pleasant month; but the constant rains and floods, to say nothing of the frost and snow, which for a time seemed to precipitate us into the middle of winter, have by no means kept up the traditional good character of the month. Even the many-tinted chrysanthemums and dahlias soon lose their beauty when wetted by rain, and the flower gardens in consequence are already beginning to assume a wintry aspect. As flowers disappear, however, the lower classes of plants have a chance of being observed.

The varied hues and bright colours of fungi are especially noticeable during this month, from the greater abundance of these plants in autumn, and hence fungologists usually select October for their forays and excursions. The Cryptogamic Society of Scotland seems to be in a remarkably vigorous condition. During the past year about sixty new species of fungi have been added to the Scotch flora, and some excellent papers, having a very practical turn, are specially worthy of mention as having been read at the recent meeting of the Society in Glasgow, one on the "Club-root Fungus (*Plasmodiophora brassicæ*)," which causes a remarkable disease affecting the turnip, mustard and other Cruciferæ, by Mr. A. Stephen Wilson (published in the *Gardeners' Chronicle*, October 16, p. 467), and another by Mr. J. Young, on "Dry Rot in Houses and the Best Means of eradicating it." The Woolhope Club, at Hereford, and the Epping Forest Club, also seem growing in numbers, and becoming very popular among cryptogamic botanists.

Those who are interested in muscarine will be glad to learn that the *Agaricus muscarius* appears to be very abundant this year. It may be found commonly under birch trees, especially those growing in sandy loam. It should be carefully distinguished from *Russula emetica*, a species which is equally brilliant and similar in colour, but has no white warts on the pileus, and no ring on the stem. It is singular how some plants seem to follow the footsteps of the white man. Thus, in Jamaica the common mushroom, *Agaricus campestris*, seems to have become naturalized in the neighbourhood of the cinchona plantation on the Blue Mountains in Jamaica. An excellent paper on the fungi affecting particular trees is given in the *Garden* for September 25, p. 319, and is evidently written by some one who knows their haunts and habits.

In the Economic House at Kew the papaw tree is now in blossom (female flowers), and also the ginger plant. A few others of economic rather than pharmaceutical interest are also in flower, such as the Sunn hemp, *Crotalaria juncea*, the China grass, *Bœhmeria nivea*, and the *Daphne papyracea*. In the open ground there are but few medicinal plants in flower, the saffron crocus and colchicum being almost the only species of medicinal interest.

The fool's-parsley, *Œthusa Cynapium*, is now fruiting abundantly in kitchen gardens, and the difference between its fruit and that of *Conium* can now be readily observed; the two vittæ on the commissure becoming distinctly visible as the fruit ripens.

In Sowerby's 'English Botany' the editor remarks, "This plant is one of the most dangerous of its order. . . . When eaten it produces vomiting, giddiness and other symptoms of narcotic irritant poisoning. A case is recorded which happened in Germany, of a woman putting some leaves in mistake for parsley into soup, of which two of her children partook and died in consequence." A number of other writers have also stated that the plant possesses poisonous properties. Dr. J. Harvey, however, in a communication published in the St. Thomas's Hospital Report, vol. x., p. 257, gives the results of a series of experiments with the juice of the plant obtained before flowering, and with the juice obtained from the plants in green fruit. In these experiments from 1 to 8 fluid ounces of the juice were administered without any effects being produced, and he, therefore, comes to the conclusion "that the *Œthusa Cynapium* of Sussex, Kent, Surrey, Essex and Hertfordshire is not only absolutely free from the noxious properties attributed to it, but that it is pleasant all, to sight, smell and taste, and in the absence of the more fragrant and succulent plants, might well be used as a pot-herb or a salad." He further continues, "if anyone should think differently of the plant of his locality, I will be ready to indulge his scruples, to test the matter with him and satisfy him, as I have no doubt I shall be able to do, that my conclusions are independent both of locality and season, and that the only influence which these conditions have on fool's-parsley, as on hemlock, is to increase or diminish its succulency." It would have added still more to the interest of the results thus obtained if it had been stated whether the plants experimented with grew on a damp or a dry soil, since a difference in this kind is known to influence considerably the amount of active principles contained in plants.

The use of chlorophyll in vegetable growth appears to be by no means conclusively ascertained. Pringsheim recently suggested that it was chiefly of use in protecting the subjacent cells and their contents from those rays of light that would be adverse to the secondary processes which have been distinguished as growth. But Dr. Gilbert, in his very interesting address to the Chemical Section of the British Association, now publishing in this Journal (see before, p. 336), points out that the plant may receive abundance of nitrogen, may produce abundance of chlorophyll and be subject to the influence of sufficient light, and may yet not assimilate a due amount of carbon. He shows that the presence of a due supply of potassium salt and of sufficient available nitrogen is necessary for the proper assimilation of carbon by plants. The amount of carbon assimilated evidently does not depend on the protective power of the chlorophyll alone, nor on its chemical action. In connection with the colouring matter of leaves it has been observed that the leaves of the Virginia creeper, *Ampelopsis hederacea*, change to the well known beautiful red hue sooner on walls exposed to the north and east, and that if the weather be wet during the time when they usually change colour the red tint is only sparingly developed.

Dr. Siemens is still prosecuting his researches on the influence of light on vegetation, and has already, to a certain extent, done away with one of the objections to the application of the electric light for promoting vegetation, viz., the expense, by using the steam of the engine supplying the electric machines to heat the water pipes used to warm the hothouses.

Anything of a green colour, and not belonging to the vegetable kingdom, is often regarded by a certain portion of the public as likely to possess deleterious properties, and even green coloured oysters might perhaps find their way into the analytical laboratory. It has long been observed that in certain localities oysters have a green colour, especially marked in the mantle or "beard," and recent experiments by M. Puységur, at Sissable, and repeated in the Jardin des Plantes at Paris (*Nature*, October 7, p. 549), show that this colour is, as was supposed, due to a diatom, *Navicula ostrearia*. According to these experiments, perfectly white oysters become coloured in twenty-four hours when placed in water containing the diatoms, the depth of green colour bearing a direct relation to the quantity of diatoms present in the water, and when the oysters are removed to pure sea water the colour disappears altogether from them after a few days. The endochrome, or yellow chlorophyll of the diatoms, would seem to be absorbed through the line of suture joining the valves of the diatoms, where the frustules are scarcely silicified at all, and being digested and decomposed, the colouring matter passes direct into the blood, to which it imparts its colour.

The border line between the animal and vegetable kingdom has always been a very shadowy one, and a new form, which has recently been discovered by Professor Perrier, will not tend to make it any clearer, for Professor Van Tieghem (*Bull. Soc. Bot. France*, 1880, p. 130) states that he is not well able to say whether the organism is an animal or plant. It has, however, received a name—*Dimystax Perrieri*.

In *Comptes Rendus* for September 27, p. 553, M. Lœwenberg states that he has found a micro-organism in the discharge from furuncle or abscess in the ear. He believes that the disease is communicable to other portions of the body by contact of the diseased matter, and hence uses antiseptics, such as boric acid or thymol, in the form of injection or lotion.

Professor Baillon (*Bull. Mens. Soc. Linn. de Paris*, No. 33) calls attention to the fact that in most works on descriptive botany, the natural order of Onagraceæ is characterized by the constant absence of stipules, and quotes the classical works of Hooker, Decaisne, Endlicher and Duchartre in proof of his assertion. Professor Baillon finds that in the common fuchsia little stipules are often present. In *Circæa* also they can be detected, and in the *Lopezia* of our gardens all the leaves have two very distinct stipules, which have often been referred to in botanical works, as also is the case with *Haloragis*, though Bentham and Hooker describe them as absent. The stipules are in many cases very minute, often subulate, and sometimes of a red colour.

At a meeting of the Royal Horticultural Society, October 12, Professor Henslow called attention to a Zanzibar orchid, *Angræcum Kotschyi*, which possessed the peculiarity of a spirally twisted spur; this he suggested might possibly act as a tendril, and would thus add another to the list of organs, *e.g.*, leaflets, petioles, flowering branches, tips of leaves, stipules, etc., which are known to form tendrils.

Perhaps few of our native plants offer such a variety of forms of the same organs on one plant as the common arrowhead, *Sagittaria sagittifolia*, of which an interesting account will be found in the *Garden* for October 16, p. 387. The roots show three distinct forms, tuberous, fibrous and stoloniferous. The leaves are sometimes submerged phyllodes (flattened leaf-like stalks), others consist of an elliptical blade on a tall petiole, the lower portion of the leaf not being developed, and others again offer the true arrow-shaped form. The flowers also present similar variations, the lower ones usually fertile, producing seed; the upper ones, barren on the flowering stems, produce flowers with the sexes separate.

A singular monstrosity of the poppy sent by Mr. Lynch, of the Cambridge Botanical Gardens, is illustrated in the *Gardeners' Chronicle*, October 9, p. 469, in which beside the ovary being fully formed, all the stamens are developed as if carpels.

Further information received from Jamaica shows that the damage done by the late hurricane is likely to considerably affect the revenue arising from the sale of cinchona bark. In a letter, forwarded from Kew, to *Nature*, Mr. Morris states that he estimates that 20,000 cinchona trees of all ages have been uprooted or so severely damaged that they must be immediately barked. The number of available cinchona seedlings has also been reduced by the hurricane from 500,000 down to 80,000.

The calisaya cinchona cultivated in Jamaica hitherto would appear (*Nature*, October 21, p. 592) to have been a hybrid plant, with more of the *C. succirubra* than *Calisaya* in its nature. A specimen of this hybrid is now to be seen in the Economic House at Kew. Fortunately the error has been detected and three young plants of the best variety of Calisaya, *C. Ledgeriana*, given to the Kew authorities for the purpose by Mr. J. E. Howard, F.R.S., have been forwarded to that colony, and others to Ceylon.

In Bengal, according to Dr. King's recent report about three quarters of a million of young plants have been planted out, and a crop of 361,590 pounds of dry bark has been harvested. Carthagena bark has been brought into cultivation.

From the *Gardeners' Chronicle*, October 16, 1880, p. 498, we learn that the crop of hops in this country amounts this year to 507,606 cwts. As there are 67,671 acres under hop cultivation, the yield is about 7½ cwts. per acre.

In the *Practitioner* for October is an admirable paper by Dr. Lauder Brunton, on "Indigestion as a Cause of Nervous Depression," which is worthy of being printed *in extenso* in a paper of world-wide circulation, explaining as it does the effects of the high pressure under which people live in the present day, and dealing with many of the problems of daily life in a masterly manner.

In the same journal it is stated that a French gentleman, being convinced that the papaw plant would become useful in medicine, planted a large extent of ground with the trees, and has collected the juice in much the same way as opium, the juice being allowed to dry on incisions in the half ripe fruit and then scraped off; thus obtained it is in the form of coarse grains, which dissolve readily in water. The writer states that compared with the most active pepsine and with the most active liquor pancreaticus he has found it to surpass them both in the power of digesting either cooked meat or hard-boiled white of egg. It does not, however, act in an acid solution. But a sentence occurs at the end of the paragraph which should not be omitted here, lest it have a connection with the statement above quoted. "We believe that the French firm who have introduced this substance into medicine will shortly appoint an agent in this country, if, indeed, they have not already done so."

After experimenting upon the physiological action of the narcissus, snowdrop and hœmanthus, plants belonging to the natural order Amaryllidaceæ, Dr. Ringer has examined the properties of an alkaloid isolated by Mr. W. A. Gerrard from a liliaceous plant, the common garden tulip, and has communicated his results to the *Practitioner*, October, p. 241. He finds that nitrate of tulipine differs almost entirely in its action from the amaryllidaceous alkaloids, it being a muscle poison affecting the muscles like veratria, but in a lesser degree. These results are interesting from a botanical as well as a physiological point of view, as confirmative of the theory that the relationships between natural orders may, to a certain extent, be indicated by the nature of their chemical constituents. The nearer relationship of the Liliaceæ to the Melanthaceæ seems shadowed forth by the fact that a liliaceous plant has yielded an alkaloid like veratria. In the same manner the position of the genus *Duboisia*, as belonging to the Atropaceæ rather than to the Scrophulariaceæ, was demonstrated by the discovery of duboisine (hyoscyamine of Ladenburg) and nicotine in plants of the genus. If, as Sir James Paget in his recent address, delivered in the Pathological Section of the British Medical Association, says, that much may be learned by human pathologists from a study of the consequences of injuries to and diseases of plants, it is equally certain that botanists may learn a great deal as to the relationships of plants from a knowledge of their physiological action and chemical constituents. If a knowledge of botany be banished, as has been suggested, from the medical curriculum, it may be hoped, for the sake of the progress of medical science that some knowledge of it will be required before the medical curriculum is entered upon. Those who think differently will do well to peruse Sir James Paget's thoughtful and learned address (*Lancet*, p. 603, 645). Not only are observations more readily made on less complex structures, and facts concerning vitality, growth and disease more easily ascertained in them than in higher forms, but the most minute members of the vegetable kingdom, as shown by the recent investigations concerning bacteria, are by no means the least important objects of investigation, since a knowledge of the laws which govern their appearance and vitality and propagation must be of the utmost value to mankind.

Japanese aconite is the subject of a communication from Mr. Geerts, of Yokohoma (*Pharm. Zeit.*, October 23), who says positively that it is derived only from *Aconitum Fischeri*, Reichb. The Japanese distinguish between two kinds of the drug, namely, "ü-dzu," the principal tuber, and "bü-shi," the younger but more poisonous tubers, of which there may be five or six to a plant. The latter tubers are said to form the drug used in Japan, but they first undergo a special preparation, having for its object partly to render them less toxic, and partly to preserve them from decay and from insects. This consists in steeping the fresh tubers for a long time in a mixture of common salt, vinegar and water, then drying them in wood ashes and afterwards in the sun. Besides agreeing with the experience that two kinds of roots are met with in the market under the name of Japanese aconite, these details may furnish an explanation of the peculiar condition of some of the specimens, which has been pointed out by Mr. Greenish, and also of the fact that the crystallizable alkaloid cannot always be obtained from these tubers.

German pharmacists appear to look upon the question of the constitution of aconitine as still undecided, inasmuch as we learn that the Committee charged on behalf of the German Pharmaceutical Association with the selection of a subject for the Hagen Bucholz Prize Essay for 1881 has decided upon, "The Preparation and Chemical Constitution of English and German Aconitine." The essays are to be sent without the author's name under a motto, to Apotheker W. Danckwortt, Magdeburg, before August 1 next.

The second alkaloid stated by Herr Ladenburg to be present together with hyoscyamine in henbane (*Pharm. Journ.*, [3], x., 872), has now been isolated and described by that chemist (*Berichte*, xiii, 1549). It was separated from the mother liquor after the larger proportion of the hyoscyamine had crystallized out, but resisted all attempts at its crystallization. The double gold salt was, however, obtained in crystals, which were better formed, and not so soluble as those of the gold salt of hyoscyamine. Analysis showed that the new base has the same composition as hyoscyamine, represented by the formula—$C_{17}H_{23}NO_3$; but when treated with baryta, though the acid of the decomposition products proved to be identical with tropic acid, the base was found to be only isomeric with tropine. The alkaloid has therefore been named "hyoscine," and the base resulting from its decomposition "pseudotropine." The action of hyoscine upon the pupil of the eye is described as analogous to that of atropine, and at least as strong. Herr Ladenburg points out that all the strongly mydriatic alkaloids at present known to occur naturally are isomeric with each other. They are atropine and hyoscyamine ($C_{17}H_{23}NO_3$), both of them splitting up into tropic acid ($C_9H_{10}O_3$) and tropine ($C_8H_{15}NO$); and hyoscine ($C_{17}H_{23}NO_3$), splitting up into tropic acid ($C_9H_{10}O_3$) and pseudotropine ($C_8H_{15}NO_3$). The artificial mydriatic alkaloid, homatropine, has the composition $C_{16}H_{21}NO_3$, and splits up into amygdalic acid ($C_8H_8O_3$), and tropine ($C_8H_{15}NO$). From the analogy which homatropine presents in its physiological action to atropia, Dr. Murrell has been led to experiment as to whether it might prove a useful addition to the list of remedies for morbid sweating. He reports, however (*Practitioner*, October, p. 252), that when administered to patients suffering from the night sweating of phthisis it proved decidedly inferior to atropia, Dover's powder, picrotoxin, and other known remedies.

According to M. Bochefontaine (*Comptes Rendus*, xci., 579), the *Conium maculatum* contains two active principles, one of them possessing the property usually attributed to conia of paralysing the central nervous system, the other acting more like curara. The physiological experiments which have led him to this conclusion were performed with two hydrobromic acid compounds. The first, which, because of its action, M. Bochefontaine calls hydrobromate of conia, was in amber coloured crystals and was the most toxic of the two. The second, prepared from the first by several recrystallizations, formed colourless or slightly nacreous crystals. An inference which he draws is that in the case of the hydrobromate successive crystallizations tend to eliminate the principle paralysing the nervous centres and to fix the curarizing principle. Unfortunately for the value of this opinion, however, there is no chemical evidence as to the real nature and constitution of either one or the other of these supposed hydrobromates.

The differences of opinion existing between Dr. Kerner and Dr. Hesse in reference to the testing of quinine sulphate and to the amount of water normally appertaining to that salt as water of crystallization, have again formed matter for comment by the last named chemist in a paper read before the German Chemical Society. A *résumé* of Dr. Kerner's views on the subject was given in the present volume of the *Pharmaceutical Journal* (page 27), together with a statement of his reasons for regarding the test of the German Pharmacopœia as preferable to the one recommenced by Dr. Hesse, and sufficient for all practical purposes. Dr. Hesse now states that cinchonidine, when freshly precipitated, is more easily soluble in dilute ammonia than quinine is, and that although a separation of crystalline cinchonidine from such a solution does take place after the lapse of some time, while the quinine solution will remain clear for several hours at least, the ready solubility of freshly precipitated cinchonidine interferes with the application of the ammonia test for detecting small amounts of impurity in quinine sulphate.

In addition to this, Dr. Hesse states that he has observed another circumstance which renders the official test of the German Pharmacopœia inapplicable. This consists in the different behaviour of cinchonidine sulphate when merely mixed with quinine sulphate, as in making experiments with the ammonia test, compared with that which it presents when actually crystallized together with quinine sulphate, as in an impure sample of this salt. In the latter case Dr. Hesse finds that the cinchonidine sulphate assumes a form in which it escapes detection to some considerable extent by means of Kerner's ammonia test. In illustration of this peculiarity in the behaviour of cinchonidine sulphate, Dr. Hesse gives several examples of commercial quinine sulphate, containing from 9 to 13 per cent. of cinchonidine salt, which, when tested as the German Pharmacopœia directs, furnished results indicating that they were pure.

As regards the amount of water in commercial quinine sulphate, Dr. Hesse is of opinion that, except when the salt has effloresced, a small percentage of water is less an indication of the sample being good than it is of the probable presence of a considerable amount of cinchonidine salt, since he finds that the presence of this impurity exercises an influence upon the water of crystallization of the quinine salt and, as he thinks, probably reduces it to six molecules, the proportion normally existing in the cinchonidine salt.

Messrs. A. Riche and A. Remont, having been engaged in the examination of the squill, chronicle the observation (*Journ. Pharm. et Chim.*, October, p. 291) that its bitterness varies very much, in some instances the juice of the bulb being even sweet. This variation they attribute to the presence of a substance they have separated and named "scilline," which appears upon coming into contact with acids to be converted into levulose with extreme facility, the bitterness of the bulb being reduced in proportion as this change progresses. "Scilline" is described as forming a yellowish-white spongy amorphous mass, soluble in water in all proportions, and only slightly soluble in strong alcohol. The name "scilline" is, however, unsuitable; for if this substance should prove to be one hitherto unknown, the name has been already appropriated by Merck (*Pharm. Journ.*, [3], ix., 1038) to indicate a crystalline substance nearly insoluble in water and soluble in alcohol. But the new "scilline" of Messrs. Riche and Remont is possibly only a rediscovery, as it would seem to have much in common with the "sinistrin" obtained by Schmiedeberg in 1879 ('Pharmacographia,' 2nd edit., p. 692).

In a communication to the Academy of Sciences (*Comptes Rendus*, xci., 607), M. Poirot attributes to the absinthe (*Artemisia Absinthium*) extraordinary properties as an insectifuge. He says that among the absinthe plants that cover the vast plains of North America, he has never seen flies, ants, or any other kinds of insects, and to these he adds worms, scorpions, serpents and rattlesnakes. He proposes to use this property in the extinction of the phylloxera, as he believes this pest would not be able to go through the necessary metamorphoses in a soil manured with the leaves and stalks of the plant.

Picrotoxin, the substance prepared from cocculus indicus, to which different formulæ have been attributed by different chemists, has been investigated by Messrs. Barth and Kretschy (*Monatshefte f. Chemie*, i., 99), who by a process of fractional crystallizations from benzol and from water have ascertained that it consists of a mixture of at least three different bodies, which they have named "picrotoxine," "picrotin," and "anamirtin." Picrotoxin ($C_{15}H_{16}O_6+H_2O$) crystallizes from hot benzol in rhomboid form, fuses at 201° C., reduces silver nitrate, especially upon the addition of ammonia, and Fehling's solution when heated, and is extremely bitter and very poisonous. Picrotin ($C_{25}H_{30}O_{12}+nH_2O$) crystallizes from benzol in four-sided needles with oblique ends, completely fuses at 250° to 251° C., reduces silver nitrate and Fehling's solution, and is bitter, but not poisonous. Anamirtin ($C_{19}H_{24}O_{10}$) is the most soluble in water; it crystallizes in tabular lamellæ, and is neither bitter nor poisonous. The relative proportions in which these substances were obtained were:—Picrotoxin, 32; picrotin, 66; anamirtin, 2; but the authors are of opinion that these proportions may vary with differences in the seed from which the original substance is prepared.

The formation of phosphorus pentiodide, which has hitherto been doubted, is now stated to have been accomplished by Mr. Hampton, working in the laboratory of the University of Virginia (*Chemical News*, October 8, page 180), by bringing together, in an atmosphere of nitrogen, phosphorus (dissolved in carbon bisulphide) and iodine in slight excess of that required for the compound PhI_5. The compound thus obtained readily decomposed when heated above 50° C. or brought into contact with atmospheric air, but it is described as having, before decomposition, appeared as a very dark crimson, almost black, mass of crystalline structure, apparently made up of thick needles or slender prisms.

In the same laboratory some experiments have been made, by Mr. W. T. Page, to determine the extent to which carbon bisulphide is soluble in water. For this purpose a small quantity of carbon bisulphide was placed, together with pure water that had been deprived of air by boiling, into well filled and stoppered flasks, and these were kept at definite temperatures and shaken at short intervals from day to day. At the end of a given period, after ensuring that no decomposition had taken place, the solution was oxidized with potassium permanganate acidified with nitric acid, and the resulting sulphuric acid determined as barium sulphate. It was found that after having been kept thirty days at a temperature of from 12° to 13° C. the water had dissolved about one-fifth per cent. by weight of carbon bisulphide, and that the proportion dissolved diminished with a rise in the temperature.

The liquefaction of ozone is reported by Messrs. Hautefeuille and Chappuis (*Comptes Rendus*, xci., 522) as having been effected when operating upon a mixture of oxygen and ozone very rich in ozone. Very soon after pressure was applied there was an appearance of a blue colour, and when the pressure equalled several atmospheres the gas became of an indigo blue colour. At the moment of release after a compression equal to seventy-five atmospheres there was an appearance of a white mist, which was taken as an indication of liquefaction, if not of solidification. It was found necessary that the capillary tube containing the mixture should be kept at a low temperature during the operation (about − 23° C.) and the compression effected slowly, otherwise the ozone was decomposed with the liberation of light and heat, manifested in a strong detonation accompanied by a yellowish flash. The authors promise that in a future communication they will discuss the part that this coloured gas may play in the atmosphere.

Herr Zulkowsky (*Berichte*, xiii., 1395), in a paper "On the Behaviour of Starch towards Glycerine," gives some details not without a bearing upon the discussion which followed the reading of Mr. Willmott's paper on "Plasma" last year (*Pharm. Journ.*, [3], ix., 828). He points out that when starch is heated with concentrated glycerine the soluble modification is formed, the quantity increasing with the rise of temperature, until the mass becomes quite fluid at 170° C., and the starch is almost completely changed into the soluble form at 190° C. As, however, might be expected there is a difference in the rapidity and completeness with which this conversion takes place in starch from various sources. Potato starch passes quickly and easily into the soluble form; wheat starch is not so rapidly acted upon, and rice starch is not entirely changed after having been kept at 190° for a considerable time. From the glycerine solution the unconverted starch may be separated by pouring it into water and filtering. Upon adding strong alcohol to the filtrate the soluble starch is precipitated. This is completely soluble in water, and even in dilute alcohol, but a concentrated aqueous solution exposed to the air gradually gelatinizes through a reformation of insoluble starch. It might throw some light upon the history of glycerinum amyli if further experiments were made to ascertain whether the rapidity with which this reformation of insoluble starch takes place also varies with the kind of starch used. The fact that soluble starch is produced when starch and glycerine are heated together was mentioned by Dr. Senier in the discussion referred to.

Preparations of iodide of iron certainly occupy a full share of pharmaceutical literature. M. Carles has been turning his attention to the decomposition that takes place in the "normal" solution of iodide of iron of the Codex, which is used among other things for the extemporaneous preparation of syrup of iodide of iron, and he has sought for a preventive in some insoluble substance of the same nature, but having a greater avidity for oxygen than the iodide of iron. This he says (*Bull. Soc. Pharm. Bord.*, xx., 112) he has found in hydrated sulphide of iron, which he prepares by precipitating sulphate of iron with sulphydrate of ammonia. The precipitate is washed by decantation several times with boiling water, collected upon a filter and preserved in a pappy condition in a well stoppered bottle. A few drops of this paste added to the iodoferrous solution is said to keep it colourless for an indefinite time, or to remove the colour when shaken with a coloured solution. The alteration which takes place in syrup of iodide of iron he attributes to alkaline substances, principally lime, in the syrup used, and he proposes to prevent it by the addition of a small quantity of citric acid, because that acid does not form precipitates with the salts of lime present.

According to a writer in the *Canada Medical Journal*, the bitter taste of potassium bromide may be disguised by the use of simple syrup. Three drachms of syrup, containing about 150 grains of sugar, mixed with each drachm of the bromide, is said to completely alter the taste, giving it an agreeable nutty flavour, not unlike that of cocoa-nut milk. If largely diluted, children are alleged to take it with avidity.

According to the *New York Medical Record*, a formula for the treatment of tan and freckles, proposed by Professor White and endorsed by Dr. Nevins Hyde, is as follows:—℞. Hyd. bichlor., gr. vj.; acid mur. dil., ʒj.; aquæ, ℥iv.; alcohol, aq. rosæ., āā ℥ij. ; glycerine ʒj. M. Apply at night and wash off in the morning.

There is in the present day a tendency to regard the time-honoured preparations which have secured a place in the national Pharmacopœia as scarcely abreast of the age, and instead of pharmacy following in the wake of medical science, it is in advance of it, and ingenuity is vastly exercised in combining remedial agents, which alone have scarcely held their own, into a "preparation," and thus this one claim of novelty suffices to induce many practitioners to order it in their prescriptions. Perhaps these changes have been "rung" more frequently on the hypophosphites than on any other class of remedies. It seems difficult to believe that they possess no value, and yet more difficult to determine what value they do possess; individually they have all been tried, and each in succession has been found wanting, and more or less abandoned. But there is a charm in a compound which a simple preparation does not possess, and combination may develop a latent quality hitherto unrecognized. R. E. H. in simplicity refers to his Pharmacopœia for some hypophosphite liquor ordered in prescription No. 449. The liq. hypophosph. co. is occasionally ordered by a west-end physician, and is prepared by a west-end house, but the formula has not been published.

In prescription No. 451, hyd. chlor. most probably means calomel; that substance alone, or mixed with sugar, or opium, or both, is occasionally ordered to be blown into the eyes in ulcers of the cornea, and there is no reason why the same end should not be sought by dropping the calomel, diffused in a fluid, into the eye. Calomel is still usually written hyd. chlor. in prescriptions. Mr. Henry Brown states that hyd. chlor. is hyd. perchlor., or corrosive sublimate; such a statement must not be allowed to pass without comment, and it is to be hoped that it will not be accepted by the readers of this Journal, or coroner's inquests will dispose of those customers that still remain to the pharmacist. Referring to the B.P., under hyd. subchlor. will be found synonyms "Calomelas, 1864, Edinburgh, Dublin. Hydrargyri chloridum, London. Calomel." With this definite description before him, is the dispenser required to ramble abroad after the U. S. Pharmacopœia, and seek from it some support for the use of a corrosive preparation of mercury, the very mention of which calls forth visions of a "death's head and cross-bones?" The word subchlorid. is of comparatively recent introduction into medicine, and even now by no means generally used. The strength even of the solution should raise a doubt as to hyd. perchlor. being indicated in that prescription as an application to the eye. Following in medical terms the indications of science, it should always be in company with common sense. It is just possible, but scarcely probable, that chloral hydras may be meant; but again, if that substance be intended it should be written chlor. hyd., instead of hyd. chlor., as in the prescription.

With reference to the extracts in No. 452: if properly made the ext. lupuli should be soluble in water, but not forming a bright solution. There is a deposit of insoluble matter from most of the Pharmacopœia extracts when re-dissolved; but it is difficult to see how a "green spirituous extract" can be obtained from a carefully prepared ext. lupuli, B.P.

The dispenser would be justified in using the lin. plumbi acet., as suggested by Mr. H. Brown, for the lin. plumbi co. of prescription No. 453, if unable to communicate with the prescriber and thus obtain more definite information as regards a preparation for which there is no published formula. As suggested by another correspondent, it may refer to the more recent preparation of lead, the glycerole of subacetate of lead, lately introduced into medical practice.

The quantity of syr. ferri phosph., B.P., which the product should measure when made from the Pharmacopœia formula may differ occasionally when made by different persons, and this difference would probably in some measure depend upon the quantity of moisture left in the phosphate of iron after being pressed, and previously to its solution in the phosphoric acid. Unless the product measure 12 fluid ounces the quantity of phosphate of iron in each drachm would not be in accordance with the B.P. One correspondent states that he makes the syrup strictly adhering to the B.P. directions, and the product measures 12 ounces. It is difficult to perceive on what authority another writer says that the difference should be made up with water.

For prescription No. 455, the inquirer can take his choice of several formulæ, forwarded by Mr. Henry Brown and Mr. E. H. Storey, for ung. rumic. c. sulph., and given in the Journal of October 23. Essentially they are much alike; probably the ointment has outlived its reputation.

In No. 456 the sp. æth. nit., if so acid as to decompose pot. iodid., should be previously neutralized with an alkali, as pot. bicarb., so as to avoid the liberation of free iodine, which would otherwise be set free in the mixture. The B. P. says that sp. æth. nit. "effervesces feebly or not at all when shaken with a solution of bicarbonate of soda." The quantity of iodine liberated being therefore dependent on the amount of free acid in the sp. æth. nit., it is scarcely possible to conceive that any medical man would rely on such a contingency for the dose of iodine which he intended to give to his patient. It is more rational to assume that the writer of the prescription intended to administer iodide of potassium in definite doses rather than free iodine in doses perfectly indefinite, and which to some extent must vary with every sample of sp. nitre used in dispensing the prescription.

The strychnia in the liquor of No. 457 is dissolved and kept in a state of solution by the addition of hydrochloric acid; alone it is almost insoluble in water, and the addition of sodæ bicarb. to the B.P. liquor would throw down the strychnia either in a state of fine division, or after standing, in a crystalline condition. Although the quantity of water present is more than sufficient to redissolve the precipitate, strychnia being soluble in water to the extent of 1 in 7000, yet taking into consideration the amount of salts present it is probable that this will not occur. A "shake the bottle" label was therefore very properly sent with it, or the greater part of the strychnia might have been taken in the last dose of the mixture. J. H. F. says that strychnia is not thrown out of solution by bicarbonate of soda. Fresenius, in his 'Qualitative Analysis,' 9th edit., p. 356, states: "The addition of bicarbonate of soda to an acid solution of strychnia causes no precipitation, and it is only after the lapse of twenty-four hours, or even a longer period, that strychnia crystallizes from the fluid in distinct prisms, in proportion as the free carbonic acid escapes."

It may safely be assumed that the plumbi glycerid. mentioned by "Jacque," No. 458, is the same as the plumbi glycerol. of Mr. Balmanno Squire, which will be found described in the Journal, [3], vi., p. 881., although it is not usually called a glycerid. This view corresponds with that of Mr. Henry Brown on this preparation.

The mixture, No. 459, should be made by dissolving the phorphorus in the benzol, and then by means of mucilage diffusing and suspending it when added to the water and other ingredients, otherwise the phosphorus will be thrown out of solution and deposited. Great care should be taken in the dispensing of any prescription containing phosphorus, and such a formula is not the most suitable for its administration.

The gallic acid in prescription No. 460 is in excess of that which the quantity of water ordered with it will hold in solution; if dissolved in hot water it will on cooling crystallize out. The proper method with such a mixture is to rub down the gallic acid to a fine powder and diffuse it through the liquid. A "shake the bottle" label should accompany the mixture. W. H. says the mixture was sent out clear. As the solubility of gallic acid in water is 1 in 100 a solution of ʒj in ℥vj of water cannot be made. In spirit the solubility is 1 in 8, ʒj of gallic acid would therefore require ℥j of spirit. Such an addition would be a liberty that no dispenser should presume upon. Glycerine may be used as a solvent, but there is no warrant for such a deviation from the prescription, and the dispenser's attention may be directed to some valuable observations in the *Pharmaceutical Journal*, [3], vol. iv., p. 336, on the property glycerine possesses of modifying, in a remarkable degree, the action of some otherwise very astringent compounds. From these remarks it may be gathered that, having regard to the intentions of the prescriber, the use of spirit or glycerine in order that this mixture may be sent out clear cannot be justified, and the intelligent dispenser will pause before he neutralizes the activity of the most important ingredient in the prescription, and by doing so imperils the life of the patient.

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EXEMPTION FROM SERVICE ON JURIES.

IT would be inconsistent with the estimation in which Englishmen hold the institution of trial by jury for any individual or class of individuals to object to the performance of the duty which may at any time be required of them in this respect, unless they were able to bring forward very strong reasons, based upon considerations of benefit to the public, for being allowed exemption. There are few persons who have not experienced inconvenience from being called away from their business to serve on juries, but even among those who have suffered in this way, we believe that after the subject had been fairly considered, the general conclusion would be that exemption from liability to serve cannot be sought for by any plea of interference with one's own pursuits or business occupation, except in so far as such interference is likely to be detrimental to the public interests.

That physicians and surgeons should be exempt from liability to serving on juries is a natural consequence of the duties they are habitually called upon to perform, and of their frequent occupation with cases of great emergency. Similar exemption may fairly be claimed also for other persons whose ordinary duties demand in the public interest an amount of personal attention incompatible with attendance at law courts as jurymen, and when the existing Juries Act was passed it was out of regard for the responsible and delicate position of those engaged in dispensing physicians' prescriptions that pharmaceutical chemists were put in this respect upon the same footing as members of the medical profession. At that time pharmaceutical chemists were the only members of the drug trade who could be thus recognized in the eye of the law as being engaged in avocations affecting the safety of the public, and hence it was quite natural that immunity from jury service should be restricted to them, although they constituted only a fraction of those carrying on the drug trade.

Nor was it without very considerable effort that this result was achieved; had it not been for the influence of organization exercised through the action of the Pharmaceutical Society, and the respect commanded for its claim by the fact that it was urged upon the grounds of benefit to the public as well as the official recognition and qualification of its members, even pharmaceutical chemists would not have been included among the classes exempted by the Act from service on juries. Whenever the opportunity arises for extending this exemption to the entire body of chemists and druggists, it may be expected that the same influence exercised through the same body will secure the same consideration from the Legislature.

Meanwhile, however, we fail to recognize the propriety of stirring in this subject as the Law and Parliamentary Committee of the Chemists and Druggists' Trade Association proposes to do. In the abstract the Council of the Pharmaceutical Society has recognized the principle that chemists and druggists, like pharmaceutical chemists, should be exempt from serving on juries. As we pointed out last week the Council has also obtained recognition of this principle by the Legislature and in all probability it might have become the law if the Juries Bills of 1872 or 1874 had been passed. Whenever another Juries Bill is brought in, the exemption of chemists and druggists will no doubt be dealt with, but until that opportunity offers we think there is not much prospect of obtaining consideration of the subject.

Moreover, it may be asked with no little pertinence what practical disadvantage is caused by the limited scope of the exemption from jury service? Cannot anyone who desires to obtain it do so by a process that ought not to involve much if any trouble, and an outlay of less than ten pounds? Then again, if the nature of a chemist and druggist's business be such as to require in the interests of the public that he should be exempt from jury service, we do not hesitate to say that he should not hold any less position in the body than that of a pharmaceutical chemist. The remedy for any existing inconvenience is therefore ready at hand for those who choose to avail themselves of it, and we consider the adoption of such a course would be even more conducive to the interests of the pharmaceutical body than agitation of the question whether the exemption from jury service is to be extended. The circumstance that Scotchmen do not share with their English brethren the exemption belonging to the grade of pharmaceutical chemist was once attributed by Mr. MACKAY to "the proverbial modesty of Scotchmen in not advancing their claims," but however that may be, the disadvantage is one that does not lie so much to the discredit of the Pharmaceutical Society or its executive as our correspondent, Mr. STEWART, seems to think. Justice to Scotland in this respect is wanting chiefly because Scotchmen, objecting to be governed by the same laws as Englishmen, have a Juries Act of their own, which does not seem to give them so much advantage as the English Act does.

Considerations of expediency also lead to us to regard the agitation of this subject as being peculiarly inappropriate and undesirable.

The demand for extended exemption from jury service must necessarily provoke inquiry into the possible effects of granting it. If so many persons are made exempt, may there not be a difficulty in finding jurymen, and will not the interests of the public be thus prejudiced to a greater extent than by leaving things as they are? It is not long since dentists were granted exemption from jury service should they desire it; but we fail altogether to perceive that a dentist's occupation constitutes in itself any adequate reason for thus reducing the available number of jurymen by upwards of five thousand. Even by the admission that chemists and druggists should be just as much exempted from serving on juries as pharmaceutical chemists are, there is implied an assumption that there is a close similarity if not identity between the duties in which both classes are engaged as servants of the public. Unfortunately, however, we cannot accept that assumption as representing the actual position of affairs. Some of our correspondents inform us, from time to time, that the chief part of many a chemist and druggist's business consists in the sale of patent medicines and other proprietary articles, and we fear there is too much reason for accepting this statement as correct. But if that be the case there can scarcely be any better reason for seeking exemption from jury service for those so situated than there is for the average dentist to obtain it by reason of the nature of his duties as a servant of the public. It is not because the dentist's occupation does not admit of his being called upon to act as a juryman that the members of this class have been exempted, but because dental practitioners have been incorporated as a class to be recognized by registration and legal qualification, and have thus been brought within the shadow of one edge of the medical profession. In like manner we believe that in proportion as those engaged in the practice of pharmacy succeed in taking a similar position, and in making that occupation, as it should be, a branch of the medical profession, so will they more surely be able to enjoy advantages and immunities that, as mere traders, they could never hope to possess.

INSPECTION OF WEIGHTS AND MEASURES.

The Justices for the Peace for the County of Middlesex, acting under the Weights and Measures Act, 1878, as the local authority for the county, have appointed Professor Redwood Chief Inspector of Weights and Measures for the district under their authority, and they have assigned to him the duty of verifying troy, bullion and decimal grain weights and the apothecaries' weights and measures used in the sale of drugs. The office of the Chief Inspector is at 21, Hart Street, Bloomsbury, and he will attend there every Tuesday between the hours of eleven and four.

A notice has been issued by the Clerk of the Peace for Middlesex to the effect that persons desiring to have any of the above-named weights or measures verified and marked in accordance with the requirements of the statute are to apply at the Chief Inspector's office, by letter or otherwise, and that arrangements will be made for receiving such weights and measures and testing them in the order in which applications are made.

THE NEW SCHOOL OF PHARMACY IN PARIS.

We learn from the *Répertoire de Pharmacie* that the building of the new "Ecole supérieure de Pharmacie" in Paris is now complete and that in 1881, at the commencement of the second semestre, the students will leave definitively the old school in the rue de l'Arbalète.

The new school, which is situated between the rues de l'Abbé-dé-l'Epée and d'Assas and the Avenue de l'Observatoire, occupies a space of 17,000 square metres. Its principal entrance is in the Avenue de l'Observatoire, opposite the Rue Herschel, and in the "cour d'honneur," 57 metres in length, will be placed statues of Parmentier and Vauquelin. The basement consists of seven separate divisions where the professors' laboratories will be situated. There are two principal amphitheatres, each having an area of 100 square metres. The gardens and grounds are at the side of the rues d'Assas and Michelet.

CHEMICAL SOCIETY.

The first meeting of the Chemical Society will be held next Thursday, November 4, at 8 o'clock in the evening, and the following papers are to be read:—"On the Compounds of Vanadium and Sulphur," by E. W. E. Kay; "Report on the Atmospheric Oxidation of Phosphorus and on Some Reactions of Ozone and Peroxide of Hydrogen," by C. T. Kingzett; "Action of Heat on the Mixed Vapours of Benzene and Toluine," by Dr. T. Carnelly; "Bismuth and Bismuth Compounds, Part I. Oxides and Hydrates, Part II. Halogen Compounds," by M. M. Pattison Muir, G. B. Hoffmeister and E. E. Robbs; "On the Colour, Properties and Relation of the Metals Copper, Nickel, Cobalt, Iron, Manganese and Chromium," by T. Bayley; "Action of Diazo-Naphthalin upon Salicylic Acid," by Dr. Percy Frankland; "Action of Organo-Zinc Compounds upon the Nitriles and their Analogues," by Dr. E. Frankland, F.R.S. and C. C. Graham; "Action of Zinc Ethyl on Benzoylic Cyanide," by Dr. E. Frankland and D. A. Louis; "On the Basic Sulphates of Iron," by Spencer Pickering; "Fourth Report on Researches in Chemical Dynamics, Sec. I., by Dr. C. R. A. Wright; Sec. II. and III., by Dr. C. R. A. Wright and A. Menke; "On Some Naphthalin Derivatives," by Dr. Armstrong and N. E. Graham.

The Sunderland Chemists' Assistants and Apprentices' Association held a conversazione in their rooms, on the 11th inst. There was a good attendance, and much interest was shown in inspecting the scientific apparatus, pharmaceutical novelties and preparations displayed. After the discussion of matters of pharmaceutical interest, the members separated, having spent a very pleasant and profitable evening.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

At a meeting of the Board of Examiners for England and Wales, held in London, on Wednesday, October 27, 1880, the report of the College of Preceptors on the examinations held on October 5 was received.

Two hundred and twenty-seven candidates had presented themselves for examination, of whom *ninety-two* had failed. The following *one hundred and thirty-five* passed, and the Registrar was authorized to place their names on the Register of Apprentices or Students:—

Abel, Frank George	Chester.
Abel, Peter Alexander	Inverurie.
Adler, Martin Woldemar	London.
Alexander, Adam	Aberdeen.
Allen, Thomas	Kelso.
Andrews, Charles Russell	London.
Aplin, Albert Edward	Weymouth.
Ayre, William Sharp	Seaham Harbour.
Barber, Daniel Stone	Dursley.
Barton, John William	Campbeltown.
Batchelor, William	Stalybridge.
Bentley, William	Egremont, Cumberland.
Bice, James	St. Ewe.
Bishop, William	Bridgnorth.
Bostock, Thomas H.	Eastwood.
Briggs, Alfred Radley	Wakefield.
Brooke, Joe William	Ashton-under-Lyne.
Broome, Bertie	Cromford.
Brown, Charles	Barking.
Buckley, John Davies	Leominster.
Bullock, James	Uttoxeter.
Burnby, John James	Bardney.
Burroughs, George Henry	Seaforth.
Cheney, Henry Robert	Banbury.
Clark, Adam Rankine Gibson	Dumfries.
Clarke, Andrew	Scarborough.
Clarke, Harry Ward	Richmond.
Collins, James Ernest	Ipswich.
Cowie, George	Banff.
Crickmore, Robert	Rochester.
Cullinan, Edward	London.
Dalwood, Harry F. W.	Sherborne.
Daniel, Enoch	Cardiff.
Darroll, Charles	Warminster.
Davis, John	Nottingham.
Dawson, John Harper	Fife Keith.
Delarue, Edward Ludlow	London.
Drake, Henry Charles	Newark.
Duck, William George	Cardiff.
Duckworth, William	Blackburn.
Eden, Thomas Watts	Evesham.
Ensor, John Thomas	Birmingham.
Evans, Edgar Michael	Cardiff.
Evans, William James	New Quay.
Ferrie, George Thomas	Edinburgh.
Forshaw, James Henry	Huyton.
Forster, John Robert, junr.	Blyth.
Giles, William	Wallsend-on-Tyne.
Gill, George Hewson	Glossop.
Gilpin, Samuel Richard	London.
Goy, William Henry	Stamford.
Gray, William Underwood	Lincoln.
Hallowell, Frederick	Macclesfield.
Harries, David	Carmarthen.
Harvey, Robert Rose	Cardiff.
Higgins, Sydney John W.	Pewsey.
Higgs, Edwin Coster	Reading.
Hill, Elric John	Norwich.
Hill, Herbert William	Hull.
Holmes, Arthur	Chippenham.
Horsburgh, Robert	Edinburgh.
Hudson, John Beckinton	Newcastle-on-Tyne.
Hulme, Harold Edwin	Pendleton.
Hutchinson, William	Dunbar.
Ives, Herbert	Norwich.
James, James Owen	New Quay.
Johnson, Martin Kemble	Stoke.
Jones, Henry	Landport.
Jones, Philip Henry	Conway.
Jones, Robert Watkin	Oswestry.
Jones, Tom Young	Carmarthen.
Kerr, Robert	Edinburgh.
Kimber, Arthur Weaving	Fyfield Wick.
King, Richard Henry	Bradford-on-Avon.
Knapman, Thomas Lang	Torquay.
Knowles, Robert	Over Darwen.
Lawrie, Thomas	Edinburgh.
Lawson, Albert Edward	Shrewsbury.
Lees, James Nall	Rochdale.
Lockwood, Joe	Hyde.
MacCreath, David	Newton Stewart.
McGregor, James	Edinburgh.
Mackay, Alexander	Inverness.
Maddock, Geo. Edw. Barrow	Blackburn.
Michie, James	Aberdeen.
Millbright, George James	Shrewsbury.
Morrall, Edward Ernest	Bridgnorth.
Morris, Daniel	Portmadoc.
Moulden, William Henry	Bingley.
Myers, George	Welton.
Nicholson, Arthur	Birmingham.
Nicholson, Walter John Cecil	Woodstock.
Osborne, James	Bridgwater.
Painter, Edgar	Stafford.
Paisley, James	Seaham Colliery.
Plews, Harry William	Bedale.
Pollaky, Francis Hughes Jas.	London.
Price, Henry Thomas	Shrewsbury.
Proudman, Edward William	Leominster.
Rahn, Ernest William	Beccles.
Ranken, John	Forfar.
Robb, David	Ossett.
Robinson, Frank Richard	Birmingham.
Rogers, Frederick Hughes	Northwich.
Sanders, Francis Theodore	Ramsgate.
Shallcross, Joseph Richard	Tunstall.
Shepherd, Robert Farel	Beverley.
Simpson, Alexander T.	Edinburgh.
Smart, Thomas Willis	Reading.
Stanton, Leonard William	Wolverhampton.
Swinscoe, Herbert Nicholas	Wisbech.
Tate, Herbert William	Manchester.
Taylor, George	Newark.
Taylor, Henry Pearson	Alnwick.
Taylor, John William	Radcliffe.
Thomson, John Hutcheson	Lochee.
Timbury, Alfred Jefferies	Leominster.
Tirrell, John, jun.	Hanley.
Tite, John Reynolds	Towcester.
Trembath, Henry	Penzance.
Tyler, Charles Skelton	Cambridge.
Vallance, Arthur Clayton	Mansfield.
Walker, Herbert	Nottingham.
Ward, Thomas Armistead	Wigan.
Watson, Edwin	Cardiff.
Watson, John Winder	Tunstall.
Weston, George, jun.	Sleaford.
Wheeldon, William Henry	Derby.
Whitehouse, John William	Bradford.
Whitfield, Allen	Chirk.
Williams, Ernest Bertrum Billing	Edmonton.
Williams, Herbert Edward	London.
Wilson, Samuel	St. Helen's.
Woodyatt, John Fred	Macclesfield.
Woolley, Samuel Walter	Stamford.

The following is a list of the centres at which the examination was held, showing the number of candidates examined at each centre and the result:—

	Candidates				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	6	4	2	Lancaster	2	1	1
Birmingham	15	7	8	Leeds	10	5	5
Brighton	1	0	1	Lincoln	6	4	2
Bristol	7	6	1	Liverpool	8	4	4
Cambridge	1	1	0	London	34	12	22
Canterbury	2	2	0	Manchester	17	15	2
Cardiff	7	6	1	Newcastle-on-T.	11	6	5
Carlisle	5	1	4	Northampton	1	1	0
Carmarthen	4	3	1	Norwich	7	4	3
Carnarvon	3	2	1	Nottingham	10	8	2
Cheltenham	3	1	2	Oxford	3	3	0
Darlington	4	1	3	Peterborough	5	3	2
Dundee	4	2	2	Sheffield	3	0	3
Edinburgh	13	8	5	Shrewsbury	7	7	0
Exeter	6	3	3	Southampton	2	1	1
Glasgow	4	2	2	Truro	3	2	1
Hull	4	3	1	Worcester		4	0
Inverness	2	2	0	York		1	2

The questions for examination were as follows:—

Time allowed: Three Hours for the three subjects.

I. LATIN.

1. Translate into English the following passages:—

(A). *Id ea maxime ratione fecit,* quod noluit eum locum, unde Helvetii *discesserant*, vacare, ne propter bonitatem agrorum Germani, qui trans Rhenum incolunt, e suis finibus in Helvetiorum fines *transirent*, et finitimi Galliæ provinciæ Allobrogibusque essent.

(B). His rebus cognitis, Cæsar Gallorum animos verbis confirmavit, *pollicitusque* est sibi eam rem curæ *futuram*: magnam se habere spem, et beneficio suo et auctoritate *adductum*, Ariovistum finem injuriis *facturum*. Hac oratione habita, concilium *dimisit*.

2. Parse fully:—"Id ea maxime ratione fecit;" and give the present, perfect, and supine of *discesserant* and *transirent*. Decline *agrorum*, *spem*.

3. In (B.), explain the construction of "His rebus cognitis," and give the derivation of the verbs in italics.

4. Translate into Latin:—(i.) Orgetorix is chosen to carry out these things. (ii.) That fact was told the Helvetii by a spy. (iii.) All things being got together for the setting out they fix a day, upon which all are to meet on the banks of the Rhone. (iv.) Yesterday, to-day, to-morrow, the day after to-morrow.

•II. ARITHMETIC.

[The working of these examples, as well as the answers, must be written out in full.]

5. An iron merchant buys 32,016 tons of iron at £4 13*s.* 4*d.* per ton; he sells half of it at cost price, half of the remainder at a profit of $\frac{1}{2}$*d.* per lb., and the rest at a profit of $\frac{1}{4}$*d.* per lb.; what was his gain?

6. Add together the sum, difference, product, and quotient (the greater being divided by the less) of $\frac{3}{4}$ and $\frac{7}{10}$.

7. A person who possessed three-eighths of a mine, sold two-thirds of his share for £2520; find the value of seven-eighths of the whole mine.

8. Find the value of 7·75 of £1, and 0·63 of 16 days 12 hours.

9. If 3 men can mow 8 acres of wheat in 2 days, how long will it take 5 men to mow 20 acres at the same rate

III. ENGLISH.

10. Write the following nouns in the plural number:—*lady, loaf, hoof, staff, ox, brother, focus, vertex, genus, crisis.*

11. Give the diminutive forms of the words—*stream, hill, duck, lass, maid*; and the force of the following prefixes—*mis, un, per, sub.*

12. Explain the function of a *conjunction*, an *adverb*, and a *preposition*. Write three short sentences, each containing *one* of the above-mentioned parts of speech.

13. What is meant by *weak* and *strong* verbs? Give the present infinitive of *ridden, shorn, got, sprung, clad, wrought, stricken.*

14. Write a short composition upon *one* of the following subjects:—

"The Force of Example."
"Self-Reliance."
"Thrift."
"The Advantages of Travelling," or,
"The Character of Queen Elizabeth."

EXAMINATIONS IN LONDON.

October 20, 1880.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Six candidates were examined. *One* failed. The following *five* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Allsworth, Norman	Havant.
Coverdale, George	Leeds.
Davies, Richard	London.
Horne, John	Wednesbury.
Morse, Charles Henry Stafford	Bishop's Stortford.

MINOR EXAMINATION.

Fourteen candidates were examined. *Six* failed. The following *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ackerman, Henry	Chipping Sodbury.
Adams, Henry George	Maidstone.
Austen, Charles Wilson	Surbiton.
Baines, Francis	Corsham.
Baker, Walter Robert	London.
Bardill, Draper Welch	Derby.
Botham, Frank John	London.
Bowman, Samuel	Durham.

MODIFIED EXAMINATION.

Three candidates were examined. *Two* failed. The undermentioned passed, and was declared qualified to be registered as a Chemist and Druggist:—

Tregear, Augustus Frederick	London.

October 21, 1880.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Six candidates were examined. *Three* failed. The following *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Christopherson, Fred	Ipswich.
Hope, Arthur Peach	Uppingham.
Phillips, James Wilson	Broadstairs.

MINOR EXAMINATION.

Eighteen candidates were examined. *Seven* failed. The following *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Brampton, William S. Howes	Stanion.
Burford, Samuel Francis	Leicester.
Chaplin, John Henry	Wakefield.
Cooper, Walter Temple	London.
Crompton, Alfred, jun.	Bury.
Cule, Taliesin	Merthyr Tydvil.
Curry, Nicholas	Spennymoor.
Ellis, Richard	Knaresborough.
Evans, Thomas	Chorley.
Forrest, Ernest William	Gainsborough.
Gilkes, William Henry	Banbury.

October 22, 1880.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

Dr. Greenhow was present on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-five candidates were examined. *Fourteen* failed. The following *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Chapman, William Henry	Birmingham.
Gill, Sutton Dudley	West Bromwich.
Harrison, Peter Webster	St. Helen's.
Hart, Thomas	Darlington.
Howell, William	London.
Hucklebridge, Philip	London.
Hunt, Tom George	Snaith.
Jackson, William E. Gillson	Newark.
Jenks, William	Bristol.
Jevons, Wallis Byron	Market Rasen.
McDonald, John	Liverpool.

October 27, 1880.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

MAJOR EXAMINATION.

Six candidates were examined. *Five* failed. The undermentioned passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

James, Charles Frederick	Highworth.

MINOR EXAMINATION.

Eighteen candidates were examined. *Ten* failed. The following *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Moore, Albert	Ashton-under-Lyne.
Murray, George	Coldstream.
Newcombe, William Langdon	Shepton Mallet.
Norton, Alfred James	Swansea.
Paine, Charles	Belton.
Preston, William	Barnoldswick.
Prosser, Frank Henry	Birmingham.
Quine, Richard Henry	Warrington.

October 28, 1880.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

Dr. Greenhow was present on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-one candidates were examined. *Fourteen* failed. The following *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Rigg, George Farrer	London.
Ripley, Edward	Cambridge.
Stanford, Frederick William	London.
Sumner, John	Wilmslow.
Watson, Henry Gervase	Sheffield.
Whitton, Richard	Lincoln.
Woods, William Herbert	Plymouth.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's Examination:—

Certificates of the University of Cambridge.

Holmes, Francis	Lutterworth.
Miles, Charles	Dorchester.
Vinen, John	Paignton.
Walker, William Roddis	Herne Hill.

Certificates of the College of Preceptors.

Klosz, Sydney Albert	London.
Robinson, John	Wrexham.
Rowland, Leonard Bromfield	Wrexham.
Tighe, John Wynne	Exeter.
Webb, Benjamin	Aylesbury.

Certificate of the University of Edinburgh.

Stewart, Fergus Ferguson	Dalkeith.

Certificate of the Faculty of Physicians and Surgeons of Glasgow.

Morrison, Forbes	Glasgow.

Certificate of the University of Oxford.

Steward, Josiah William	Bridgnorth.

EXAMINATIONS IN EDINBURGH.

October 20 *and* 21, 1880.

Present—Messrs. Ainslie, Borland, Gilmour, Kemp, Kinninmont, Stephenson and Young.

Professor Maclagan was present on behalf of the Privy Council.

MAJOR EXAMINATION.

20*th*.—*Two* candidates were examined. *Both* failed.

MINOR EXAMINATION.

20*th*.—*Eleven* candidates were examined. *Five* failed. The following *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Beaulah, William	Manchester.
Brown, John Jarvey	Glasgow.
Cormack, John	Kirkwall.
Foggitt, Thomas Jackson	Thirsk.
Gilmour, George	Glasgow.
Hawdon, Jas. Alexander Jacob	London.

21*st*.—*Fourteen* candidates were examined. *Five* failed. The following *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Moir, James	Leith.
Ogston, William	Aberdeen.
Palmer, Tom Clifford	Grimsby.
Reid, James	Edinburgh.
Simpson, James	Foveran.
Tait, Robert	Edinburgh.
Turnbull, William Scott	Edinburgh.
Walker, Francis	Liverpool.
Walkley, James Byron	Bollington.

MODIFIED EXAMINATION.

21*st*.—*One* candidate was examined, but failed to pass.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's Examination:—

Certificate of the Royal College of Surgeons of England.

Hewitt, John Richard	Birmingham.

Certificate of the University of Cambridge.

Clarke, Frederick Henry	Edinburgh.

Proceedings of Scientific Societies.

NEWCASTLE-ON-TYNE LITERARY AND PHILOSOPHICAL SOCIETY.

ELECTRIC LIGHTING.*

BY J. W. SWAN.

Almost two years ago I had the honour of delivering a lecture in this place on "Electric Light;" to-night I have undertaken to report the progress which has been made since then in connection with the subject.

At the time of my last lecture the public mind was greatly perturbed by the question whether or not gas lighting was about to be superseded by electric lighting. It was generally believed that a revolution-working discovery had been made, and you may remember, as a consequence, gas stock was much depressed in value. After a while, when the supposed wonderful discovery dwindled and paled in the daylight of scientific examination, the panic subsided, and then the current of feeling drove the other way, and in place of the hasty credulity which at first took possession of the public mind, there is now, I think, an equally unreasonable unbelief in the possibilities of electric lighting—the idea now widely prevailing that electric light, as a substitute for gas, is after all a delusion.

In tracing the progress of electric lighting during the last two years, I shall endeavour to give you some reasonable grounds for forming an opinion on the question whether or not there is a prospect of electric light being made useful to us for lighting our streets and houses, and, therefore, to what extent it may probably compete with gas light.

In the first place, I feel it to be necessary, in order that I may insure that I am taking you along with me, that I should lay at least some slight foundation of general principles.

The economical production of powerful electric currents naturally occupies the foremost place in the consideration of my subject, for it is evident that unless such electric currents as are required for electric lighting can be produced with sufficient economy and facility, electric lighting as a common means of artificial illumination is altogether out of the question. I stated in my last lecture that the dynamo-electric machine, driven by the steam engine had given us cheap electricity.

The dynamo-electric machine, you will remember, is a machine consisting of bobbins of copper wire and magnets so arranged that the bobbins of copper wire can, by the turning of a spindle, be rapidly moved in and out of the magnetic rays or lines of force which emanate from the poles of the magnets. When the bobbins are so moved electric currents are produced in them which can be used for electric lighting and other purposes. Motive power is in this way transformed into electric power.

It is, moreover, an example of that universal law which we have all come in contact with in one shape or another, that you get nothing for nothing in this world. So long as no work was being done by the machine hardly any power was required to drive it; but the moment work was taken out of it, by the heating of this wire, a corresponding amount of extra motive power had to be applied to it through the arm of my assistant.

The dynamo-electric machine is the most economical generator of powerful electric currents.

There have been no great recent improvements in the dynamo-electric machine, indeed there is not much room for great improvement: it gave in its original form such a very good return in electricity for the motive power applied to it. There have been minor improvements, which have resulted in a slightly increased yield of current for a given amount of motive power absorbed.

Progress has also been made in the economical development of steam power. On the whole, I may safely say that the cost of producing electricity by mechanical means has been diminished.

It is practicable to develop one-horse-power by the combustion of 2 lbs. of coal per hour, and to produce with this amount of motive power a current of electricity sufficient to give a light of over one thousand standard candles. That is to say, we can maintain for one hour an electric light more than equal to one thousand standard candles, or sixty-six large gas burners, by the combustion of 2 lbs. of coal. That is a much more economical result than can be obtained by the Voltaic battery, or any other means of generating an electric current at present known.

The Voltaic battery, as a means of generating current for electric lighting, is still as far behind the dynamo-electric machine as ever; but as an auxiliary to the dynamo-electric machine, for the purpose of storing electricity, a modification of the Voltaic battery is very likely to prove useful, and to have an important bearing on the economical production of electric currents, such as would be required in an extensive general application of lighting by means of electricity; and employed in that manner it would perform the same part in a general system of electric lighting that the gasometer performs in gas lighting.

It could scarcely be considered a satisfactory condition of things that the continued burning of lamps in your house should depend on the continuance of the revolutions of the fly wheel of a steam engine and other wheels connected with it, and yet that in some measure would be the actual condition if electric lamps were fed in a hand to mouth fashion, by taking the current directly from a single dynamo-electric machine or a single engine. Such a mode of using electricity would be almost as liable to break down as would a system of gas-lighting without gasometers, and which depended upon the supply of gas direct from the gas retorts. The breaking of a shaft, or the slipping of a belt are things which in the natural course of events will certainly happen, and it would obviously be in the highest degree inconvenient if these accidents were immediately telegraphed to you in the form of extinguished lights. Of course, in the electric lighting of a town from a great central station, there would be many engines and many generators, all working together, reducing to almost nothing the consequence of such accidents as I have mentioned.

But to further meet this difficulty the secondary battery comes to our aid. M. Planté was, I believe, the first to put the idea of a secondary battery into practice. The secondary battery of M. Planté consists of plates of lead placed opposite each other, and very near together (but not touching). A Planté cell consists simply of two pieces of sheet lead rolled up together, and separated by the space of about one-eighth of an inch.

You observe that in this combination we have two plates of the same metal, viz., lead; and in this respect the combination differs from an ordinary Voltaic battery, inasmuch as the very essence—so to speak—of the Voltaic battery is the dissimilarity of the two plates which in part constitute it. It is zinc and copper, or zinc and platinum, or some dissimilar combination of that sort that we are all familiar with as characteristic of the Voltaic battery.

Here, in the secondary battery, the two plates are alike; therefore, of themselves, they cannot generate a current of electricity like the ordinary Voltaic battery.

But if these two lead plates are for a time connected by wires with a generator of electricity, no matter of what kind (it may be a dynamo-electric machine which supplies the primary current), one of the lead plates is changed on its surface—it becomes oxidized—and after undergoing this change, it is, when detached from the generator, in such a condition as to be able to give out, at any future time, a current of electricity on its own account; and when the charge has been expended the plates are, like an empty gasometer, just in the same condition they were before receiving the charge, and ready to be charged afresh.

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* Lecture delivered October 20, 1880.

The secondary battery is therefore an instrument of very great interest at the present moment, and it is much to be hoped that it may be improved, because, in the simple form which I have described, it does not quite do all that would be required of a secondary battery, applied as a store of electricity on a large scale for extensive practical electric lighting.

I have here a modified form of a secondary battery, which, if it does not give us all that could be desired, makes a very considerable contribution towards it. This battery was charged this morning; before being charged it was nearly inert. I will join the poles together by this platinum wire, and if the charge has been retained the wire will become hot. [The wire is, you see, white-hot.]

The want of a means of storing electricity is a newly felt want; as yet it cannot be said to have been quite fully supplied, but, as I have shown you, it has been supplied to a certain extent, and research is still busy at work seeking its complete fulfilment. There can be no doubt that what is wanted will be found, and with the perfecting of the secondary battery that great objection to electric lighting—that you cannot store the power which produces it, as you can store gas, will be completely met.

Besides the dynamo-electric machine, and besides the Voltaic battery, there is yet another kind of generator of the electric current which I must at least mention; it is the thermo-electric battery.

In the dynamo-electric machine, electro-motive force is developed indirectly by the combustion of coal in the furnace of a steam engine. In the thermo-electric battery electricity is developed by the direct action of heat upon the plates composing it.

This diagram will enable you to understand the principle of the construction of the thermo-electric battery, or thermo-pile as it is generally called.

Here is represented a plate of antimony, and here a plate of bismuth. If heat, from any source, as for instance from a gas flame, is applied at the point where these two plates are represented as joined together—the opposite ends of the plates being kept cold—a certain electro-motive force is developed, which, when the cold ends of the plates are united by a conducting wire, will operate to cause an electric current to flow in this circuit.

The thermo-electric pile is a combination of such couples arranged exactly like the pairs of a Voltaic battery, so that at the extremities of the combination, an electro-motive force is developed, which is the sum of the electro-motive force of the individual pairs.

The current produced by the thermo-pile is an exceedingly weak one, and consequently the united energy of a very great number of couples is required to produce such an electro-motive force as is necessary for the electric light.

Twenty years ago the effects obtained by means of the thermo-pile were of such a trifling character as to hardly raise the idea that it would ever be a rival of the Voltaic battery where strong currents of electricity were required, but since then the thermo-pile has been so far improved that it has already replaced the Voltaic battery in more than one electro-plating works.

Here is a thermo-pile of an improved form. It is the Noë pile constructed by M. Bregnet of Paris. It is now in action. There is a gas burner at the centre of the group of pairs heating one end of each pair. I have made a circuit of wire between the cold ends of the first and last couples of the series, the circuit at this point goes through a short piece of thin platinum wire, which, when the current passes, will become hot. As this piece of platinum wire is too small for you to see from a distance, I have laid upon it a piece of gun-cotton, and if the wire becomes hot enough, this will be ignited, but without any noise. The circuit is at the moment broken. I will now complete it by pressing this knob.

It is said that the thermo-pile of Clamond has maintained four electric lights, each of 220 standard candles, by the combustion of 21 lbs. of coke per hour. This is no doubt a much greater quantity of fuel than would have been required for producing the same result by means of the dynamo-electric machine, but yet it is a result sufficiently economical for some purposes, and certainly sufficient to encourage the belief that in the thermo-pile, we have, as it were, an additional string to our bow, and that if such results have been arrived at with this species of generator in its as yet immature form, there is probability that still more economical results may ultimately be obtained by this means.

I might spend much time in describing the special features of different new generators of electric currents, but as the time at my disposal is short, and as the other parts of my subject are more interesting and important, I pass on to speak of the different ways of applying currents of electricity to the production of light.

All the various means of producing light by electricity that can make any pretention to practicability are divisible into two classes, namely:—

1st. Lighting by the electric arc.
2nd. Lighting by incandescence.

In lighting by the electric arc, there is a break or gap in the circuit which has to be bridged over by a sort of electric flame. In lighting by incandescence there is no break or gap at the point where light is produced, but a thin highly infusible and badly conducting solid substance is there interposed which becomes white hot, and emits a light, bright in proportion to the degree of heat produced in it.

Now, to fix in your mind precisely what I am talking about, I will first show you what I mean by the electric arc. This will enable you more easily to follow my remarks on the question of electric lighting by this method.

Here is an enlarged view of the electric arc,—here are the two carbon points, and here—between them—is formed the electric arc. A powerful electric current, produced by a gas engine and dynamo-electric machine, is supplied to these two pencils of carbon through thick copper conducting wires, and you see that a stream of flame is flowing or rushing between them. If the points are too much separated, the light is lessened; by increasing the air-space between the points, resistance to the passage of the current is increased, and the current is consequently diminished, and when this diminution of current passes a certain limit the light is lessened. On the other hand, when the points are made to approach too closely to each other, the light becomes less for the opposite reason.

A certain amount of difficulty or resistance must be offered to the passage of the current in order to produce light, and to get the best effect the resistance must neither be too much nor too little.

When the points are made to touch there is no longer the resistance of the air-space to be struggled through, the light consequently goes out.

Observe the alteration in the points; they burn away, and one faster than the other. Now as the production of a steady light demands that the points should be maintained at a constant distance apart, it is evident that under the complicated conditions of the case a nice regulation of the distance of the points to each other is a matter of extreme difficulty.

I will now ask for the current to be turned on to a lamp hung up aloft, in order that you may see how very nearly the difficulties of producing a steady arc light have been surmounted.

The particular lamp I am using for the purpose of my illustration is Crompton's lamp. Properly regulated it feeds the pencils together almost continuously and with great precision.

That then, ladies and gentlemen, is *par excellence* the Electric Light. That is the form and style of electric light that inventors have for the last forty years struggled and battled with difficulty upon difficulty to render serviceable to the wants of man.

From the nature of the electric arc light you will readily perceive that it is a kind of light not suited to the lighting of dwelling houses, nor shops, nor streets.

It does not lend itself kindly to division, nor extensive distribution. It will give you either a great deal of light or none.

For certain exceptional uses it is excellent. If you want a very brilliant illumination all centred in one focus, for a light-house, or signal, for example, or for a high-roofed railway station, or very large workshop, or open space, it is unquestionably the most economical and the best of all artificial lights.

It has already found for itself in England over two hundred appropriate applications. Its use is continued and increased on the Thames embankment. It is used in the reading room of the British Museum; in the Picton Library, Liverpool; in a portion of the South Kensington Museum; at the Liverpool Street Railway Station; the Barrow Shipbuilding Works; the St. Enoch Railway Station, Glasgow; on the Promenade at Blackpool; and at the New Albert Docks, where by means of Siemens's lamps, three miles of wharves and quays are made almost as light by night as by day, and at a very moderate cost.

As an illustration of the economy of lighting by means of the electric arc under conditions suited to its use, I instance the case of the Alexandra Palace, where two thousand gas lights, which consumed 26*s.* worth of gas per hour, are replaced by six of Mr. Crompton's lamps, giving a greater aggregate amount of light than the two thousand gas burners, at a cost of 6*s.* per hour. In some instances the economy of the electric arc light is greater by half than in the case I have mentioned. Not only is it economical in such a case as that of the Alexandra Palace, but it produces an effect of general illumination overhead, as well as upon the ground, not produceable by any other means.

But the interest which attaches to electric arc lighting is much lessened by the fact that the purposes to which that mode of lighting is suited are exceptional. We do not as a rule want the light of one thousand candles or more all in one place. What we do generally want is a number of small and steady lights, spread about in different rooms, and in different parts of those rooms. For electric light of this description we must search in another direction.

I said that there is another way of producing electric light; namely by incandescence.

Lighting by incandescence is a branch of the subject which has a special charm for me, because I have bestowed upon it much thought and labour; and it is, I believe, the branch which will yield the largest crop of fruit. Electric lighting by incandescence is just as simple as arc lighting is difficult; all that is required is a material which is not a very good conductor of electricity, highly infusible, and which can be formed into a wire or lamina, and is either non-combustible in air, or, if combustible, does not undergo change in a vacuum. There are, so far as I know, just two substances that possess, in any sufficient degree for the purpose in question, the qualities I have specified.

The two substances are: platinum, or an alloy of platinum with iridium; and carbon. Platinum has the advantage over carbon that it is not combustible in air; it does not, like carbon, burn away if you make it white hot; but it is very inferior to carbon in the degree of heat it will bear without fusion; and for producing light by incandescence it is essential to economy that the incandescent material should be capable of enduring an extremely high temperature, because the amount of light emitted by an incandescent substance increases in a more rapid ratio than the temperature.

When, for example, you have a piece of platinum wire or carbon red hot, it emits almost no light, but double its temperature by sending a double quantity of current through it, and it will yield much more than twice the light it did before.

It is therefore evident that the hotter the incandescent material can be made the less the light will cost per unit of power expended.

Iridio-platinum, comparatively with other metals, may be called extremely infusible, but compared with carbon it is nowhere. Carbon has in fact resisted without fusion the very highest degree of heat brought to bear upon it, and what that degree of heat is I can hardly estimate, it is so enormous.

But carbon has been found so difficult to deal with on account of its ready combustibility (and some other troublesome properties which I will mention afterwards) that experimenters have bestowed much attention upon platinum and iridio-platinum as the incandescent material for electric lamps.

Mr. Edison was, I think, the last who attempted to utilize platinum in an electric lamp, and I think there can be no doubt that he obtained better results with platinum and came nearer making a useful platinum lamp than any experimenter in the same track who had gone before him. Edison's platinum lamp was the lamp of which so much was promised and expected in October, 1878, and which led, you remember, to the panic in gas shares. This lamp did not realize the hopes of the inventor. Whilst Mr. Edison was endeavouring to produce a useful incandescent lamp by means of platinum, I was endeavouring to obtain the same end by means of carbon.

It had appeared to me for many years that if ever electric light was to become generally useful, it would, most probably, be by means of the incandescence of carbon. I had, long before the time to which I am referring, attempted to render this idea practicable.

As a matter of history, I will briefly describe an experiment which I tried about twenty years ago.

I had a number of pieces of paper and card of various forms and sizes buried in charcoal in a crucible. This crucible I sent to be heated white hot in one of the pottery kilns belonging to Mr. Wallace, of Forth Banks. From the pieces of carbonized card which I thus obtained I selected a long spiral, the ends of this I clipped between small blocks of carbon carried by uprights and connected with conducting wires. A small glass shade was cemented over this mounted carbon spiral, and the air was exhausted by means of a very good air-pump, lent to me for the purpose of this experiment by the Rev. Robert Green, of Longhorsley. A good vacuum (according to the ideas that then prevailed) having been produced, I applied the wires of my battery (consisting of ten cells of Callan's modification of Grove's battery) with great expectation of a brilliant result; instead of this, there was the most absolute negative presented to me, not a vestige of heat or light appeared in my long ringlet of carbonized paper. It was evident, and I immediately recognized the fact, that the electric current of the strength I was using would not go in sufficient quantity through so long a piece of carbon as I had taken. I therefore repeated the experiment with shorter carbon and a greater number of cells, and I obtained, under these altered circumstances, an extremely interesting result.

My carbon was in the form of an arch, about 1 inch high and $\frac{1}{4}$ of an inch wide. The ends of the arch were held in small clamps with square blocks of carbon.

The air-pump having been worked, I had the pleasure of seeing that when contact with the battery of forty or fifty cells was completed my carbonized paper arch became red hot, and it was evident that nothing more was wanted than a still stronger current to make it give out a brilliant light; but I had used up all the battery power at my disposal, and having reached this limit, I contented myself with watching the behaviour of the arch, the engrossing question being, How long will it endure?

I noticed that the inner part of the arch was hotter than the outer part, and that, perhaps in consequence of this, the arch became bent on one side. This bending gradually increased, until at last the arch had so far curled down that the top was on a level with the clamps, and on coming in contact with the sole of the lamp it broke in two, and the experiment collapsed.

That, I confidently believe, was the very first instance in which carbonized paper was ever used in the construction of an incandescent electric lamp.

I am now speaking of twenty years ago, and at that time the Voltaic battery was the cheapest source of electricity known, and the means of producing high vacua were very much less perfect than they are now.

I laid my electric light experiments aside until about three years ago, when two things concurred to lead me to pursue the subject afresh.

The discovery of the dynamo-electric machine had entirely altered the position of the question of electric lighting, shifting it out of the region of things scientifically interesting into that of things practically useful.

The Sprengel air-pump, too, had been invented, and with its invention we had been provided with a means of producing much higher vacua than could be produced by the old form of air-pump.

Mr. Crookes's radiometer experiments had shown us what a really high vacuum was and how to produce it.

Mr. Stearn, of Birkenhead, an ardent scientific amateur, was so attracted by the extraordinary results Mr. Crookes had obtained by means of high vacua, as to go with great enthusiasm into the same line of experiment, and he soon acquired such a knowledge of the Sprengel pump, and such expertness in its manipulation as perhaps was only equalled by Mr. Crookes himself.

I had the good fortune to make Mr. Stearn's acquaintance, and that was the other one of the determining causes of my second attempt to solve the problem of electric lighting by the incandescence of carbon.

In the interval between the first and second periods I have mentioned, many attempts had been made by various experimenters to render practicable incandescent carbon lamps, but none were entirely successful.

Here is represented a variety of the most notable of these attempts. Some are vacuum lamps, and some have air admitted. Sawyer and Mann's lamp is filled with nitrogen. When the incandescent carbon is in air it burns away, and must consequently be renewed just as a candle must be renewed; it must also be thicker than would be necessary in a vacuum, and being thicker it requires a proportionally greater current to render it incandescent; both these circumstances are obviously against economy.

The André lamp is one of the best of this type. In this the supply of air is limited; still this lamp, and all those lamps, are lacking in simplicity and in economy.

In all the various attempts to utilize the principle of the incandescence of carbon in vacuo, two great difficulties had stood in the way, and baffled every attempt to overcome them. One was the rapid wearing away and consequent breaking of the incandescent carbon; and the other the obscuration of the lamp by a kind of black smoke. So uniformly did these phenomena present themselves that the idea was propounded and generally accepted that the blackening of the lamp globes was due to volatilization of the carbon under the action of the enormous heat to which it was subjected.

In Fontaine's work on electric light this passage occurs at page 180:—

"Attentive examination of incandescent carbons, through a strongly coloured glass, has shown that they are not uniformly brilliant. They present obscure spots indicative of non-homogeneity, and the position of cracks, which rapidly disintegrate the carbon. The vacuum never being perfect in the receiver the first carbon is in greater part consumed. It would appear that, consequently upon the little oxygen contained in the lamp being transformed into carbonic acid and carbonic oxide, the carbon should be preserved indefinitely. But there is then produced a kind of evaporation which continues to slowly destroy the incandescent rods. This evaporation is, besides, clearly proved by a pulverulent deposit of sublimed carbon, that we have found on the interior surface of the bells, on the several interior parts, rods, contacts, hammers, etc."

If this idea of the volatilization of carbon were founded in fact, any further attempt to render incandescent carbon lamps durable by means of a vacuum were mere waste of time, and durable they must be if they were to be of any practical value.

Fortunately I did not accept as conclusive the experiments which seemed to show that carbon was volatile, and that the blackening of globes of incandescent carbon lamps was an inevitable result of the carbon being very highly heated. I knew that the conditions under which, without exception, all previous experiments had been tried, were such as did not allow to be formed anything approaching a perfect vacuum within the lamp. Screw fittings had invariably been employed to close the mouth of the lamp, and the ordinary air-pump to exhaust the air. Under such circumstances it was certain that a considerable residuum of air would be contained within it, and also that it would leak. Then, there had never been any thought given to the gas occluded in the carbon itself, and which, when the carbon became hot by the passage of the current through it, would be evolved; nor had sufficient care been taken to make the resistance, at the points of fixture of the carbon, less than in the carbon to be heated to incandescence.

It was evident to me that before any definite conclusion could be arrived at as to the question of the volatility of carbon, the cause of the blackening of the globes, and the wearing away of the incandescent rods, we must first try the experiment of heating the carbon to a state of extreme incandescence in a thoroughly good vacuum (such as Mr. Crookes has taught us how to procure), and under more favourable conditions as to the contact between the incandescent carbon and the conductors supporting it than had hitherto obtained.

Accordingly, in October, 1877, I sent to Mr. Stearn a number of carbons, made from carbonizod cardboard, with the request that he would get them mounted for me in glass globes by a glass blower, and then exhaust the air as completely as possible. This delicate operation Mr. Stearn very kindly undertook, and very skilfully carried out.

In order to produce a good vacuum it was found necessary to heat the carbon to a very high degree by means of the electric current during the process of exhaustion, so as to expel the gas occluded by the carbon in its cold state; for, otherwise, however good the vacuum was before the carbon was heated, immediately the current passed and made it white hot, the vacuum was destroyed by the out-rush of the gas pent up in the carbon in its cold state. In order to make a good contact between the carbon and the clips supporting it, the ends of the carbon were thickened, and, in some of the early experiments, electrotyping and hard soldering of the ends of the carbons to platinum was resorted to.

I will not weary you, however, with details, but simply say that the prescribed conditions having been rigorously complied with, it was found, after many troublesome experiments, that when the vacuum within the lamp globe was good, and the contact between the carbon and the conductor which supported it sufficient, there was no blackening of the globes, and no appreciable wasting away of the carbons.

Thus was swept away a pernicious error, which, like a lying finger-post, proclaiming "No road this way," tended to bar progress along a good thoroughfare.

It only remained to perfect the details of the lamp to find the best material from which to form the carbon, and to fix this material in the lamp in the best manner.

These points, I think, I have now satisfactorily settled; and you see the result in the lamp before me on the table.

It is a very modest-looking affair, but its performance goes beyond its appearance. The carbon is extremely thin—a mere hair,—and how wonderfully strong and elastic it is I will endeavour to show you by means of the lantern.

This carbon, unlike the carbon spoken of by Fontaine in the extract I read to you, is quite homogeneous and almost flinty in hardness, and it becomes harder by use in the lamp; the longer and the hotter it is heated, the harder it becomes. What degree of hardness it will ultimately arrive at is an interesting question.

Here is a magnified view of the carbon ring in a state of incandescence, observe how absolutely uniform in brightness it is; that proves it to be homogeneous and foretells its durability.

Now I will show you how easily lamps of this kind are lighted, and how completely this form of electric light can be divided and distributed.

Is it not a pleasant light? It is not so white as the arc light, but yet a whiter light than gas. Colours are correctly seen by it, as this picture shows. But the great merit of this light consists in its not being in contact with air, and therefore there cannot possibly be the slightest air pollution caused by it. The rooms in which this light is used will be as pure by night as by day.

It is essential to economy in lighting by incandescence that the incandescent carbon should be very thin. The carbon I use is not one-twentieth the thickness of the thinnest of the carbons formerly employed, and therefore one-twentieth of the current, costing one-twentieth the price, will produce in my thin carbon the same degree of luminosity as twenty times more current will produce in such carbons as were used in those ancient lamps.

You will notice that in my lamp leakage is very thoroughly guarded against; the wire which passes through the glass not only having the glass fused around it where the wire and globe meet, but, in addition to this, the wire is coated with glass almost up to the carbon. In this way the vacuum is preserved very effectually.

You have, of course, all heard that after Mr. Edison abandoned his platinum lamp as impracticable, he invented a new lamp in which carbonized cardboard is used.

Here is a diagram of Mr. Edison's carbon lamp, with its horseshoe of carbonized paper. It is in some respects like mine, but latterly I have given up the use of carbonized cardboard, and am now using a material as much better than carbonized cardboard as carbonized cardboard was better than the material previously used. In an article which appeared in the February No. of *Scribner's Magazine*, authenticated by a letter from Mr. Edison in the same publication, it is stated that Mr. Edison was the first to use carbonized paper; that is incorrect. And this also occurs after a description of the Sprengel pump used in exhausting these lamps:—"Mr. Edison's use of carbon in such a vacuum is entirely new." Now, I dare say there are many here who will remember this little lamp, which I showed here two years ago in action. This lamp has exactly the same simplicity as my present lamp, being composed entirely of three substances, namely, glass, platinum, and carbon, and it was exhausted in precisely the same manner, and to the same degree, as that which Mr. Upton—no doubt in good faith but still in error—speaks of as "entirely new."

I do not mention these things in any way to disparage Mr. Edison, for no one can esteem more highly his inventive genius than I do. I merely state these facts because I think it is right to do so in my own interest, and in the interest of true history.

The complete seclusion of the light in this lamp from contact with air suggests its adaptability to coal mine illumination, and I earnestly hope that this may prove to be one of its uses.

But the great purpose to which a lamp of this kind is applicable, is the lighting of your houses. In view of such an application two all-important questions present themselves:—one, as to distribution, another, as to cost.

Can this light be divided, distributed, and measured as gas is divided, distributed, and measured? And at what cost? It is quite impossible in a brief lecture to discuss these questions exhaustively, but as far as is possible in a few words I will answer them.

1st. Then, as to division and distribution, it has been asserted on very high authority that great loss necessarily attends the division of the electric light. To a certain extent this is true of lighting by the electric arc, but it is totally and absolutely erroneous of lighting by incandescence. There is no loss in dividing the electric light produced by this means. Faraday has stated the law of the case in these words: "An electric current which will heat one inch of wire white hot will also heat to the same temperature 100 inches, or an infinite length of the same wire." There is no question of the truth of this. Now, as it is only necessary, in order to maintain a given current, to increase the force which produces it in the same proportion as you increase the resistance to its flow, it follows that the cost of raising to a certain degree of incandescence a longer or shorter length of carbon or of maintaining a 10 candle-light or 100 candle-light will be exactly proportional to the light produced. You may even contemplate on this principle the economical production of an electric light as small as a rush-light. A certain unit of light may be established in an indefinite number of places, with no greater aggregate expenditure of power than that directly and simply proportional to the number of lights.

With regard to distribution, I believe that it will prove to be practicable to light any large town—all Newcastle, for instance—by means of wires laid in the ground as gas pipes are laid, and all branching from one centre, and conveying the electric current to lamps like this.

The lamps now lighted are supplied by a current coming from generators working at the far end of Mosley Street (a quarter of a mile away), and it would be just as easy by using a more energetic current—a current as it were under higher pressure—to maintain these several miles away, and for this purpose the conductors need not be large, not so large certainly as to make the distribution of electric current more costly than the distribution of gas.

For supplying large towns with electric light, Mr. Edison proposes to have a number of centres for the supply of electric power, perhaps a quarter of a mile apart, whence wires would be sent out in every different direction, distributing the current to the houses round about. His plan of distribution is this. He proposes to send out bundles of main wires from each of the centres of supply, and from these main wires to branch as many small wires into the houses as there are lamps to be lighted, each branch wire proceeding from a main wire to the place where the lamp is situated, and from thence to a return main wire.

Now although this plan has the great merit of simplicity, I do not think it will answer, except for very short distances.

When a number of lamps are grouped together in that manner, it is necessary that the individual lamps should offer a very high resistance to the current, for if each lamp does not offer an extremely high resistance to the passage of the current there must be great waste, a large proportion of energy being in that case spent in heating the conducting wires, instead of the carbon in the lamps.

Mr. Edison accordingly proposes to make his lamps of a very high resistance; he proposes to use for the incandescent material a form of carbon which offers a higher resistance than simple carbon in its compact state; but if carbon pure and simple is used, then I submit it had better be in as stable and condensed a state as possible, because in process of use it tends to consolidate, and it is undesirable that any change should take place in the lamp during use.

The resistance offered by a filament of carbon in its best state for incandescent lamps, as thin as it is safe to use in a lamp, and of a length sufficient to give say a light equal to one burner, or ten standard candles (a unit of light which I think we must not go beyond in planning an extensive system of town lighting), will not offer so high a resistance as that which Mr. Edison has made the basis of his scheme of distribution.

With lamps of this resistance, the result would be that before many were bridged across from one main wire to another, as much or more work would be done in the conducting wire as in the lamp. The only way of avoiding this waste of energy, without abandoning the idea of small units of light, would be either to employ enormously thick conductors, or have a very limited area supplied from one works.

I think the difficulty is capable of being surmounted in this way: Instead of grouping the lamps as Mr. Edison proposes, each lamp being as it were a loop or bridge between two mains, I propose to string them in series—ten, fifty, or perhaps one hundred lamps being all interposed in one and the same line. In this way every lamp would add to the resistance of the line, instead of, as in Mr. Edison's plan, diminishing its resistance. The waste of energy in the conducting wire would thus be avoided.

A copper wire, less than one-eighth of an inch thick, would supply current for one such series of, say from ten to one hundred, lamps at five miles distance, with a very small percentage of loss; while to supply at the same distance a corresponding series on Mr. Edison's plan would demand copper conductors of such thickness as would certainly make the plan far too expensive; or if such thick conductor was not used there would be an impracticably extravagant waste of energy in the wire. If even 50 per cent. of the energy were expended in the wire, the size of the conductor required to transmit the current, say, even two miles, would be far too great.

There is no way of escape that I know of from this dilemma, viz., that either we must make our unit of light larger than necessary for a very great many purposes, and so give up the idea of extensive division and extensive distribution, or, in order to gain these points, we must group the lamps in the manner I have proposed.

There are, no doubt, difficulties in the carrying out of my plan, but none that are not easily surmountable. For example, if twenty, fifty or one hundred lights were in a series, a break in any part of the line would extinguish all the lights. This danger can be met in two ways:—

I would have only one lamp belonging to a given line in one house, so that the extinction of such a line of lights as we are contemplating would not be a very serious mishap; but I would make such a mishap extremely unlikely to occur, by placing along with each lamp an automatic circuit closer. This would so act as to bridge over the gap made by the accidental breaking or failure of a lamp, and so prevent the extinction of the rest of the lamps in the series, while a fresh lamp was put in the place of the broken one—a thing no more difficult, and probably not more costly, than the replacement of a broken gas burner chimney or globe.

There is another difficulty occasioned by the variation of the current in proportion to the number of lamps in action.

What is required in this case is to maintain a uniform current in the line of lamps, whether one or one hundred are alight. This can be accomplished by self-acting apparatus somewhat on the principle of the governor of the steam engine, and which would automatically raise or lower the potential or pressure by steps of one-hundredths, according to the number of lamps in use.

I have also considered the question of measuring the current and, if time allowed, I could show you that that could be done as easily as the measuring of gas.

Similarly, all other practical difficulties arising out of this method of distribution can be met, and being met, we are at liberty to contemplate a great central works producing electricity by large steam engines, and distributing it by means of wires to a whole town, exactly as gas is now distributed by gas works.

I have already referred to the cost of electric light produced on the arc principle, and shown that when the circumstances are favourable to the employment of that method, it is much more economical than gas light.

The economy of lighting by incandescence has not been exemplified by so many instances of actual practical use. One thing is, however, quite clear, and that is, that electric lighting by incandescence is an economical process,—it will be less costly than gas lighting. That is conclusively demonstrated by the fact that 1000 fee of gas employed in working a gas engine to develop an electric current, and used in my lamps, will yield more light than 1000 feet of gas consumed in the ordinary way in gas burners. This room is now lighted by twenty of my electric lamps, and to produce the current which feeds them 160 cubic feet of gas per hour are being burnt in a gas engine; before my lamps were kindled the room was lighted by seventy gas jets, consuming, I am told on good authority, 280 feet per hour. It is very evident that we have got more light out of the gas through the medium of electricity than was got from the larger quantity of gas which those burners consumed. Our conditions here are somewhat unfavourable to my light for a fair comparison, but from measurements carefully made, both of light produced and current required to produce it, I am warranted in saying that at least twice as much light will be produced by a certain quantity of gas used to generate an electric current [employed in my lamps, as would be obtained from this quantity of gas burnt in gas burners in the usual manner.

If that is so, then it is evident that when, instead of the motive power of gas, that of steam produced in the most economical manner is employed, this method of electric lighting will be very much less costly than gas lighting. I reckon that 40 lbs. of coal employed in raising steam to generate electricity is capable of producing in my lamps the effect of 1000 feet of gas burnt in gas burners in the ordinary manner.

The economical view of the question is therefore, in my opinion, very favourable to electric lighting, and I think fully warrants me in anticipating an extensive substitution of electric light for gas light.

The great difficulty which till now has completely blocked the way to any general use of electric light was the difficulty of division, that difficulty is now completely overcome, by the method of producing electric light by the incandescence of carbon in vacuo of which I have given you a practical demonstration to-night.

Now, ladies and gentlemen, if I have not exhausted my subject I certainly have exhausted your patience. I will weary you no more.

Eighty years ago Science gave us enlarged means of turning night into day; since then not a little of our lifetime has been spent in gas-lit rooms, and it has been somewhat of a reproach to Science that she has not provided us with this larger measure of light without at the same time imposing on us the necessity of breathing a vitiated atmosphere.

To-day, Science vindicates herself; henceforth we may make the long nights of our northern winter bright without any such sacrifice.

Parliamentary and Law Proceedings.

POISONING BY VERMIN KILLER.

An inquest has been held at Forest Gate, before Mr. C. C. Lewis, coroner, touching the death of Hannah Bickmore, aged 17. After evidence had been given tending to show that death had resulted from taking strychnine.

Mr. Cumine, chemist and druggist, was sworn, and stated that he knew the deceased and had done so for some little time as servant in the employ of Mr. Cole. He also stated that deceased purchased some vermin poison at his shop, and he produced the "poisons" book with deceased's signature.

Horace Charles Dadson, deposed: I am an assistant to Mr. Cumine, chemist and druggist, of Forest Gate, I knew the deceased by sight. She came to the shop on the morning of the 15th inst., and asked for a packet of vermin killer. She was served with a sixpenny packet, on her signing the "poisons" book, now produced. I cautioned her at the time as to its dangerous contents. I saw no difference in her appearance, and her manner was as I had been in the habit of seeing her. The packet contained about 3½ grains of strychnine.

The jury returned a verdict that deceased had taken poison which caused her death, but in what state of mind she was at the time there was no evidence to show. They also were unanimous in their opinion that there was no blame attaching to Mr. Cumine in the matter of selling the girl the vermin poison.

POISONING BY OPIUM.

On Monday last an inquest was held at Hull, before Mr. J. J. Thorney, respecting the death of Amos Withers.

The evidence showed that the deceased, who was forty-one years of age, had been in the habit for about four years of taking the twelfth part of a drachm of opium to alleviate pains in the head and stomach, and to make him sleep. Deceased was in a measure addicted to drink, but prior to last week he had not partaken unduly for eight or nine weeks. He, however, commenced to drink on Monday week, and drank more or less heavily up to the day of his death. On Friday deceased sent for half a drachm of the drug, and his wife, who was present, handed it to him, telling him to take a small portion. He put the whole in his mouth, and upon the return of Mrs. Withers from fetching a little water, he informed her that he had swallowed all the half drachm. An emetic was immediately taken by the deceased, who appeared to be very much alarmed, and Mr. Hollingworth, surgeon, was at once sent for. The emetic was not effectual, and the man died at half-past eight on Saturday morning.

Mr. Hollingworth said that when he first saw the deceased he had no extraordinary appearance, but complained of feeling drowsy. The vomit smelt of opium, which showed that the drug was dissolved. Witness did not at first use the stomach pump, because he was aware that a lump of opium would not ascend in the tube; he used it eventually, however. The heart seemed to fail, and witness adopted artificial respiration. Witness remained with deceased up to five o'clock, when, finding that he could render no further aid, he left. He attributed death to congestion of the brain and convulsions, which could be attributed to opium poisoning.

In answer to the Coroner, a girl named Ellen Ellis, who fetched the opium from the shop of Mr. Price, chemist, Witham, said that she did not sign her name in any book when she obtained the poison.

Mr. Price, in his evidence, pointed out that it was unnecessary to do so. It was only essential to place the ordinary label, bearing the words "Opium—Poison" on the package.

A Juror: Is it customary for you to supply every child who comes to you?

Witness said it was not his custom to do so. He usually asked who the opium was for, and whether such person was accustomed to taking it.

A Juror: Then you can sell it to every child?

Mr. Price: Certainly, if I choose to be careless. The law places no restriction on me.

The jury briefly consulted, and returned a verdict that death resulted from opium, which was accidentally administered by deceased.—*Eastern Morning News.*

Dispensing Memoranda.

[451]. Mr. Henry Brown, in last week's Journal, in answer to No. 451 of "Dispensing Memoranda" says, "What in the name of wonder suggested calomel to J. G. P. S.?" as applied to the eyes.

When living with a surgeon in large practice some years since, we both of us frequently used it; about ½ grain on the edge of a spatula, blown into the eye.

JONES COPPOCK.

[451]. I never heard chloral hydras used for such a purpose, therefore hyd. submur. is meant.

———.

[451]. Why in the name of wonder should Mr. Henr Brown object to the idea of using calomel for the eyes?

A few weeks since I dispensed a prescription written by a London physician as under—

℞ Calomel . . . . ℥ij.
(In a stoppered phial).

To be dusted into the eye with a camel hair pencil.

The prescriber used it at the time of consultation; I was also an eye-witness to the patient using it himself, and have since been informed that the result has been a perfect cure after several years' suffering.

Mr. Henry Brown says hyd. chlor. is hyd. perchlor., or corrosive sublimate.

The London Pharmacopœia says hyd. chlor. is calomel.

Which is the most authentic?

Had I used hyd. perchlor. to-day in making the following pills I should not have felt so comfortable in my mind as I do at the present moment:—

℞ Hyd. Chloridi . . . . gr. xij.
Confec. . . . . q.s.
Ft. pil. vi.

Midhurst. S. E. COWAP.

[451]. Should use calomel, as the above is evidently an eye lotion. Calomel is used in some diseases of the eye in conjunction with opium. I have never yet heard of chloral hydrate being used for that purpose.

A. C.

[451]. "What in the name of wonder suggested to J. G. P. S. calomel?" Thus writes Mr. Henry Brown in last week's Journal. If Mr. Brown wishes I could show him many copies of prescriptions for the eyes in which calomel is used. I should most certainly use calomel.

J. W.

[451]. In contradiction of the rather positive statement of Mr. Brown, I may say that J. G. P. S. was right in supposing "calomel" might be intended in this prescription. It is frequently ordered by an eminent Liverpool oculist, and I have, within the last week, dispensed one of his prescriptions, in which it was ordered as follows:—

℞ Pulv. Hyd. Subchlor. (Calom.) . . . ʒij.
Ft. pulvis bene trituratus.
To be dusted into the eyes once a day.

The "calom." was evidently inserted to prevent any possible doubt in the matter. I may add it was for a child, under two years of age, and is not by any means a solitary instance.

KARL SANG.

[451]. I have often read with much pleasure the answers of Mr. Henry Brown to numerous questions in the "Dispensing Memoranda," but I must differ with him in his answer to this question. He begins by saying "hyd. chlor. is hydrarg. perchlor., or corrosive sublimate." On what authority does he state this? Hydrarg. chloridum of the London Pharmacopœia is the same as hydrarg. subchlor. of the present. Now, how can hydrarg. chloridum be also called (as it is according to Mr. Brown), hydrarg. perchlor.? Is not this latter a double chloride whose formula is $HgCl_2$, while that of the chloride is HgCl? Mr. Brown quotes as his authority the U. S. Pharmacopœia, but a dispenser has for his authority the British Pharmacopœia. How many cases of poisoning would occur daily if hydrarg. perchlor. was dispensed as hydrarg. chlorid.? I have often dispensed prescriptions in which hyd. chlor. is so written; I always use calomel. If chloral was intended the writer would have written it thus: Hydrati chloral. or chloral. hydrat. Besides, as Mr. Brown states, "nobody would drop such an irritant as chloral into the eye." Therefore, I should dispense the prescription thus—

℞	Hydrarg. Chloridi (Calomel)	gr. v.
	Ext. Opii	gr. ij.
	Aquæ	℥ij.

Ft. lotio.

Hydrarg.

[451]. The correspondents who have replied to the question No. 451 of "Dispensing Memoranda" seem to be curiously mistaken. I have often dispensed, by the direction of an eminent oculist, calomel in the dry state to be blown into the eye, and I could likewise name some of the most eminent in London at the present time who are constantly ordering it thus.

I think calomel would be intended in such a prescription as No. 451, and for an assistant to think that any other article was meant would be evidence to me, neither of his cuteness nor carefulness, but of nervous incapacity or lack of experience.

J. C. Hyslop.

[452]. If the extracts are of a proper consistency the dispenser should have no green spirituous extract left.

——.

[455]. Ung. Rumicis c. Sulph.—Under the above heading I find in Ruddock's 'Hom. Vade-Mecum' the following formula:—

℞	Ung. Rumicis	℥j. (see below).
	Sulph. Hypochlorid.	ʒij.

M.

Perhaps your correspondent may be able to ascertain whether the prescription is of homœopathic origin or not.

Ung. Rumicis.

℞	Ext. Rumicis	ʒj.
	Cerat. Simp. (Hom. Ph.)	℥j.

M.

N.B.--The extract is prepared from 4 ozs fresh dock root, by percolating with a mixture of 27 ozs. water and 3 fl. grs. glycerine, and afterwards evaporating to a syrupy consistency.

Sandown, I. W. **George Brown.**

[455]. Ungt. Rumic. c. Sulph. is chiefly prepared in the following manner:—

From *Rumex Acetosa*, nat. ord. Polygonaceæ, or docken roots. Washed and freed from earth, sand, etc., then shred and boiled with axungia by means of a water-bath for ten minutes, then strain through calico; rub the sulph. sublim. in a mortar until it is free from grittiness, allow the axungia, etc, to stand in a cool place for another ten minutes, and add the sulph. sub., gradually stirring till cold.

℞	Docken Roots	4 parts.
	Axungia	4 parts.
	Sulph. Sub.	1 part.

J. H. Edwards.

[456]. I should neutralize the free acid in spirit of nitre as the prescriber no doubt meant spt. æth. nit., B. P., which normally is neutral; it is only after keeping that it becomes acid. I would advise liquor potassæ in place of potassæ carbonas. I do not think the prescriber meant to give free iodine.

A. C.

[457]. Mr. W. J. Smith was quite correct in putting on a "shake the bottle" label, as the strychnine is precipitated by the sodæ bicarb., after standing for some time. The reply given by your correspondent, J. H. F., is therefore quite misleading, and he would do well to try the experiment for himself.

J. I. F.

[459]. I should dispense this prescription thus: Dissolve the phosphorus in the benzol, then form an emulsion with 2 drachms of powdered gum arabic and 1 ounce of water, then add calcium chloride, etc., dissolved in water.

A. C.

[460]. I think if the gallic acid were rubbed to a fine powder and then mixed with acid. sulph. and water, the mixture would be dispensed in accordance with prescriber's wishes. It is an axiom in medicine that complexity ought to be avoided, provided the therapeutic action is not affected. Alcohol adds to the complexity of the mixture, but does not improve its therapeutical action; therefore it should not be added.

A. C.

[461]. Will some one kindly inform me what is the best solvent for quinæ salicylas?

B. J. Kent.

[462]. "Nemo" would be glad to know how the following recipes should be dispensed:—

℞	Iodide Mercury	gr. 8.
	Dissolve in Hydrochlor. Acid	gtt. 10.
	Antimonial Wine	1 oz.

℞ Ointment, White Calx of Mercury.

Notes and Queries.

[683]. LITHIA WATER.—"Syphon" would like to know if any reader could inform him how to make lithia water in syphons.

[684]. PHOSPHATED BEVERAGE.—Can any of the readers of the Journal kindly give a form for making a good "phosphated beverage?"

Solus.

[685]. PEROXIDE OF HYDROGEN.—I have tried peroxide of hydrogen for golden hair, mixed in the following manner:—

℞	Peroxide of Hydrogen	℥j.
	Aq. Rosæ	ad ℥x.

M.

I find it does not answer. Could some one, in any way, enlighten me on the subject?

W. M. Covell.

Correspondence.

EXEMPTION FROM JURY SERVICE IN SCOTLAND.

Sir,—I shall be much obliged if you will allow me to inform your correspondent, Mr. James Stewart, through the medium of your columns, that it is the determination of this Association to endeavour to obtain, at the earliest possible date, the exemption from jury service of all registered chemists and druggists, whether residing in England, Scotland or Wales.

With reference to the memorial recently forwarded from this office to the Home Secretary, I may say that it was intended to urge the Government to extend the principle of exemption from jury service, now enjoyed by certain pharmaceutical chemists, to the whole body of registered chemists and druggists, but as no legislation on the subject was pending no good result would have been gained by referring to details of all desirable alterations in the existing law on this question.

W. F. HAYDON,
Secretary of the Chemists and Druggists' Trade Association of Great Britain.
23, *Burlington Chambers, New Street, Birmingham.*

Sir,—In reference to your comments on my letter in last week's Journal on the subject of jury service, I must plead guilty to being hitherto unaware of the fact that "the Council of the Pharmaceutical Society had already obtained recognition of the principle" for which I contend. It certainly reflects great credit on the sense of fairness and logical acumen of the recognizing parties. But, Mr. Editor, "fine words butter no parsnips," and what the pharmaceutical chemists of Scotland desiderate is, not merely the recognition of an abstract principle, but exemption.

I can remember when, fifteen years ago, I aspired to the honour of being a pharmaceutical chemist, one of the brightest attractions of that consummation was the almost certain prospect of being exempt from jury service.

The liability to jury service on the part of chemists in a small way of business is harassing in the extreme. This I have felt to be the case, repeatedly.

As for awaiting the advent of a "Jury Bill before Parliament," I cannot conceive a better *raison d'etre* for the introduction of a jury bill than the exemption of the pharmaceutical chemists of Scotland and the chemists and druggists of Great Britain from jury service.

What I should like to see is, the Pharmaceutical Society adding its powerful weight to the action of the Chemists and Druggists' Trade Association, in the way of approaching the Home Secretary at this particular time. Even supposing that we must wait till some more potent reason for legislation anent jury service turns up, such joint action would, in my opinion, lessen the chances of our being forgotten or overlooked.

JAMES STEWART,
Pharmaceutical Chemist.
Dalkeith, N.B.

THE TEACHING OF DISPENSING.

Sir,—As a student who has just entered for a course of lectures at the Society's School, I venture to address you in reference to a letter which appeared in a recent *Pharmaceutical Journal* on the "Teaching of Dispensing" by Professor Redwood. Mr. Mee says he wishes to raise the standard of the Minor examination, at the same time he condemns an improvement made in the curriculum, which will enable young men to become better assistants—a sad want. The letter seems to me to be an insult to the Professors of the school and to all students of the Pharmaceutical Society.

Young men at the present time go to the schools with good practical acquaintance of their business, and twenty years hence the (so called) soft material will have deposited some secondary layers, and I hope we shall be the means of raising the profession to its proper level, and pass it down as a respectable, upright, and honest means of obtaining a livelihood, which is not the case at present in the majority of shops. I believe also that we shall allow time and render aid to pupils in their studies: not keep our shops open until 10.30, which is now invariably the case in some shops in the north of London. Teach us dispensing in the shops? Some of my fellow students and myself know to our sorrow the incompetency of chemists to teach. And who is better fitted than Professor Redwood, a sound practical man, to instruct us properly in this important branch of our profession? The whole letter appears to me to be a conglomeration of misplaced words.

A. STUDENT.

Sir,—I was sorry to see in a recent Journal a letter from "A Member," expressing regret at the formation of a dispensing class at Bloomsbury Square.

This gentleman appears to be well acquainted with the lamentable fact that many students are deficient in a knowledge of elegant dispensing. Has he, however, considered what may be the cause of this? It is hardly probable that young men who evince an eagerness to acquire a knowledge of more difficult subjects would willingly remain ignorant of so important a branch of their calling. Is it not because many masters take little or no pains to teach their apprentices their business? It may be a good method, as far as "counter work" is concerned, to set a novice to work and to leave him to educate himself; but in dispensing something more is required. Yet how many masters, after having watched their apprentice make up a few mixtures, trouble themselves any more in the matter? Hence so many young men discover, when they commence their preparation for the Minor, that there is a difference between mixing the ingredients of a prescription and dispensing the same.

To many students this class will be a great boon, since it will enable them to acquire a knowledge they could not gain elsewhere, excepting in our leading dispensing businesses.

I am quite unacquainted with the technicalities of cabinet-making, but it seems to me that instead of comparing these students to common deal awaiting the "veneering" process, it would be better to liken them to more valuable wood which, having been roughly hewn by unskilful workmen, will have to be planed and squared before it can be submitted to the process of polishing by a skilled artificer, whereby its utility and value will be enhanced a hundredfold.

SGANARELLE.

Caution.—A correspondent, signing himself "*Victim*, wishes to advise his fellow-chemists, if called upon by a person offering coal black marking ink pencils, to test them before purchasing. A specimen is shown which is stated to have been washed and boiled, but the writing of which he found to disappear on the application of a little soap and cold water.

Plymouth Assistant.—The design of the stamp to be used as a sign of verification is decided in each district by the local authority, but some time since it was recommended by the Board of Trade that a design like No. II. should be universally adopted, with a particular number for each district.

J. C. S.—Such a person can remain on the Register of Chemists and Druggists, and therefore can legally keep an open shop for the retailing and dispensing of poisons.

Civet will find recipes for gasogene powders in the number for May 17, 1879, p. 950.

Mr. H. Burnam is thanked for his communication.

T. H. M.—The answer to your question would appear to depend upon whether the manufacturers have legally secured to themselves the sole use of the name. You are recommended to consult a solicitor.

Norsk.—Moller "On the Manufacture of Cod Liver Oil," 1862. See also two papers in the present series of this Journal, vol. ii., 448, 483, and vol. vii., 810.

Electro.—See Ure's 'Dictionary,' vol. i., under "Cyanides," or Cooley's 'Cyclopædia,' under "Electrotyping."

L. R. Oswald.—The question has been recently asked without obtaining an answer.

J. E. Williams.—The formula has not been published, and we think it would be useless applying for it except to the medical man in question.

P. Princep.—We are unacquainted with any published data giving the relation of strength and specific gravity in solutions of hypophosphorous acid.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Hambar, Davenport, Siebold, Fraser, Kent, Hartridge, Allen, Nemo, Welt, Omikron, Filius, Minor, Chemicus, Secretary of the Nottingham Association.

INDIAN HENBANE.

BY W. DYMOCK.

Henbane, though a native of the Himalayas, was probably unknown as a medicine to the ancient Hindu physicians. "Parasika-yamani" and "khorasani-yamani," the names which it bears in some recent Hindu books, indicate its foreign source. Mahometan writers call it "banj," an Arabic corruption of the Persian "bang." They say it is the "afeekoon" of the Greeks, the "azmalus" of the Syrians, and the "katfeet" or "iskeeras" of the Moors. They also add that in the Deilami dialect it is called "keer-chak," because the capsules resemble a little basket with a cover, such as the Arabs make out of date leaves and call "kafeer." Meer Muhammed Husain's description of "banj" in the 'Makhzan-ul-adwiya' agrees well with the genus *Hyoscyamus*. He says there are three kinds, white, black and red, and that the white is to be preferred. He mentions the preparation of a sun-dried extract from the juice of the fresh leaves, and says that the leaves are also pounded and made into a paste with flour, out of which small cakes are formed, which when dry retain their medicinal properties for some time.

Henbane is described by eastern writers on materia medica as intoxicating, narcotic and anodyne. Amongst the many uses to which it is put the following may be mentioned as peculiar to the East:—A poultice of the juice with barley flour is used to relieve the pain of inflammatory swellings; the seeds in wine are applied to gouty enlargements, in flamed breasts and swelled testicles. About ½ drachm of the seeds with 1 drachm of poppy seeds are made into a mixture with honey and water and given as an anodyne in cough, gout, etc. Equal parts of the seed and opium are used as a powerful narcotic. A mixture of the powdered seeds with pitch is used to stop hollow teeth which are painful, and also as a pessary in painful affections of the uterus. The juice or a strong infusion of the seeds is dropped into the eye to relieve pain. Ainslie and other European writers upon Indian materia medica notice the use of hyoscyamus seeds in India and attribute them to *H. niger*, but I have not heard of anyone who has raised this plant from the bazaar seed. In the 'Mufaridat-i-Násari' it is distinctly stated that the officinal article should be the seed of white henbane (bazr-ul-banj-abiad).

Henbane seed is the only part of the plant used in native practice in India; it is known in Hindostan as "khorasani ajwain," in Bombay as "khorasain owa," and in Madras as "khorasain omam."

For the purpose of supplying Government hospitals with extract and leaves the *Hyoscyamus niger* has been cultivated at Saharunpore in the Bengal Presidency, at Hoonsoor in Mysóre and at Hewra, near Poonah in the Deccan. The quantity grown is limited to the requirements of Government. It is a cold weather crop. If sown in October, the plants will produce ripe seed in March or even earlier. As regards medicinal qualities, the experience of medical men in India is that the plant cultivated for Government yields preparations in every respect equal to those obtained from Europe. Dr. O'Shaughnessy found that 3 grains of the sun-dried extract produced marked soporific and anodyne effects.

At present henbane leaves are not an article of commerce in India, but the Superintendents of the Government Gardens are, I believe, allowed to grow any profitable crops of medicinal plants for sale. The price charged by the Hewra Gardens to the Medical Department this year for dried leaves is Rs 1⅓ per lb., and for extract Rs 4 per lb.

The price of the imported seed in the Bombay market is usually Rs 7 per maund of 37⅓lbs.

Bombay, October 15, 1880.

THE MIKANIA GUACO AS A REMEDY FOR SNAKE BITE.

In South America, under the name of "guaco," several plants enjoy a considerable reputation as remedies against snake bites. Most of them are species of *Aristolochia*, but one, the *Mikania Guaco*, is a Composite plant. Notwithstanding this reputation, very little trustworthy evidence has been published as to the real efficacy of any of them, and an attempt made by Dr. Schomburk a few years since to introduce the *Mikania Guaco* into South Australia, with a view of clearing up the doubt, does not appear to have led to a definite result. In a letter, however, recently received by the Director of the Royal Gardens at Kew, from Mr. Robert B. White, of La Salada, New Grenada, the writer gives his personal testimony as to the value of the remedy, and some other information which, by the courtesy of Mr. Thiselton Dyer, are made available for the readers of this Journal.

Mr. White says that the *Mikania Guaco* is the true "guaco," and forms the basis of all the preparations of the snake bite doctors of the district. There are two varieties, one with green stems, the other, called "morado," with purple, the latter being the most prized. There are several species of snakes in the country whose bite is deemed mortal, some of them killing in a very few hours, but Mr. White, who has lived in the Choco and other snake-infested regions many years, testifies that the guaco, properly and promptly administered, is a cure for the bite of the most venomous.

In cases of snake bite, when the guaco leaves can be obtained fresh an infusion in sugar water is made, in the proportion of one leaf to a large cupful, and this quantity is given hot every hour. It is said to stop the vomiting usually occurring. The leaves are also preserved by bruising and placing them in alcohol, and of the tincture thus formed a teaspoonful is administered every half hour for one hour and a half, and then every hour, and afterwards the dose is gradually diminished. Hot poultices of the bruised leaves and stem of the plant are applied to the wound, taking care not to use sufficient heat to drive off the volatile principle of the plant. If there be swelling and pain the limb is fomented with hot water to which some tincture of guaco has been added.

The *Mikania Guaco* is described as growing from seed in any good soil where there is a temperature of 24° to 25° C., and it would appear to be a plant deserving of physiological and chemical experiments to determine its true character. It is worthy of note that it was at one time said to be the source of condurango.

THE BARK OF ALSTONIA SPECTABILIS.*

BY O. HESSE.

Alstonia bark, the "cortex Alstoniæ" of pharmacognosists, is nearly allied to dita bark. This bark, which in Java is called "poelé," comes from the *Alstonia specta-*

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* From the *Annalen der Chemie*, vol. ciii., p. 170.

bilis, R.Br., a species which from its characteristic properties has been named by De Candolle, *Blaberopus venenatus*. This *Alstonia* grows in Timor, the Moluccas, and in the eastern parts of Java, especially in the neighbourhood of Malang.

Wiggers, on his 'Pharmacognosie,'[*] gives an extremely true description of this bark, to which I would refer.

Poelé bark differs from dita bark not alone by its extraordinarily bitter taste, but also in its anatomical structure. For comparison a specimen of dita bark was obtained, which was apparently stem bark, and a branch bark of the other kind. Herr Professor Ahles, who has examined both barks microscopically, kindly tells me that the difference in the structure of the two barks does not depend alone upon their age, but also upon the peculiarities of the respective plants.

Formerly the poelé bark was used in Java against fever with favourable results, and in Batavia especially it came much into use for this purpose. Apothecary Scharlée[†] there examined this bark and found in it a special alkaloid, which he named "alstonine." This was occasionally prepared in Batavia, but does not appear to have ever come into use either in the hospitals or in private practice.

As the name "alstonine" had already been given to a substance obtained from the Australian *Alstonia*, I have before proposed that Scharlée's alkaloid might be named "alstonamine." In the following remarks I shall use this name for the alkaloid in question.

Scharlée obtained the alkaloid by extracting the coarsely powdered bark with alcohol, and after previous filtration precipitating the tincture with tannic acid. The white flocculent tannate was washed with water, suspended in alcohol, and decomposed with freshly precipitated lead hydrate. The alcoholic solution, upon evaporation over sulphuric acid, yielded the alkaloid in brilliant oblique rhombs and prisms. In its reactions it presented relatively great similarity to ditamine. But from this alkaloid it differs, as also from echitenine, by its power of easily crystallizing.

Further, that it cannot be echitammoniumhydroxide is evident from the following experiment. Freshly precipitated echitammonium tannate in alcoholic solution was treated with freshly precipitated lead hydrate, but was not decomposed by it. This result is not surprising, as it is known that echitammoniumhydroxide separates lead hydrate from its combinations.

Consequently, there is in alstonamine an alkaloid differing from the alkaloids of dita bark.[‡] In order to obtain further information upon the nature of this alkaloid, I undertook an investigation of poelé bark. I am indebted for a specimen to Professor Wiggers, who had obtained it some time ago direct from Batavia, possibly from Scharlée himself.

I first prepared an alcholic extract from 50 grams of powdered bark. This was treated with dilute acetic acid, when a resinous mass was left which contained a considerable quantity of echicerin.[§] The clear filtered acetic solution was then supersaturated with soda, shaken with ether, and this treated with acetic acid. After supersaturating this solution with ammonia the base removed from it by pure ether weighed 0·066 gram. It was found to be identical with ditamine.

The liquid left after treatment with ether was next supersaturated with potassium hydrate and shaken with choloroform. Upon evaporation of the chloroform solution, after washing with water, there remained a brown amorphous residue, which after treatment with hydrochloric acid gave 0·423 gram of echitammonium chloride.

The mother-liquor was then again supersaturated with potassium hydrate and shaken with chloroform, which now upon evaporation yielded 0·042 gram of a mixed residue, consisting of an amorphous alkaloid and one crystallizing readily from chloroform. The crystals were concentrically grouped prisms and behaved towards nitric acid like ditamine. The substance was repeatedly dissolved in chloroform and upon evaporation of the solution obtained again unaltered. The small quantity of this substance which I thus obtained, though not sufficient for further experiment, was sufficient to ascertain that it was not ditamine, echitenine, or echitammoniumhydroxide. As besides this no other crystallizable alkaloid could be observed in this alstonia bark, I assume that these crystals were actually Scharlée's alstonamine.

As to the amorphous portion, in which these crystals were imbedded, it corresponded in its behaviour with echitenine.

The quantity of bases present in 100 parts poelé bark accordingly amounted to—

0·132	Ditamine.
0·808	Echitammoniumhydroxide.
0·080	Echitenine and Alstonamine.

In order, therefore, to obtain a sufficient quantity of alstonamine for a thorough investigation a considerable quantity of poelé bark would be required. Unfortunately I have not been able to procure such a quantity, so that I must desist from the further examination of this alkaloid.

One result of especial interest is that the bark in question contains more than six times as much echitammoniumhydroxide as does dita bark, in which I found 0·13 per cent. It may be observed that the action of this alkaloid and its chloride upon the animal organism is similar to that of curare, so that it probably follows that persons who are treated with this bark for the relief of intermittent fever would undergo a more or less powerful poisoning.

THE RESIN OF LEPTANDRA.[*]

BY J. U. LLOYD.

Leptandrin of commerce varies in appearance from two reasons:—

1. Different fineness of powder.
2. Difference in composition.

If an alcoholic tincture of *Leptandra virginica* be evaporated to the consistence of a thick syrup and this be poured into cold water a black tarry substance separates. This, if washed with pure cold water, finally becomes tasteless, and, if it be dried, constitutes the article above named. This has a deep black colour and breaks with a shiny fracture. It resembles much in appearance asphaltum. The powder produced from it varies in colour in accordance with its fineness, becoming of lighter shade as comminution progresses. This is the main reason for the difference in the colour of the resin (by resin is understood the precipitate before mentioned), and it may cause powders from the same lump to vary considerably.[†]

Sensible Properties.—If the precipitate of which I have been speaking were "leptandrin of commerce" there would be no very remarkable difference in the appearance of the various lots. The odour would be the same and all specimens tasteless, or nearly so. There is no officinal process for making "resin of leptandra." There is no preparation recognized by the Pharmacopœia under the name of *leptandrin*. The question arises: Is leptandrin of commerce the powdered resin to which article the name was originally applied by William S. Merrell? In my opinion the majority of physicians who use

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[*] 'Pharmakognosie,' 5th edit. (1864), p. 358.

[†] 'Geneeskundige Tijdschrift voor Nederl. Indie,' vol. x., p. 209 (1863).

[‡] See before, p. 331.

[§] *Pharm. Journal*, [3], vol. vi., p. 144.

[*] Read at the twenty-eighth meeting of the American Pharmaceutical Association at Saratoga. Reprinted from the *American Journal of Pharmacy*, October, 1880.

[†] Seven samples, powdered from one piece and sifted through sieves of different fineness, were exhibited.

"leptandrin" do not recognize the resin as the active principle of the root. Why should we take it for granted that manufacturers prepare the article, labelled *leptandrin*, by precipitation of the resinous substances? Professor John King did not make his original preparation from the root of *Leptandra virginica* in this manner. He informs me that he forms his opinion of the therapeutical value of *Leptandra virginica* from the use of a dried mixture of aqueous and of alcoholic extracts.

Resin (?) *of Leptandra*, or leptandrin, was discovered by William S. Merrell about 1850. We may well suppose that the value of podophyllum resin (podophyllin) and the object of improvement led Mr. Merrell to the precipitation of the resin of leptandra and to the supposition that it (the resin) would prove to be the medicinal principle of *Leptandra virginica*. This latter is admitted to have been a mistake, for very few eclectic physicians desire the resin, and the best authorities have decided against it.

I am of the opinion, furthermore, that very little of the "leptandrin of commerce" is the resin, and that the difference in "sensible properties" of various lots may be ascribed to difference of composition. Manufacturers desire to prepare the best representative of the root, and as the resin fails to answer, they seek for other principles and other means of manipulation, and label the result "Leptandrin."[*] Thus, I conclude that "the leptandrin of commerce" varies much in appearance and in "sensible properties" from the fact that it is of different degrees of fineness and of various compositions.

"*What is the best process for the preparation of the resin?*" Resin of leptandra exists as such to the extent of 6 per cent. (average of 3000 pounds) in well dried root of not less than one year's age after collection. It is a recognized fact that the yield of resin increases with the age and exposure of the root after collection where water, simply, is employed as a precipitant, and for this reason the root of two or more years of age is desirable. If the powdered root be percolated with alcohol and the percolate evaporated to a syrupy consistence, and this be poured into a larger quantity of cold water, a semi-solid substance settles. This, when well washed and dried, is the so-called resin. If the water which was used as a precipitant of the resin be examined it will be found very bitter, in consequence of the presence of the bitter principle, first noticed by Professor E. S. Wayne (1856) and afterwards by Professor F. F. Mayer (1863). The latter gentleman ascribed to it the properties of a glucoside, and I think his views will be supported. If five per cent. of sulphuric acid be mixed with the precipitating liquor after decantation from the resin, and the mixture be permitted to stand some weeks, the bitterness disappears, and a quantity of resin, similar in appearance to the original precipitate, is produced. If, however, the sulphuric acid and the precipitating liquid be mixed and then boiled together from thirty to sixty minutes, the reduction takes place at once, the bitterness disappears and resin results as one product.[†]

This would indicate that the bitter principle is a glucoside, and that the resin is a product of its decomposition, although I have not experimented regarding the corresponding production of glucose. That this resin is thus formed in a considerable amount may be seen by specimen shown, which is (12 pounds) the result of a 1000 pound batch of leptandra. In making this lot the overlying liquid was simply decanted from the precipitate and it may have contained a small amount of mechanically divided resin which refused to settle. From the foregoing it would be obvious, that if the object be to obtain the greatest possible yield of resin the best process will be to obtain resin from the glucoside also.

Formula.—Extract the root of leptandra (properly powdered) by means of alcohol. Evaporate the percolate to the consistence of a thick syrup, and pour the result, with stirring, into ten times its bulk of cold water; decant the supernatant liquid, add to it 5 per cent. of sulphuric acid, boil until the bitter taste disappears, and then wash separately the two resins with water and dry them, after which mix and powder them. To dry the precipitated resin, place in a vessel and expose, with frequent stirring, to a steam-bath until it is of such a consistence as to break when cold; then break it into small pieces, and finish the drying by exposing to the air. The resinous substances obtained by means of sulphuric acid may be dried by simple exposure to the air. According to many authorities resin of leptandra is inert. I am decidedly in favour of a dried alcoholic extract, although such must contain a considerable amount of glucose, which exists in the root in large amount, and is extracted by alcohol to a considerable extent. The trouble experienced in drying an alcoholic extract (recorded by Dr. T. L. A. Greve) without the use of foreign substances, and with full preservation of its characteristics, renders its preparation by ordinary methods tedious and somewhat difficult. I have no trouble with leptandra when I pursue the following process:—

Extractum Leptandræ Alcoholicum.—Precipitate the evaporated alcoholic extract by means of water, in the manner before directed, and evaporate the liquid to the consistence of a thick solid extract. Dry the resin, powder it, and stir this powder into the solid extract and thoroughly incorporate them. The thick mass is then to be picked into small pieces, spread in layers in a drying closet and dried by a current of warm air, then powdered. From the foregoing preparation the full effects of leptandra root may be expected.

It will be noticed that I use the dry resin as an absorbent instead of carbonate of magnesium or other extraneous substance. This, or a similar preparation, might well be recognized by our Pharmacopœia. The preparations which are sold under the name of leptandrin constitute an important article of commerce, second, among the so-called resinoids, only to resin of podophyllum (podophyllin). Dried alcoholic extract of leptandra differs to such an extent from the precipitated resin, which was named "leptandrin" by its discoverer, Mr. W. S. Merrell, as to forbid their substitution for each other. If the resin be rubbed with distilled water, and the mixture be then poured upon a filter-paper, the filtrate will be colourless, almost tasteless, and free from bitterness. Under the same conditions the filtrate from the dried extract is dark coloured and very bitter.

Resin of leptandra will never run together at ordinary temperatures nor in any atmosphere. On the contrary, extract of leptandra upon exposure to a moist atmosphere, or if not well dried, will run into a hard lump. The yield of dry extract, made by the process I suggest, will average ten per cent. of the weight of the root employed.

THE ACTION OF OILS ON METALS.[*]

BY WILLIAM HENRY WATSON, F.C.S., ETC.

At the Plymouth meeting of this Association I brought forward the results of some experiments, showing the actions of various oils on copper, and the conclusions arrived at were briefly these:—

1. That of the whole of the oils used, viz., linseed, olive, colza, almond, seal, sperm, castor, neatsfoot, sesame, and paraffin, the samples of paraffin and castor oils had

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[*] Leptandra is valued by many for its laxative properties. The principle which imparts to the root this effect has never been identified.

[†] This cannot be taken as conclusively pointing to the formation of the resinous substance from the bitter principle. It may be that the resinous matter is held in a state of minute suspension by the liquid, or even is in actual solution. The subsequent manipulation with the acid solution may simply throw it down.

[*] Read before the Chemical Section of the British Association, Swansea Meeting, 1880. Reprinted from the *Chemical News*, October 15, 1880.

the least action, and that sperm and seal oils were next in order of inaction.

2. That the appearances of the paraffin and the copper were not changed after seventy-seven days' exposure.

3. That different oils produce compounds with copper varying in colour, or in depth of colour, and consequently rendering comparative determinations of their action on that metal from mere observations of their appearances impossible.

I was disposed to conclude that these experiments would indicate the relative action of the oils on other metals, simply expecting that the extent of action would vary throughout, but that the variations would be proportionate between the different oils.

Since the publication of these results, however, an interesting paper has appeared (*Pharm. Journ.*), "On the Action of Paraffin Oils on Metals," by Dr. S. Macadam. He comes to the same conclusion as myself with regard to their action on copper, but referring to iron, says "it is slightly affected by paraffin oil, and on ten days' contact the oil becomes deeper in colour and throws down a fine ferruginous sediment." Owing to this, I have lately made experiments on the action of the same oils as those previously used on copper, on iron, and the results, which are the subject of this communication, are interesting to me as showing that there is no relation between the action of an oil on copper and the action of that oil on iron; that, in fact, in several instances those oils which act largely on iron act slightly on copper, while those which act largely on copper act little on iron. Of course the actual extent of action of the same oil (with the exception of paraffin) is greater on copper than on iron.

In addition to the oils used in my experiments on copper, I also used a sample of refined lard oil, and a special lubricating oil, prepared by the Dee Oil Company, near Chester. The following observations were made, after twenty-four days' exposure:—

1. *Neatsfoot.*—Considerable brown irregular deposit on metal. The oil slightly more brown than when first exposed.

2. *Colza.*—A slight brown substance suspended in the oil, which is now of a reddish-brown colour. A few irregular markings on the metal.

3. *Sperm.*—A slight brown deposit, with irregular markings on the metal. Oil of a dark brown colour.

4. *Lard.*—Reddish-brown, with slight brown deposit on metal.

5. *Olive.*—Clear and bleached by exposure to the light and air. The appearance of metal same as when first immersed.

6. *Seal.*—A few irregular markings on metal. The oil free from deposit, but of a bright clear red colour.

7. *Linseed.*—Bright deep yellow. No deposit or marks on metal.

8. *Almond.*—Metal bright. Oil bleached and free from deposit.

9. *Castor.*—Oil considerably more coloured (brown) than when first exposed. Metal bright.

10. *Paraffin.*—Oil bright yellow and contains a little brown deposit. The upper surface of the metal on being removed is found to have a resinous deposit on it.

11. *Special Lubricating.*—Metal bright. Appearance of oil not perceptibly changed.

The samples were then chemically examined, and the amounts of iron found in them were as follows:—

Neatsfoot oil (English)	0·0875	grain.
Colza ,,	0·0800	,,
Sperm ,,	0 0460	,,
Lard ,,	0·0250	,,
Olive ,	0·0062	,,
Linseed ,,	0·0050	,,
Seal ,,	0·0050	,,
Castor ,,	0·0048	,,
Paraffin ,,	0·0045	,,
Almond ,,	0·0040	,,
Special lubricating oil	0·0018	,,

For comparison, the following are the results obtained of the action of these oils on copper, as previously communicated, after exposure of ten days:—

	Copper found.	
Neatsfoot oil	0·1100	grain.
Colza ,,	0·0170	,,
Sperm ,,	0·0030	,,
Olive ,,	0·2200	,,
Linseed ,,	0·3000	,,
Seal ,,	0·0485	,,
Paraffin ,,	0·0015	,,
Almond ,,	0·1030	,,

Owing to the length of exposure being different in the two series, we cannot fix on the actual differences in the *rate* of action of any of the oils on the two metals. However, it is shown that almond oil, which acted largely on copper, acts very slightly on iron; in fact, with the exception of the paraffin and special lubricating oil (a mineral preparation), it acted less than any of the other oils on iron. The same is shown, as already mentioned, as to the action of various other oils; thus, while sperm oil acts slightly on copper, it acts considerably, compared with the others, on iron. Linseed, seal, castor, almond and paraffin may be bracketed as having about the same and very little action on iron, while linseed, olive, neatsfoot, almond and seal have the greatest action on copper.

QUILLAIA TOOTHWASH.*

BY ALEXANDER E. BENNETT, PH.G.

An excellent toothwash containing glycerin is made as follows:—

℞	Soap Bark, ground	4 oz.
	Glycerin	3 oz.
	Diluted Alcohol	sufficient for 2 pints.
	Oil of Gaultheria,	
	Oil of Peppermint	āā 20 drops.

Macerate the soap bark in the mixture of glycerin and diluted alcohol for three or four days, and filter through a little magnesia previously triturated with the volatile oils.

Thus made, a much better preparation is obtained than by macerating the bark in the dilute alcohol, and adding the glycerin afterwards.

NATIVE OXIDE OF ANTIMONY.†

Among the papers read before the meeting of the American Association of Science, was a communication by Mr. E. T. Cox, on the oxide of antimony deposits in Sonora, Mexico, about thirty miles from the Gulf of California. The district is mountainous, the hills being in short narrow ranges, with table-land lying between, composed for the most part of broken and highly porous material. The formation consists mostly of granite and subcarboniferous limestone, with porphyry, quartzite, and trachite dykes. Extensive fissures exist in the rocks, and in these the metal occurs from 4 feet to 20 feet wide, and, so far as is known at present, to a depth of 30 feet; the oxide of antimony being almost pure and very uniform. The area over which these remarkable deposits occur is limited, being about five miles long and half a mile wide. They are being worked by a Boston company, who possess extensive claims, on some of which antimony ore stands up in ridges above the surface, and can be traced for some hundreds of feet. The oxide contains on an average about 50 per cent. of pure metal, much of it reaching 77 per cent. The principal impurity is silica. It is believed that at lower depths than have yet been reached the nature of the deposits will be found to change gradually to sulphide of antimony.

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* From the *American Journal of Pharmacy*, October, 1880.

† From the *Journal of the Society of Arts*, October 8, 1880.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 6, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PROSECUTION UNDER THE WEIGHTS AND MEASURES ACT.

THE provisions of the new Act for the verification, stamping and inspection of apothecaries' weights and measures again call for the serious consideration of all members of the trade. The case brought before the magistrates of Marylebone this week, and reported at page 385 of our present issue, shows that chemists and druggists are exposed to very considerable danger even where they have taken pains to place themselves, as they believe, in conformity with the requirements of the new Act.

The facts of the case, so far as they have been made known, are very simple. Mr. WHITTLE appears to have provided himself with measures manufactured by the York Glass Company, which purported to bear the legal mark of verification of the inspector acting under the direction of the local authority for York. Naturally, he has presumed that these measures were correct, and he has taken the stamp upon them as a guarantee that he was safe from being charged with infringement of the Act by reason of the provision it contains that a weight or measure duly stamped by an inspector under the Act shall be a legal weight or measure throughout the United Kingdom. In taking that view of the matter we think Mr. WHITTLE was quite in the right, and though it is true he might have used other means of ascertaining whether the measures in question were strictly correct, we do not think he was at all called upon to do so. Having procured the measures from a firm of high repute as makers of graduated vessels he was justified in regarding them sufficient for his purposes as to accuracy, and as they bore the stamp of an authorized inspector under the Weights and Measures Act he had no occasion to send them to the inspector of his own district for verification.

But notwithstanding these plausible reasons for supposing that he had loyally put himself in conformity with the law, Mr. WHITTLE has been made disagreeably aware that his measures were still subject to the criticism of the inspector of his own district, and on the occasion of a visit by that official to inspect his weights and measures four of the measures were pronounced by him to be incorrect. As a consequence of this Mr. WHITTLE has been summoned before the Marylebone Bench of Magistrates on the charge of having in his possession measures which were inaccurate.

As regards the alleged inaccuracy of the measures in question, it appears that no evidence was adduced at the hearing of the case beyond the statement by the inspector of the particular details in which he asserted that he had found them inaccurate. On looking to that statement, it will be seen that the incriminated measures were two half-ounce measures and two 60 minim measures. In no one of these instances is it alleged that the measures were inaccurate as regards the total quantities they were intended to measure. As measures respectively of half an ounce, or 240 minims, and of 60 minims, there does not appear to have been anything to complain of, so far as the charge goes and so far as we are informed. It is only the alleged inaccuracy of the inferior graduations that is complained of, that is to say, the half-ounce measures are said to be inaccurately graduated up to the 25 and 30 minim marks, while the 60 minim measures are said to be inaccurately graduated up to the 15 and to 35 minim marks, but not otherwise.

Then, again, as to the amount of alleged inaccuracy within the limits above named, it appears that in the two half-ounce measures it is stated as having been 1 minim in 25 and 2 minims in 30, while in the smaller measures it was 1 minim in 15 and 1 minim in 35. We will not here attempt to justify such irregularities of graduation as those which have been stated by the inspector to have an actual existence, though we have much reason for believing that they are not in excess of what may reasonably be expected under the circumstances, and not such as to justify condemnation of the measures. Moreover, the mode of manufacturing such measures and the way they are used must be taken into account before such irregularity of graduation can be made a foundation for a charge of infringing the Weights and Measures Act by having in one's possession unjust measures. It is notorious that in the minor graduations of such measures the subdivisions are made—not at haphazard—but still somewhat arbitrarily. It is also to be remembered that for the measurement of such quantities as those which the Marylebone inspector indicates as being most incorrectly marked on Mr. WHITTLE's measures it is not the custom of the practised and careful dispenser to use a half-ounce measure or perhaps even a 60 minim measure, but that a more accurate instrument of measuring is had recourse to.

Putting aside, however, these several considerations, there is another point on which we think it is very much more imperative that we should have clear and indisputable evidence of proof before there can be any pretence for subjecting a respectable tradesman to the indignity of being charged with using false weights and measures. The Marylebone inspector has made certain definite allegations and Mr. GREENWELL, the clerk to the magistrates, well remarked that he had better first of all prove that these allegations were well founded. This is the point to which we desire to call attention and we regret that the desirability of the step suggested by the clerk to the magistrates does not seem to have attracted his attention at an earlier stage, for we venture to think that if such had been the case Mr. WHITTLE might not have been summoned before the magistrates. Certainly upon that occasion the inspector did not respond to the suggestion offered, and so far the charge rests wholly upon his dictum.

In saying this much we do not mean to impute to the inspector any disposition to mislead or misrepresent, but having regard to the faculties of manipulation and observation requisite for satisfactorily carrying out such operations as the testing of graduated measures, we do not hesitate to declare that without very conclusive proof to the contrary we should be strongly inclined to doubt the accuracy of the inspector's results as stated in this case. To our apprehension the question is whether the figures given by the Marylebone inspector represent irregularities of graduation or inaccuracies of observation.

But however that may be, it certainly was never the intention of this Act that irregularities of graduations relating to drops of liquid should—even if they existed—be made a pretext for a charge involving the suspicion of intentional fraud. The officials of the Board of Trade connected with the Standards Department have always manifested such readiness to render assistance to those charged with the administration of the law relating to weights and measures that it might have been expected the local authorities of Marylebone would have sought counsel in that quarter as to the propriety of instituting such a prosecution as that of Mr. WHITTLE. They have, indeed, now referred the case to the Board of Trade, but from our reading of the Act it seems more than doubtful whether that department can now take any action.

As the case stands it is one of conflict between two authorized inspectors upon points of detail that are really less important than they are made to appear, and there is much reason for believing that the settlement of such points is far beyond the capacity of the average inspector of weights and measures. Few of these officials, indeed, are competent to do the work required in testing apothecaries' weights and measures. The situation is one of a serious nature, however, to chemists and druggists and to those who supply them with weights and measures, but it may perhaps produce the good effect of constraining local authorities to pay more attention to the due performance of their duties in the matter of verification and inspection of weights and measures than they have done hitherto.

We are informed that the Council of the Pharmaceutical Society, having regard to the gravity of the case, has empowered the President to confer with the Society's solicitor as to the best mode of procedure with a view of averting the possible inconvenience with which members of the trade now seem to be threatened in connection with the inspection of apothecaries' weights and measures.

THE METRIC SYSTEM.

REFERRING to the position of the metric system in the United States, where although endorsed by the medical and pharmaceutical professions and other scientific bodies, the system does not make way amongst the general public, the *Pharmacist* affirms that much could be done towards the removal of this indifference by judicious legislation. It suggests that if, for example, the tax on tobacco were fixed at so much per kilogram, the whole traffic in that article would, as a matter of convenience, soon follow this lead and, as a result, people would become familiar with the names and values of the weights of the metric system. A similar result it is thought would also follow the taxing of liquors by the litre or decalitre.

GRAHAM MEDAL.

IT is announced that the triennial Gold Medal of the Chemical Section of the Philosophical Society of Glasgow, founded in commemoration of the work of the late Professor GRAHAM, will be awarded at the end of the present session for the best paper on any subject in Pure or Applied Chemistry. Papers should be sent, not later than February, to the Secretary of the Section, Dr. J. DOBBIE, Chemical Laboratory, University of Glasgow.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

THE first meeting of this session will be held at 17, Bloomsbury Square, W.C., on Thursday, November 11, at 8.30 p.m. The President, Professor ATTFIELD, F.R.S., will occupy the chair. The election of officers for the ensuing session will take place, after which the President will refer to the objects of the Association and will introduce for discussion the subject of "Chemical Constitution from the point of view of the Student of Pharmacy."

THE CHEMISTS' ASSISTANTS' ASSOCIATION.

A MEETING of the above Association will be held at its rooms, 32A, George Street, Hanover Square, on Wednesday next, November 10, at 9 p.m., precisely, when Mr. E. M. HOLMES, F.L.S., will read a paper on "British Mosses."

THE returns for duty paid on patent medicines during the year ending March 31 last shows that the consumption of these preparations is still increasing; the amount being £133,668 against £130,691 in the previous year.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, November 3, 1880.

MR. THOMAS GREENISH, PRESIDENT,

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present — Messrs. Andrews, Atkins, Bottle, Butt, Churchill, Frazer, Gostling, Hampson, Hills, Mackay, Radley, Richardson, Robbins, Sandford, Savage, Squire, Symes and Williams.

The minutes of the last meeting were read and confirmed.

The **President** read a letter from Mr. Moss acknowledging receipt of the letter sent from the Council accepting his resignation as an examiner.

The Benevolent Fund.

Mr. **Robbins** said he wished to correct some inaccuracies in the report of the last Council meeting, his remarks on the working of the Benevolent Fund not having been correctly represented. No doubt this arose partly from the fact that there was a great deal of matter to get into the Journal,[*] but the principal reason probably was that the reporter who usually attended was not present. The report commenced by a reference to his reason for bringing forward the motion, but it did not give the reason at all, as he had stated he was induced to bring forward the motion because at a recent meeting of the Benevolent Fund Committee when a case was under consideration, he had asked whether the applicant was a member of the Society or not; and the reply he received was that the Committee had no power to make any distinction between those who were and those who were not members of the Society. His intention was, if his motion had been adopted, to propose at the next meeting of the Benevolent Fund Committee that applications from members and associates, and their dependents, should be first considered, and afterwards the applications from non-members; as he considered that such a change would be beneficial in the interests of the members themselves. From the observations of some of the members it might be inferred that he wished to make subscription to the Benevolent Fund a test of eligibility to receive assistance; but he was as much opposed to that as any one could be. He had always considered that those who unfortunately had barely sufficient to meet the wants of their own households were not justified in giving away money even for charitable objects. He should, therefore, certainly oppose any attempt to limit the Benevolent Fund to subscribers only. On the other hand he wished to encourage those who were in more affluent circumstances to subscribe freely and liberally, and he would give them privileges in return for so doing.

Mr. **Hampson** here rose to order.

Mr. **Robbins** said he was merely correcting an inaccurate report.

Mr. **Hampson** said the whole Council might wish to do the same, as the report was very imperfect.

Mr. **Robbins** said he should be very brief. He merely wished to make it clear that he had no intention of limiting the benefit of the Fund to subscribers.

Mr. **Andrews** suggested that the best course would be for Mr. Robbins to address a letter to the Editor, giving the corrections he wished to make. He should like half an hour himself to correct the report of his own remarks; but he should not think of doing so.

Mr. **Robbins** said he did not wish to re-discuss the question, which, of course, he had no right to do; but he certainly had a right to correct any error in the report.

The **President** thought Mr. Robbins was entitled to correct any inaccuracy in the report.

Mr. **Atkins** suggested to Mr. Robbins that his reputation in connection with the Benevolent Fund stood too high to be in need of any further explanation.

Mr. **Robbins** said there were important errors, which he ought to be allowed to correct. He was reported to have said that members had taken umbrage at the large grants made to outsiders; but he never said anything of the kind. He did not say anything about large grants, but the large amount of money given in grants, which was quite a different thing. Again, Mr. Williams had charged him with making exaggerations, which was a serious accusation; but his reply to him was not given.

Mr. **Williams** remarked that two-thirds of what he had said was not reported.

Mr. **Hampson** hoped Mr. Robbins would not occupy the time of the Council further on this matter.

Mr. **Robbins** said he would bow to the wish of the Council; but he should raise the same objection when other members wished to refer to what had taken place at former meetings.

Diplomas.

The following, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Allsworth, Norman.
Christopherson, Fred.
Coverdale, George.
Davies, Richard.
Hope, Arthur Peach.
Horne, John.
James, Charles Frederick.
Morse, Charles Henry Stafford.
Phillips, James Wilson.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Fazan, Charles Herbert	London.
Horne, John	Wall Heath.

ASSOCIATE IN BUSINESS.

Protheroe, John Godwin.........Axminster,

having passed the Minor examination, being in business on his own account and having tendered his subscription for the current year, was elected an "Associate in Business" of the Society:—

ASSOCIATES.

The following, having passed their respective examinations and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Ackerman, Henry	Chipping Sodbury.
Adams, Henry George	Maidstone.
Baines, Francis	Corsham.
Chaplin, John Henry	Wakefield.
Chapman, William Henry	Birmingham.
Crompton, Alfred, jun.	Bury.
Curry, Nicholas	Spennymoor.
Ellis, Richard	Knaresborough.
Evans, Thomas	Chorley.
Harrison, Peter Webster	St. Helens.
Hart, Thomas	Darlington.
Howell, William	London.
Hucklebridge, Philip	London.
Hunt, Tom George	Snaith.
Jackson, William Edw. Gillson.	Newark.
Jenks, William	Bristol
Jevons, Wallis Byron	Market Rasen.
Paine, Charles	Belton.
Prosser, Frank Henry	Birmingham.

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[*] The report of Mr. Robbins's remarks was printed as it reached our hands without abridgment or alteration.—Ed. Pharm. Journ.

Rigg, George Farrer...............London.
Stanford, Frederick William ...London.
Sumner, John ....Wilmslow.
Woods, William Herbert.........Plymouth.

Modified.

Tregear, Augustus Frederick ...London.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Clague, Thomas Maltby ....Douglas.
Nicholson, Walter John Cecil...Woodstock.
Williams, Ernest B. B. ....Edmonton.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

RESTORATIONS TO THE REGISTER.

The names of the following persons, who had severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Thomas Crocker, 23, Bayswater Terrace, London, W.
Thomas Jones Parry, Ebenezer, Carnarvon.

ADDITIONS TO THE REGISTER.

The Registrar reported that—

Mary Letitia Harley, 135, Great Dover Street, Borough, London, S.E., and
Henry Chetham Robinson, 65, Battersea Park Road, London, S.W.,

having made statutory declarations that they were in business before the passing of the Pharmacy Act, 1868, and this declaration having been supported by duly qualified medical practitioners, their names had been placed on the Register.

REPORTS OF COMMITTEES.

FINANCE.

The report and recommendations of this Committee were received and adopted, and several accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to a registered chemist and druggist, who has had three previous grants of like amount. This applicant was formerly in business for thirty years.

£10 to the widow of a late associate of the Society who died in June last, and who had himself twice received assistance from the Fund.

£5 to the widow of a pharmaceutical chemist member.

£10 to the widow of an associate, who has had two previous grants of like amount.

£5 to be placed in the hands of the Secretary for giving casual relief in pressing cases.

£12 to a registered chemist and druggist to provide him with a cork leg.

Several applications had been deferred for further inquiries. One had not been entertained, the applicant having £500 in a bank.

The Secretary had reported that there were five other applications, which were not yet complete.

A letter had been received from one of the late Mr. Isherwood's orphans stating that she was very happy and comfortable.

The report and recommendations of this Committee were received and adopted.

The Council went into committee to consider one particular case, and in the result the Secretary and one of the members of Council were requested to make personal investigation into the circumstances.

LIBRARY, MUSEUM AND LABORATORY.

The Librarian's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
July 1 to 31	Day . . .	286	18	4	10
	Evening .	155	13	3	7
August 1 to 31	Day . .	33	5	0	1
Sept. 15 to 30	Day . .	69	10	1	5

Circulation of books.	No. of Entries.		
	Town.	Country.	Total.
July	153	197	350
August	68	77	145
September 15 to 30 .	74	126	200

Carriage paid.	£	s.	d.
July	4	1	11
August.	2	2	6
September	2	11	9

The Librarian had also reported that in making the annual inspection of the Library he had found the undermentioned books were missing:—

Beasley's Book of Prescriptions, 4th ed., 1872.
Chemist and Druggist, 1866-7 (double vol.).

The following donations to the Library had been received:—

Histoire et Documents Inédits sur les Caux de St. Pardoux. From Professor J. LÉON SOUBEIRAN.

Jalan de la Croix, N., Das Verhalten der Bacterien des Fleischwassers gegen einige Antiseptica, 1880.

Kessler, F., Versuche über die Wirkung des Pepsins auf einige animalische und vegetabilische Nahrungsmittel, 1880.
From Professor DRAGENDORFF.

Macfie, R. A., Copyright, 1879. From the AUTHOR.

Massachusetts College of Pharmacy, Sundry Reports, Prospectuses, etc. From Dr. B. F. DAVENPORT.

Müller, F. v., Eucalyptographia, 1880, 6th decade.
From the AUTHOR.

Power, F. B., On the Constituents of the Rhizome of Asarum Canadense, 1880. From the AUTHOR?

Pulteney, R., Historical and Biographical Sketches of the Progress of Botany, 1790, 2 vols.
From Mr. W. T. ELLIOTT.

Royal College of Physicians, Pupil's Pharmacopœia, a Translation of London Pharmacopœia, 3rd ed., by W. Maugham, 1824. From Mr. W. FEVER.

Royal College of Surgeons of England, Calendar, 1880. From the COLLEGE.

Royal Dublin Society, Scientific Proceedings, 1877-80; Scientific Transactions, 1877-80.
From the SOCIETY.

Sinimberghi, N., Il ferro dializzato, la sua vera composizione chimica e il miglior modo di prepararlo, 1879. From the AUTHOR.

Smithsonian Institution, Annual Report for 1878.
From the INSTITUTION.

Tommasi, D., Ossicloruri alluminici, osservazione sull' attuale peso atomico dell' alluminio, 1880.
— Ricerche intorno alla formazione dell' idrato ferrico, 1880. From the AUTHOR.

United States of America, Surgeon-General's Office, Index-Catalogue of Library, vol. i., 1880.
From the SURGEON-GENERAL.

University College, London, Calendar, 1880.
From the COLLEGE.

University of Edinburgh, Calendar, 1880.
From the UNIVERSITY.

University of Glasgow, Calendar, 1880.
From the UNIVERSITY.

The Committee recommended that the publications of the Society be forwarded to the Royal Dublin Society.

The Committee recommended the purchase of the undermentioned works for the Library:—

Archiv für experimentelle Pathologie und Pharmakologie.

Bancroft (E.), Essay on the Natural History of Guiana, 1769.
Bourgoin (A. E.), Traité de pharmacie galénique, 1880.
Camboulives (M.), Manuel pratique de thérapeutique, de matière médicale, de pharmacologie et de l'art de formuler, 1880.
Gamgee (A.), Text-book of the Physiological Chemistry of the Animal Body, 1880.
Linnean Society, Transactions, vol. 29, Botany of the Speke and Grant Expedition from Zanzibar to Egypt.
Museum of Practical Geology, Catalogue.
Wurtz (A.), Atomic Theory, translated by E. Cleminshaw, 1880.

The Librarian had presented his report on the annual meeting of the Library Association, and on his visit to the Society's rooms in Edinburgh.

The Curator had presented a report, in which it was stated that the attendance in the Museum during three months had been as follows:—

	Attendance.	Total.	Highest.	Lowest.	Average.
July 1 to 31	Day. .	271	19	3	10
	Evening	62	13	0	2
Aug. 1 to 31	Day. .	44	5	0	2
Sep. 15 to 30	Day. .	103	20	0	8

The following donations had been received:—

Duboisia Leaves.
From Messrs. Grimwade, Ridley and Co.
Single Camomile Flowers.
From the North British Branch.
Specimens of Boracite and Crude Boracic Acid.
From Messrs. Townsend and Co., Glasgow.
A Mass of Crystals of Chlorate of Potassium, and Iridescent Crystals of the same Salt.
From the North British Seaweed Company, Glasgow.
A Mass of Crystals of Bichromate of Potassium.
From Messrs. J. and J. White, Glasgow.
A Series of Specimens illustrating the Products of the Destructive Distillation of Wood.
From Messrs. Turnbull and Co., Glasgow.
A large Series of Specimens illustrating the Manufacture of Copper and Sulphur.
From the Tharsis Sulphur and Copper Mining Co.
Specimens of Tong-pang-chong Root; a Sweet Cayenne Pepper Pod; Quebracho Bark and Leaves. From Messrs. Thos. Christy and Co.
A fine Specimen of *Prunus Laurocerasus* in fruit.
From Messrs. Kay, Brothers, Stockport.
A fine Specimen of Root of *Veratrum Viride.*
From Messrs. Morson and Son.

Letters of thanks had been received for duplicate specimens of Indian and other drugs which had been distributed to the following:—

Professor Bommer, of Brussels.
„ Fristedt, of Upsala.
„ Dragendorff, of Dorpat.
The Leicester Chemists' Assistants' Association.
Parkes' Museum of Hygiene.
St. Bartholomew's Hospital Medical School.

The Curator reported also that the duplicate specimens asked for by Professor Soubeiran, of Montpellier, and by the Leicester Chemists' Association, and by Professor Fristedt, of Upsala, had been forwarded to them. Specimens of the drugs received from the India Museum had been placed in the Society's Museum, as also specimens of the Morocco drugs, recently presented by Mrs. Leared. Some duplicates of Indian drugs, etc., still remained, of which a list had been prepared and would shortly be distributed.

An application had been received from the Aberdeen Chemists' Association for some glass covered tin boxes, which were for disposal. The Committee recommended that the request be acceded to.

Mr. J. Collins had offered some Herbarium Specimens of Medicinal Plants for sale. The Curator was desired to select such as might be suitable for the Society's Museum, and to arrange with him as to the price, and report at the adjourned meeting.

A gross of bottles was required for the Hanbury collection of materia medica, which would shortly be attended to. The Committee directed that they be procured.

The Professors had attended, and reported that the entries in the respective classes were rather more numerous than at the corresponding period of last session.

The Committee recommended that the 'Historical Sketch of Pharmacy' should be sold at 3*s.* 6*d.*, and that copies should be sent to the provincial associations and to such learned societies as the President should select.

An advertisement for an Assistant Curator had been drawn up and inserted in the Journal, in response to which eleven applications had been received, and the Committee recommended that Mr. William Elborne, pharmaceutical chemist, and Bell Scholar of last session, be appointed.

An application had been received from Professor Attfield asking that additional means for warming the laboratory might be provided, and it was recommended that this should be done if the cost did not exceed £20, and if it would not interfere with the policy of insurance.

It was also recommended that a list of Bell Scholars and of the Pereira and Silver Medallists be prepared, with a view of displaying them on a tablet in some conspicuous position.

The Council went into committee to consider the report. On resuming,

The report and recommendations of the Committee were received and adopted.

It was also resolved that a copy of the Librarian's and Curator's reports, on their recent visit to Edinburgh, should be sent to the Secretary of the North British Branch, to be submitted to the Council and Board of Examiners in Edinburgh.

The **President** asked the Council to sanction the sending of the Journal, regularly as published, to the Botanical Gardens in St. Petersburg. The request was made to him by the Curator of the Gardens, Herr Maximowicz, a man of world-wide reputation, and the most eminent systematic botanist in Russia, and he had no doubt that some valuable contributions would be received from him. Herr Maximowicz had promised that publications issued in connection with the Botanical Gardens at St. Petersburg should be sent to the Society.

Mr. **Hills** suggested that a copy of the 'Historical Sketch of Pharmacy' should also be forwarded.

The suggestions were unanimously agreed to.

The **Vice-President** asked whether there were any solid grounds for limiting the list of prizemen to the Bell Scholars and Pereira Medallists? Many men had distinguished themselves as students before the institution of either of those prizes, and they might like to have their names recorded as well as those who had come to the front in more recent times.

Mr. **Sandford** said the whole subject would require a good deal of consideration, and probably no arrangements would be carried out until after the next Council meeting.

HOUSE.

The report of this Committee included a recommendation that the Secretary should have tablets affixed to the portraits and other pictures belonging to the Society, and should also obtain the advice of Messrs. Vokins as to the desirability of cleaning and re-varnishing some of them.

The report and recommendations of the Committee were received and adopted.

GENERAL PURPOSES.

The report of this Committee included the usual report of the Solicitor as to the conduct of cases which had been placed in his hands. It stated that Mr. C. D. Harrod, 105, Brompton Road, had paid the amount of penalty and costs into court.

As usual, the report of this Committee was considered in committee.

On resuming, the report and recommendations of the Committee were received and adopted.

PHARMACY ACT AMENDMENT.

This Committee had held a meeting at which it had been resolved after discussion:—

> "That in consideration of the decision of the House of Lords in the case of the Pharmaceutical Society of Great Britain *v.* The London and Provincial Supply Association, Limited, this Committee recommends that steps be taken to obtain an amendment of the Pharmacy Acy, 1868."

The report and recommendation were unanimously adopted.

Mr. **Hampson** moved:—

> "That the Pharmacy Act Amendment Committee be requested to draft a bill to amend the Pharmacy Act, 1868, and submit the same at its earliest convenience to this Council."

Mr. **Richardson** hoped the Committee would take the earliest opportunity of letting every member of the Council see the draft of the bill. It was a very important matter, and he hoped every means would be taken to make the bill as perfect as possible.

Mr. **Hampson** said he felt this was a very important occasion and that the Committee would require all the help and support of the Council in carrying out its labours. It was a great crisis in pharmacy, which necessitated fresh legislation, and he hoped the Committee would be able to produce a bill which would meet with the acceptance of the Council. It was not desirable to go into details now, but he hoped the Committee would get to work as soon as possible and draft a bill.

The **Vice-President** seconded the motion, but he thought it was worth considering whether the Committee should not limit itself to the framing of suggested alterations before putting them into the form of a bill. He had a strong opinion that if the Society endeavoured to carry a bill of its own through Parliament it would very likely fail, and therefore it should rather endeavour to enlist the Government in favour of the ideas it wished to formulate. In order to do it the Society should approach the Government, not with a bill ready drawn, but with suggestions which the Government might introduce into any bill of its own.

Mr. **Hampson** said the Committee would no doubt have to take the Council into its confidence time after time before the bill was presented in its final shape. The advantage of putting the ideas of the Committee in the form of a bill was that they then took a more perfect and definite form.

Mr. **Atkins** hoped the suggestions of the Committee, as laid from time to time before the members of the Council, would be discussed openly, or else they would lose a large amount of valuable assistance from members of the Society outside. He could quite understand there must be certain matters which it might be wise to keep to themselves, but there were many points on which they would get valuable help from outside.

Mr. **Savage** said when the Committee had come to a resolution as to the best course to adopt, it would then be submitted to the open Council and postponed for further consideration, when the public interested in the matter would have an opportunity of making any suggestions.

The **Vice-President** desired to remind Mr. Atkins that what was published became other people's property as well as the Council's. If the Council had any sort of idea that it was going to work round public companies and bring them into the same category as private individuals and published that to the world it would be simply courting organized opposition.

The motion was put and carried unanimously.

Mr. **Hampson** said he supposed the Committee, when necessary, would have power to call in the aid of the Solicitor.

The **President**: Certainly.

BOARD OF EXAMINERS.

The **President** reminded the members of Council that at the next meeting it would be necessary to appoint the Board of Examiners for the ensuing year. One gentleman, Mr. Moss, had resigned, whose place must be supplied, and it was open to any member of the Council to suggest any names.

REPORT OF EXAMINATIONS.

October, 1880.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major, (20th)	6	5	1
„ (21st)	6	3	3
„ (27th)	6	1	5
	— 18	— 9	— 9
Minor, (20th)	14	8	6
„ (21st)	18	11	7
„ (22nd)	25	11	14
„ (27th)	18	8	10
„ (28th)	21	7	14
	— 96	—45	—51
Modified, (20th) . . .	3	1	2
	117	55	62

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed
Major, (20th)	2	0	2
Minor, (20th)	11	6	5
„ (21st)	14	9	5
	—25	—15	—10
Modified, (21st) . . .	1	0	1
	28	15	13

Preliminary Examination.

Candidates.		
Examined.	Passed.	Failed.
227	135	92

14 certificates received in lieu of Society's examination:—

5 University of Cambridge.
1 University of Oxford.
1 University of Edinburgh.
5 College of Preceptors.
1 Faculty of Physicians and Surgeons of Glasgow.
1 Royal College of Surgeons of England.

PHARMACEUTICAL MEETING.

Wednesday, November 3, 1880.

MR. T. GREENISH, PRESIDENT, IN THE CHAIR.

The second Evening Meeting of the session was held on Wednesday, November 3, the chair being taken by the President at half-past eight o'clock.

The minutes of the previous meeting having been confirmed,

The **President** said he regretted there was so small a programme for the evening, but there were some matters in connection with the specimens on the table which might be interesting. As some of them were contributed by himself he would ask the Vice-President to take the chair while he described them.

The **Vice-President** took the chair accordingly.

The PRESIDENT said most pharmacists were in the habit of taking an autumnal holiday, and they certainly should be, if they were not, for it did a person engaged in business a great deal of good to get away for a bit, especially if he got out of the way of business letters. It therefore occurred to him this year to go to Russia, and he took the steamer from Hull to Riga, which was a six days' journey. On the way he asked the captain if he knew anything of Riga balsam, of which he was anxious to get a specimen. The captain said he knew it well, always kept it by him, and found it very useful when he had pains in the stomach. This balsam was a regular article at an old historic house in which he (the President) spent some five or six years at an early period of his life. When he got to Riga he obtained a bottle at the distillery where it was made, and the proprietor showed him the recipe, from which it appeared that it contained 95 per cent. of spirit, and was drawn over from certain herbs, amongst which wormwood was included. He took about a teaspoonful or rather more, and it nearly took his breath away; but he understood that the Russians would drink a beerglass full, and without so much as winking. The bottle which he brought with him bore a label, as usual in the Baltic provinces, in both Russian and German, and it might be interesting in the museum, though he did not think it was quite the same as the article he remembered some forty years ago, which was thicker, and more like a balsam. Having spent some time in Riga he went on to Reval, the part through which all drugs were introduced into the north of Russia, just as most articles coming from India and Persia were introduced through Nishnii Novgorod. Some time ago a large quantity of cocculus indicus had been sent there as juniper berries, but was stopped by the analyst, who obtained a considerable sum, about £70 or £80, for so doing from the Government. He also met there with an article which was introduced as cinnamon, and it was unquestionably a cinnamon, but not the bark commonly known under that name. He had not had time to determine what it actually was, but believed it was one of the cassias. Another spurious specimen he brought home was sold as saffron, but was really nothing but *Calendula officinalis*, mixed with a large quantity of starch and some colouring matter. From Reval he made his way to Dorpat, where he visited the laboratory of Professor Dragendorff, who presented him with a case containing thirty-two specimens, mainly salts of platinum and other metals, prepared by Professor Claus, the great authority with regard to platinum and the discoverer of ruthenium in the residues of that metal. He was formerly professor of pharmacy in that university. These were very interesting and many of the specimens were valuable, and could hardly be replaced. Professor Dragendorff also gave him an ore of manganese, obtained from the Caucasus, which he believed would in the future be an important source of supply of this mineral. There was also an interesting specimen of native soda carbonate, and a sample of mannite, extremely pure and interesting as being a product of the decomposition of lactic acid. It would be remembered that at the Pharmaceutical Conference he brought forward a sample of cayenne which had been introduced into this country; not as was at first thought as an adulterant, but as afterwards appeared for the feeding of canaries, and Mr. Brady then suggested that it was probably the paprika which was grown in Hungary. Professor Dragendorff gave him a specimen of genuine paprika, sent him by Professor Egge, and it was a kind of cayenne which was in common table use in Russia, being used freely like ordinary pepper. It had certainly a pungency which the specimen he showed at the Conference did not possess. Mr. Brady had since sent to Hungary for some paprika, and one sample possessed a little of the pungency of cayenne, but the other specimen did not. It was quite possible that the sample he showed might have been of the latter kind, as it had a good colour. Professor Dragendorff also gave him a typical sample of strychnos bark. He spent a good deal of time in the laboratory, and the professor took him over the Materia Medica Museum, which certainly astonished him by the number and the variety of the specimens stowed away in so limited a space. He has reason to believe that the present condition of the museum is mainly due to Professor Dragendorff's untiring energy. He was much pleased, also, to see there some specimens which bore on the label, "From Jonathan Pereira.' It appeared that Professor Dragendorff had purchased a portion of the museum of Martiny when it was sold after his death. Martiny was the author of a cyclopædia of drugs which is still thought very highly of in Russia, and it was from his collection that these Pereira specimens came. Professor Schmidt, Professor of Chemistry in the Dorpat University, had asked him to bring for the Society's museum six specimens of naphthas and four of ozokerit, which were obtained in Baku, in the south-east of Russia. A specimen of Persian galbanum was given him by Edward Hirschson, who had written a pamphlet on gum resins, which obtained for him the title of Magister of Pharmacy and the Suwarrow Gold Medal; it was, in fact, one of the most exhaustive pamphlets he had ever seen on any one subject. It so happened that in Russia he not only met with Hirschson, but with Treumann, also a Magister of Pharmacy, known by his pamphlet on Aloes, and with Christophson, who had obtained the same title by his researches on saponin, together with several others, who had equally distinguished themselves in the Dorpat Laboratory. Each of the men who had obtained this title was really a marked man, and he could not help repeating the opinion he had expressed before, that he should like to see some such title as Fellow of the Pharmaceutical Society given to advanced students who would devote a year or so to some particular line of research; thoroughly investigate some particular subject, and make that examination exhaustive. The title might be accompanied with a life membership to make it more valuable. He had also a few samples from a former Bell Scholar and student of this Society, Mr. Henry George Greenish, who, he was pleased to say, still carefully read the Journal, and was as much interested in the Society as when he resided in England. Some time ago he contributed a paper on The Chemistry of Nigella Sativa to the *Pharmaceutical Journal*, and these samples were illustrative of that paper, being the substances obtained from the nigella. He particularly wished attention to be directed to the frothing which occurs (analogous to saponin) when a little of the melanthin is dissolved in spirit poured into a bottle half filled with distilled water and vigorously shaken, and the close analogy which this melanthin of *Nigella sativa* bears to the helleborin of the botanically nearly related helleborus carried out the anticipation of Dragendorff that plants naturally closely allied frequently contain similar important constituents. Whilst in Dorpat he had much pleasure in spending several hours in the laboratory of Professor Russow with whom vegetable histology had been a life study. He had often mentioned how desirable it would be for students to pay attention to this subject, but the fascination of the subject never struck him so forcibly as it did on this occasion. He was also invited to visit the paper manufactury of Mr. Schultz, at Rappin, forty-five miles from Dorpat, and was much interested in what he saw. The conditions of paper manufacture were very different in Russia to what they were in England, linen rags being cheaper than wood pulp. The peasants grew and spun flax very largely, so that almost every article of clothing worn by them was was made of linen. He had brought several samples of paper; one a filtering paper, was specially interesting. It could only be made in the winter, because they never used any chemicals for bleaching, but effected this by exposure, and he was told that it was necessary for this paper to be exposed to a freezing temperature. The freezing of the water had the same effect he presumed on the filtering paper as it had in slate quarries, where it separated the laminæ. In the case of the paper it separated the fibres and made it uniformly porous. Another specimen he had brought was a material very largely used there for roofing; it was composed of several layers of paper closely pressed together, and soaked in a mixture of mineral and wood tar. The gentleman at whose house he stayed, although keeping his carriage and livery servants, had his house covered with this material. He next went to St. Petersburg, where he had an invitation from Mr. Maximowicz, who was the Curator of the Botanical Gardens, and the most eminent systematic botanist in Russia, to call upon him. He was preparing a flora of Japan, and although it was not a flora of medicinal plants he had no doubt it would be very valuable even to pharmacists, and that this gentleman, from his great knowledge of Japanese plants, would be extremely useful to the Society. They were now getting a large number of products from Japan, for instance aconite roots; he had himself expressed an opinion several times with regard to the two kinds of aconite roots from Japan, from which the aconitine had been obtained, but they were not quite certain as to what species they belonged and until they were their information would not be definite. He sketched out for Mr. Maximowicz the two kinds of aconite roots, when he pointed out one as the *Aconitum Fischeri*. In the last "Month" it was mentioned that according to information obtained directly from Japan such was really the case. He had no doubt that Mr. Maximowicz would be able to give the Curator of the Museum very valuable information in the case of any Japanese drugs which came under his notice. Mr. Maximowicz expressed a wish that the *Pharmaceutical Journal* should be added to the Library of the Botanical Gardens of St. Petersburg, and he was happy to add that the Council had this day acceded to his request. In St. Petersburg he visited a great many pharmacists, and was much struck with the large quantity of oxygen used there for inhalation. At the Oldenberger Hospital for children, the manager of which he knew, he found an enormous quantity of oxygen gas used, and on visiting many of the pharmacists he found that it was really quite an article of trade; one pharmacist, who did a fair business, told him that the quantity he sent out during two or three of the winter months was about £100 worth in value. Asthma was very prevalent in St Petersburg in October, November, and December. It seemed to him very singular that an article so much used there, each pharmacist having his gasometer, was scarcely used at all in this country. In presenting these specimens to the museum, he could not help referring to the great courtesy and kindness shown by Russian pharmacists to a representative of the pharmacy of Great Britain.

Professor **Attfield**, alluding to the specimen sent by Mr. H. G. Greenish, said that as a professor of the Society, he was much pleased to see the interesting work which his old scholar was doing. He would remind the Society that Mr. Greenish, jun., was not only a Bell scholar, but also an old member and officer of the School of Pharmacy Students' Association, in which he had, possibly for the first time, learnt the art of recording the results of his observations, and perhaps of observing, therefore, all the more accurately, and had thus, it might be, first got into the way of making those elementary investigations which had ultimately led to the important researches in which he had been recently engaged, the results of which he had sent to the Society.

Mr. **Holmes** had listened with great interest to the President's remarks. He had looked over the salts of platinum and allied metals, and found the majority of them were such as the museum had not hitherto possessed. He believed that Professor Claus was the discoverer of ruthenium. With regard to the paprika or capsicum, he had tasted it, and found it had a slight pungency; but that sent to him from various parts of this country had no pungency at all. He was told that it was not used as a stimulant for canaries, but simply to increase the brilliancy of the colour of their plumage. There was another kind of capsicum, of a somewhat globular shape, like a small tomato, which had no pungency, and this was cultivated in various parts of the continent, and was, he had reason to believe, the source of the cayenne pepper used for canaries. With regard to the nux vomica bark, it was one of the most characteristic specimens he had seen, and it was exceedingly difficult to get such a specimen in this country. The President had mentioned that several of Dr. Pereira's specimens were found at Dorpat. In the Society's museum there was the chief collection of the late Dr. Pereira, and in it there were a number of specimens which were marked from Dr. Martiny, so that Pereira had evidently exchanged specimens with Martiny. Some little time ago he had been asked to look over the specimens of materia medica in the London Hospital, where Dr. Pereira was formerly a lecturer, and he found there a set of small duplicates of the specimens which illustrated the grand work on materia medica of that author, and which were, therefore, of considerable interest and historic value. Along with these he found a specimen of bark, bearing a label stating that it had been sent over here as a false cinchona bark from Santa Marta, New Granada, in May, 1852. It was evidently the same bark as had now come into commerce under the name of coto bark. With regard to the importance of vegetable histology, he confirmed Mr. Greenish's observations. It was by the aid of the microscope that he was able to be certain that the specimen of saffron really consisted of the common marigold plant, *Calendula officinalis*. He had often read that saffron contained marigold florets; but he had never found it mixed with or substituted for saffron. In putting this under the microscope he observed that the ligulate florets exactly corresponded with those of the marigold in the number of teeth and also in the hairs. He found two kinds of hairs on the marigold florets, the one kind consisting of a single series and the other of a double series, and both these were present also on this spurious saffron. Again, there were some grains of pollen on the forked stigma, and he noticed that on the false saffron the pollen was spiny. He then took a specimen of marigold, and found its pollen was of exactly the same kind. When books were published on different kinds of pollen, diatoms, etc., they might not at first sight seem to be of much use; but cases were constantly occurring which showed the importance of all branches of vegetable histology. He had been much interested in the Russian filtering paper, and the method of rendering it porous; it reminded him of a peculiar kind of seaweed isinglass, which came from Japan, which also was very porous. For some time it could not be discovered how it was made porous, the outside being perfectly smooth; but he learnt from a Japanese gentlemen that they made the jelly by boiling the sea-weed in water, and then took it to the coldest part of the island and allowed it to freeze; when it had become solid they cut it into strips, laid it on boards and put it in the sun to dry, when the moisture oozed out and left it in a porous state. With regard to the collections of Japanese plants which Mr. Christy gave some time ago to the museum, he was able to identify one of them by means of a description of the plant published by Maximowicz. He had been interested for some time in Japanese aconite, and took the trouble some time ago to examine all the specimens in the British Museum and Kew Herbarium. There were three kinds of aconite found in Japan; one, *A. uncinatum*, had a very narrow tapering root, not larger than a quill when dried; another was identical with *Aconitum Napellus*, though it was called by another name; the third, of which he could not obtain a root, was *Aconitum Fischeri*. He, therefore, came to the conclusion that the Japanese aconite must be produced by *A. Fischeri*, and, therefore, had written to Japan and asked a gentleman whom he knew there to send him specimens, so that he might make sure that the Japanese aconite really came from that plant. However, he had evidently been forestalled by Mr. Maximowicz. It gave him great pleasure to see these specimens sent by Mr. H. G. Greenish; he found great difficulty in getting gentlemen in this country to undertake the investigation of anything new, and only a short time ago he had to send to Professor Dragendorff a bark which came into this country in some quantity, and which he had tried without success to get examined here. The cinnamon was an interesting specimen. In the spring of this year Professor Flückiger sent him a specimen of cinnamon which corresponded almost exactly with that from Dorpat. Now in 1876 it came to his knowledge that there were in this country two hundred bales of cinnamon of that kind, and they were bleached and sent to Hamburg, because the cinnamon was rather darker than ordinary kind. He believed the false cinnamon was bleached by moistening it with water or steam, and exposing it to the vapour of sulphurous acid. It seemed to have made its way from Hamburg to Russia on the one hand, and to Strassburg on the other. It had a taste something like coriander and cinnamon, mixed with a trace of clove flavour. He might mention that amongst the India Museum specimens of cinnamon recently presented to the Society he had found one, called *Cinnamomum obtusifolium*, very similar in taste to that now shown, but they did not seem exactly to correspond under the microscope, although the India Museum specimen was probably younger and might differ somewhat on that account. He should not like to say without further examination whether this false cinnamon was produced by *C. obtusifolium* or not. For practical purposes, however, it was easily distinguishable from common cinnamon by its fibrous structure and its characteristic taste.

The **President** said the sample of spurious saffron was considered a very good adulterant; it was so mixed with starch that it was evidently an intentional adulterant. The cinnamon had none of the outside bark attached to it. The sclerenchymatous tissue, or steincellen as the Germans call it, running along in one direction inside the bark, was very characteristic of one species; this had not got it, but the specimen Mr. Holmes gave them showed it very clearly.

Mr. **Holmes** added with regard to the saffron that he had remarked the starch in it, but did not feel sufficiently satisfied to say much about it, but the colouring matter he had examined carefully. He washed some of it off the florets and found it had a reddish colour, and believed it came from the petals of the poppy; the red colour of the poppy mixed with the yellow of the marigold produced exactly the orange colour of saffron. He thought the petals used to make this artificial saffron were not used in the dry but the fresh state, when the colour would be brighter. It was mixed up with some kind of flour, probably ordinary flour, because the starch seemed to be of two or three kinds. Probably the poppy petals were bruised and mixed with thin flour paste, and the fresh marigold florets coloured with the mixture.

Professor **Bentley** said he could not help rising to thank the President for his communication, though he was not prepared to make any special remarks on any of the specimens he had referred to. The President had gone over a new field and visited a country of which they knew comparatively little, and many of the matters he had mentioned were especially interesting on that account. A word or two the President had let fall with regard to his great teacher, Dr. Pereira, had given him great pleasure, and he could fairly bear out what the President had said. He had the happiness not only of being a pupil of Pereira, but was afterwards his colleague when lecturing at the London Hospital, and he remembered that he had often then referred to the Martiny specimens. The specimens of nux vomica bark were very fine, and Pereira, in his collection, had some of exactly the same character. The President had referred to the adulteration of cocculus indicus. He had seen bay berries substituted for cocculus indicus, but had never heard of cocculus indicus being sold for juniper berries before; that only showed that so far as adulteration was concerned, the most dissimilar substances were sometimes substituted for one another.

The **Vice-President** said the first article named by the President, the Riga balsam, took him back in memory to his earliest experience in pharmacy, and he should like to ask him whether anything of the old idea with regard to the virtue of this balsam still lingered amongst the Russians. At one time the most remarkable properties must have been attributed to it, for he could well remember even now the conclusion of a certain paper which was wrapped round a bottle of Riga balsam which he saw when very young. It ran somewhat in this way; after descanting a long time on the virtues of the balsam, this proof was given of them: "Take a hen or a ram, drive a nail through its head, brains and tongue, pour in a few drops of the balsam, and in a few minutes the creature will rise and eat as before. The Lord has created medicines out of the earth, and he that is wise will not abhor them." That showed that at one time, certainly, an opinion did exist that the preparation called Riga balsam had remarkable medicinal virtues, though the President seemed to indicate that it was now used rather as a cordial. He would take this opportunity of asking the members to record by acclamation, after the President had made his concluding remarks, their appreciation of his communication. When he (the Vice-President) last spoke there it was to express a feeling of regret at the President's absence, but he must now express his gratification that he was not with them then, as he was gathering the information from which they had all benefited.

Mr. **Cleaver** said he had often regretted that in this country no one was public-spirited enough to provide some place where students could go and work at pharmaceutical research of an advanced character, but he hoped the time was not far distant when there would be some institution or school founded where that sort of thing could be carried out. With regard to the Riga balsam, he recollected a few years ago it used to come into commerce as a thicker liquid, and of much darker colour than the specimen now produced. The material used for roofing appeared to be very similar to that which was used in some parts of England for roofing purposes, except that it was made of flax fibre. With regard to the oxygen gas, it was known that when the late Empress of Russia was ill lately, in the South of France, oxygen was used as a remedial agent in her case, and that a serious accident occurred in its preparation.

The **President** said he could quite sympathize with Mr. Cleaver's remark as to the want of facilities for original research in this country. In Russia he met with several men who had obtained the title of Magister of Pharmacy, and each was a man of eminence; he regretted that here we did not find the same spirit.

Mr. **Holmes** then called the attention of the meeting to a number of specimens presented to the museum, the first collection being a set from the Tharsis Copper and Sulphur Company, Glasgow, on which Professor Attfield would say a word or two. Next came a series of specimens from Messrs. Turnbull and Co., Glasgow, which represented the manufacture of acetic acid from wood by destructive distillation. One was a creasote oil, which he believed was the article commonly known as the essence of smoke, used for curing hams. There was also a fine mass of bichromate of potash from Messrs. J. and J. White, of Glasgow, and some very beautiful iridescent crystals of chlorate of potash. He did not know the cause of this iridescence, and believed that only a few of these crystals were found in a large quantity of the chlorate. These had been presented by the North British Seaweed Co. through Mr. E. C. C. Stanford, who had also given a fine mass of crystals of the chlorate, which had been injured in transit; this mass Mr. Stanford had kindly promised to exchange for a more perfect one. Mr. Ford, superintendent of the Botanical Gardens at Hong Kong, had sent him dried specimens of the plant which yielded the Chinese oil of peppermint. There was also a small case of the oil sent by Dr. Dymock, showing the state in which it was imported into India, and there was also a Chinese bottle showing how it was imported into this country. The specimen plant itself was very much like the common mint; it had hardly any botanical character to distinguish it from the *Mentha arvensis.* He had carefully examined a number of specimens of the mints referred to in the 'Pharmacographia,' in which work it was referred to *Mentha arvensis, var. Javanica,* Bl., but all the specimens of that plant which he had seen in various herbaria had the taste of spearmint not peppermint. In the Japanese Flora called 'Zomokou Zoussetz,' the peppermint plant was described as being *Mentha arvensis, var. vulgaris,* Benth., but that differed in the shape of the leaves, which were wider below than those of either the Chinese or Japanese peppermint plants, and had, moreover, only the taste of the ordinary *Mentha arvensis* of this country. In Franchet and Savatier's recent 'Flora of Japan,' it was referred to *Mentha austriaca,* Jacq., but none of the specimens he had tasted had the taste of peppermint, not even a type specimen. He therefore wrote to this gentleman at Hong Kong to kindly send him a specimen of the plant from which the oil was procured, and this certainly had the taste of peppermint. It was to him a very interesting question why plants that differed apparently in no external character should produce quite different essential oils, and he thought it must have something to do with the hybridization; just as the cinchonas yielded different amounts of quinine, etc., according to the parents, so would the mints, which were also a very intricate and difficult group, present different characteristics according to the species with which they hybridized. He could only imagine that the plant was the *Mentha canadensis,* and he therefore sent to Professor Asa Gray to kindly send him several specimens of *Mentha canadensis* to examine. One of these tasted like a mixture of peppermint and bergamot, another tasted like spearmint and horsemint mixed, whilst the third tasted of peppermint, but not so strongly as the Chinese plant. There were also on the table some specimens of quebracho bark, which although not used much as yet in this country was used on the continent and also in America very largely for dyspnœa. The name, which meant break-axe, was derived from the fact of the wood being so hard that it injured the axe and was applied to a number of different trees belonging to a number of different natural orders. Dr. Hansen, of Erlangen, had written a pamphlet on this bark, in which he gave full details of the plant that yielded it, so that there would be no difficulty in distinguishing the true bark. He had on the table one specimen of true bark, and also two of false quebracho, brought by Dr. Paul from Breslau, one of which was marked red quebracho bark and the other white, but they were neither the true bark. Externally they looked very much alike, and one might be easily misled by the appearance, but examining them with the lens it would be seen that the red kind had very hard rigid fibres, whilst the white, on the other hand, readily gave to the finger nail and had short fibres which very easily fell off almost in the form of dust. The third bark, however, was very hard and showed no sign of fibre, but consisted of alternate stratified layers of dark and light brown tissue. From St. Petersburg not long ago, he had received for the museum four other specimens of quebracho, neither of which were genuine. He had lately received from Prague a specimen of what was known as staple isinglass, which was hardly ever met with in the retail trade, and was therefore interesting. It was made in Russia, simply by folding up small portions of the swim bladder of the sturgeon, and the substance received from Prague on sale under this name consisted purely of some animal membranes, not of fish at all. He had received from the President a specimen of an object which most would be familiar with the appearance of, commonly called crabs-eyes. These calcareous substances were found in two lateral pouches of the stomach of the cray fish, and only at the time when the animal was casting its shell, for as the shell was formed these little concretions disappeared from the stomach. They had been imitated at various times, but the true article had a laminated structure. In the last century this substance was official in the Edinburgh and London Pharmacopœias, being used as an antacid. One curious thing with regard to it was that just as the lobster turned red when put into boiling water so would these, for though they were of a pale bluish colour inside, according to Guibourt they turned a red colour when put into boiling water. What the nature of the colouring matter was he did not know.

The PRESIDENT said the quebracho was an extremely interesting bark; it had been considered as a probable substitute for quinine, and was therefore worthy of very careful examination and description. The only monograph which existed on the subject was one by Dr. Hausen, of Erlangen. There was one peculiar fibre which he termed sclerenchymatous fibre, which was distinctive of the true bark. Mr. Holmes on the previous day had placed in his hand six specimens of this bark, which he examined and found that four had this peculiar fibre, but he could not determine the fibre in the others. As this was rather an important matter he would sketch on the black board the appearance of the fibre. The President then proceeded to do so, but said that at the same time he did not agree in the propriety of the name. It was not like ordinary sclerenchymatous tissue thickened by secondary deposit, but this fibre appeared to be simply liber or bast fibre, which had been increased by cells growing round them, and each cell containing a crystal of oxalate of lime.

A vote of thanks was passed to the donors of the different specimens.

INCORRECT VERIFIED WEIGHTS.

Mr. POUND exhibited a set of weights which he said had been passed by an inspector under the Act and were officially stamped, and yet the 30 gr. weight was marked as ½ a scruple. He mentioned it as a caution to those buying weights.

SPECIMENS ILLUSTRATIVE OF THE COPPER INDUSTRY.

Professor ATTFIELD then shortly described the specimens of copper salts sent from Glasgow in response to an invitation from the Council. This particular series was an illustration of the great sulphur, copper and arsenic industry. The Tharsis Company had sent specimens of cupreous iron pyrites, the raw material from which they obtained copper itself, sulphur, and, of course, sulphuric acid, much oxide of iron in different forms and a number of other products in small relative proportions. The copper pyrites contained about 50 per cent. of sulphur. The mineral was roasted and 30 per cent. burnt off in the shape of sulphurous acid which was converted in the usual way into sulphuric acid. The roasted ore was then ground, mixed with salt, and again roasted. During the latter operation the sulphide of copper was by the oxygen of the air converted into sulphate and that with the chloride of sodium gave chloride of copper and sulphate of sodium. The product was treated with water and the dissolved sulphate of sodium was converted in due time there or elsewhere into carbonate. The solution of chloride of copper had metallic iron put into it, which threw down metallic copper. Hence the whole process was commonly termed the *wet* process as distinguished from the old process of getting copper by means of roasting alone, commonly called the dry process. During the roasting what little arsenicum there was in the pyrites burnt off as ordinary white arsenic and was condensed in the flues just as soot would be in a common chimney. He might just mention that this specimen of arsenic contained selenium, according to the examination of one of his assistants, Mr. Stapleton, who, as a matter of curiosity, had tested the specimen. The other products were in small relative proportion, though in large absolute quantity, on account of the enormous amount of material acted upon. What zinc there was in the pyrites was extracted, some silver also was obtained and a very small proportion of gold. The roasted mixture of pyrites and salt was for the most part soluble in water, but there was a quantity of red matter left behind, which was oxide of iron. This was produced in various qualities by this firm, one of the specimens was labelled ochre, a second, rouge, and the other venetian red. He had now named the chief substances which this firm had been good enough to present to the Society. The series included a pretty ingot of the metal itself.

CRYSTALLIZED DUBOISINE.

Mr. **GERRARD** then exhibited some specimens of duboisine. He said he believed these were the first definite crystalline permanent specimens of the alkaloid duboisine ever prepared. Two years ago he had the honour of laying before the Society the process by which he isolated this alkaloid, and since then he had made numerous attempts to crystallize it, but it always appeared as a hygroscopic brownish mass. Recently, however, by means of a suitable solvent he obtained it in a pure white crystalline form. In the course of crystallization it appeared in two forms, one in cauliflower-like aggregations of crystals, and the other, which consisted of a fine filamentous moss-like mass floating in the crystallizing medium. Whether these two different forms were different bodies or different forms of the same body he was unable at present to state, but the process by which he had prepared it, and the properties of duboisine thus obtained, he hoped to lay before the Society on a future occasion.

The **PRESIDENT** said the meeting was much indebted to Mr. Gerrard for his remarks.

Mr. **NAYLOR** said those accustomed to the manufacture of sulphate of duboisine knew the difficulty of obtaining it in anything like a colourless condition. He had never yet seen it in anything approaching the state of purity now shown. He had made a quantity from time to time, but had never obtained it anything like free from colour, and only on two or three occasions in a crystalline condition. When he said crystalline he meant that it crystallized on pouring a concentrated solution to a piece of glass and allowing it to cool very gradually. In this way very small needles had been produced, distinguishable to the eye, but more visible under the lens. The difficulty had always been on account of its hygroscopic character, and he was quite sure not only pharmacists but the medical profession would appreciate the very valuable services of Mr. Gerrard.

Mr. **GERRARD** added that the active properties of this body would be better realized when he stated that a solution of duboisine of the strength of 1 in 32,000 would rapidly dilate the pupil of the eye.

Mr. **WILLIAMS** asked if Mr. Gerrard had had time to ascertain whether duboisine in its pure state was really the same as hyoscyamine or atropine, or whether the statement that these alkaloids were all identical had any truth in it. Now that he was able to get the alkaloid in a pure state it might be possible to settle that question.

Mr. **GERRARD** said that was just the object he had at present in view.

A vote of thanks having been passed to Mr. Gerrard for his remarks,

The **CHAIRMAN**, in concluding the business of the meeting, referred to the scarcity of papers and said he felt somewhat humiliated to think that in a place like the metropolis there should not be a paper forthcoming for the Evening Meeting of the Society. He hoped such a thing would not occur again.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The opening meeting for the session 1880–81 was held on Tuesday evening, October 26, at the Britannia Chambers, Pelham Street. The President, Mr. R. Fitz-Hugh, F.C.S., in the chair. Owing to the inclemency of the weather the attendance was but small. The session's prizes in the pharmaceutical chemistry class were presented by Mr. Fitz-Hugh, as follows:—1st. Mr. W. W. Talbot; 2nd. Mr. F. Savage; 3rd. Mr. W. Gill.

One new member and three new associates were admitted to the Association.

The President then gave the opening address, in which after giving a short *résumé* of the work done during the past year, he entered upon the subject for which he more particularly wished to address the associates, viz., study. He urged them to take one subject at a time and work at it thoroughly; also to be self-reliant in their study, and not to depend entirely upon external aids and "crams."

The Vice-President, Mr. W. H. Parker, followed, and in a few well-chosen remarks endorsed all that the President had said.

Both addresses were listened to with the greatest attention, and a hearty vote of thanks to the President and Vice-President concluded the meeting.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The inaugural meeting of the above Association was held at the School of Pharmacy, College Street, on Friday evening, October 29. Mr. G. C. Osborne was voted to the chair.

The accounts having been audited and found correct, officers were elected for the ensuing year.

Mr. G. C. Osborne was unanimously elected President, Mr. J. Hayllar, Vice-President, Mr. F. W. Ashton, Secretary and Treasurer, Mr. Norman, Librarian and Curator.

It was resolved that, as the number of members was few, the Committee should not be chosen from them, but should comprise the entire number, that business meetings should be held the first Monday in every month, and that the class conductors should read a report as to the work done at their classes at these meetings. The rules were then read through and amended.

Mr. Osborne consented to conduct the botany and materia medica classes and Mr. Hayllar the chemistry and pharmacy, both gentlemen expressing the hope that although few in number, all the members would gain such knowledge as would be useful to them, not only in preparing for the examinations, but during their business career.

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

The Executive Committee met at 17, Bloomsbury Square, on Wednesday, October 27, 1880.

Present—Mr. H. B. Brady, F.R.S., Vice-President, in the chair; Messrs. Attfield, Benger, Carteighe, Ekin, Greenish, Plowman, Redwood, Schacht and Southall.

The minutes of the previous meeting having been confirmed, Mr. Carteighe read letters from the President (Mr. Reynolds) and from Mr. A. H. Mason, apologizing for their absence; also one from the Pharmaceutical Society of Ireland, thanking the Committee for their present of a set of Year-Books.

The following gentlemen, in addition to the President of the Conference for the time being, were appointed the

Publication Committee for 1880–81:—Professor Attfield, Messrs. F. Baden Benger, Thomas B. Groves, Charles Symes, Michael Carteighe (Secretary).

A grant of ten pounds was placed at the disposal of Mr. H. G. Greenish for a chemical investigation of "nerium oleander." Several other applications were received, but the consideration of these was postponed until the next meeting of the Committee, in order that further information might be obtained from the applicants.

The names of one hundred and thirty-one members whose subscriptions were more than two years in arrears, who had failed to respond to a special notice, were removed from the roll.

CHEMISTS' ASSISTANTS ASSOCIATION.

The first meeting of the fourth session was held on Wednesday evening, October 13, at the rooms, 32A, George Street, Hanover Square, when there was a good attendance of members and visitors.

The minutes of the last meeting having been read and confirmed,

The Inaugural Address

was given by the President, Mr. F. W. Branson, who first alluded to the objects of the Association, and the advantages accruing to those assistants who attended and took part in the business of meetings held for the reading and discussion of papers on pharmaceutical and scientific subjects.

The satisfactory progress and financial position of the Association were next noticed, and indications were given of an even more successful session than the preceding one. Allusion was then made to the programme of meetings issued. The papers announced, it was explained, were not to form exclusively the proceedings of the Association, but were inserted to form the nucleus of meetings. Several notes on pharmaceutical subjects had already been promised, and additions were specially invited.

A subject of considerable interest to assistants was then noticed in the address, viz., the late hours of business still existing in many retail establishments in London. It was hoped, however, that if a uniform hour of closing could not be adopted, owing to various circumstances, at least a better arrangement might be mutually agreed upon between principals and assistants, so as to allow the latter a reasonable amount of spare time to enable them to keep their knowledge abreast of the age, and yet at the same time be able to take that amount of recreation which is so essential to health.

The immediate future of pharmacy was declared to be unpromising, and any advance was mainly to be sought in the improved training and acquirements of the pharmacist himself, for without these improved conditions legislative protective enactments would avail but little. Again, a more highly trained pharmaceutical body could not but appeal with far greater force than at present to public favour for that share of dispensing which would naturally fall to them. Barber and surgeon have dissolved partnership, and why, in course of time, should not the separation of prescribing and dispensing become general, both in medicine and pharmacy? To help to bring about such a result the present system of education, and to some extent of examinations, should be boldly re-modelled with as little delay as possible, sufficient time being allowed before alteration, so as to prevent the occurrence of cases of hardship and just complaints.

The Preliminary should be made compulsory before the execution of indentures of apprenticeship. This change would be an act of kindness to the would-be pharmacist, and would clear his path at once of those educational subjects which sometimes subsequently bar his progress, consequently he would be the better able to thoroughly study during his apprenticeship those subjects required for the Minor examination. The time allowed for the Preliminary examination should be extended, and several additional subjects might be with advantage inserted, *e.g.*, elementary mathematics, and perhaps chemistry; also a moderate knowledge of French should be required, and the Latin translation taken from a wider range than at present.

As, in the speaker's opinion, there does not appear to exist any reasonable objection against a compulsory curriculum for the Minor examination, he thought that this limitation ought to be insisted on as soon as practicable, for the advantages gained to the student would undoubtedly be great. In lieu of a portion of this curriculum a two years' course of lectures, with some laboratory practice, tested by examination, might with justice be accepted from a few well-appointed provincial centres. Those centres might become in course of time self supported by lecture fees; but perhaps at first it would be necessary to subsidize them. This should be done with caution, however, or the centres would multiply unduly, and a less efficient system of education result in consequence.

The Minor examination should, he considered, be separated into two divisions, and be held on different dates, at an interval, say of twelve months, the age limit of candidates being reduced for the first division to twenty. They could then fully qualify at twenty-one, as at present. The first might comprise botany and chemistry only, these subjects forming the foundation on which to build a fuller knowledge of materia medica and other subjects contained in the second part of the examination. With this arrangement more time could be devoted to practical dispensing than is possible with the present crowding of subjects.

The moderate amount of volumetric analysis mentioned in the B.P. should certainly be required of Minor candidates, as it was necessary for the proper conduct of a business to be able to correctly estimate the strength of so unstable, but powerful, a medicine as hydrocyanic acid. The Major being a non-compulsory examination might well be lengthened to three days, and partly written, and if certain portions were transferred to the Minor the candidate might be required to pass in one subject only, namely, chemistry, including a knowledge of the preparation and properties of the alkaloids and other active principles of important drugs. A successful examination in a single subject—chemistry—would, he believed, be held in higher esteem by the candidate himself and also by the public and medical profession, who might then perhaps be induced to consult the pharmaceutical chemist more frequently on various matters than is at present the case.

In answer to the question, "What is the use of all this scientific knowledge to the pharmacist?" the reply surely must be, that when combined with business tact and ability this knowledge has (and will have still more in the future) a decided trade value, in addition to a value of its own, which cannot be judged of in a pecuniary sense.

As regards the difficulty of obtaining apprentices, should the Preliminary examination be made compulsory (*i.e.*, before the execution of indentures), such an objection ought not to obtain a hearing, for the future well-being of pharmacy cannot be dependent on the number of premiums received from apprentices into the coffers of pharmacy.

As to objection to increased cost of education, and subsequent non-remuneration for the same, should a large number of intending pharmacists come to this conclusion, and act according to their convictions, better probably for themselves, better certainly for those already qualified, that candidates should experience discouragement at the outset, rather than be given encouragement to enter by an easy portal into an already over-crowded calling.

A vote of thanks was proposed by Mr. G. F. Snow to Mr. Branson for his excellent address. He quite endorsed his remarks, especially with regard to the suggested improved curriculum for the future education of pharmacists. He felt quite sure that the present session would be as successful as its predecessors, if not more so. At any rate the programme spoke for itself; although some of the papers were not altogether strictly pharmaceutical, they were certainly scientific, and would be productive of interesting discussion.

Mr. W. A. H. Naylor had great pleasure in seconding the vote of thanks, and he thought the suggestions as to the acceptance of a course of study from an efficient provincial centre a very good one.

Mr. Branson made a brief acknowledgment.

Parliamentary and Law Proceedings.

IMPORTANT CASE UNDER THE WEIGHTS AND MEASURES ACT.

On Monday, November 1, 1880, Mr. Elijah Charles Whittle, of 6, Townshend Road, St. John's Wood, appeared before the Marylebone Bench of Magistrates sitting in the Court House, Marylebone Lane, in answer to a summons taken out by F. W. Tibbey, Inspector of Weights and Measures, for having four glass measures in his possession which were incorrect.

The measures were as follows:—

No. 1. 240 *Minim Measure.*

Deficient on	5 m	1 m.
„	10 m	1½ m.
„	15 m	2 m.
„	20 m	1 m.
„	25 m	1 m.

No. 2. *Another* 240 *Minim Measure.*

Deficient on	5 m	1 m.
„	10 m	1 m.
„	15 m	2 m.
„	20 m	2 m.
„	25 m	1 m.
„	30 m	2 m.

No. 3. 60 *Minim Measure.*

Deficient on	10 m	1½ m.
„	15 m	1 m.

No. 4. 60 *Minim Measure.*

Deficient on	10 m	1 m.
„	15 m	1 m.
„	20 m	1½ m.
„	25 m	2 m.
„	30 m	1½ m.
„	35 m	1 m.

The Inspector having briefly stated the effect of the summons,

The Chairman (Mr. T. Hankey) asked Mr. Whittle what he had to say.

Mr. Whittle said he was at a loss to know why he was summoned at all, the measures being all officially stamped as verified according to the Act.

Mr. Greenwell (Clerk to the Magistrates) said the inspector had better first of all prove that the measures were not correct.

The Inspector said the present Act of Parliament authorized Her Majesty, through an Order in Council, to alter and make any standards which should be required for the use of inspectors and legalizing apothecaries' standard weights and measures. He had given every chemist in the district due notice of this Order, and that their weights and measures would be liable to be inspected the same as those of other traders. Having given Mr. Whittle the usual notice, he called on him a short time ago to verify his weights and measures. He had tested the ones now produced by the Board of Trade standards, and he had found them incorrect,

Mr. Greenwell having inquired the extent to which the measures were incorrect,

The Inspector stated the particulars as above given.

The Chairman inquired whether these measures had been stamped.

The Inspector said with regard to the stamp, it was rather a difficult question; they were presumed to have been stamped at York. The stamp of "V. R." and "Yk." appearing on the glass was presumed to have been the stamp.

Mr. Greenwell asked why the Inspector used the word "presumed?"

The Inspector said he felt some doubt as to its being really the work of the inspector. A man of practical experience in the glass engraving trade, and who was prepared to give evidence if necessary, informed him that the mark was cut with a wheel, and was not likely, therefore, to have been done by the inspector himself. It appeared to have been placed on the glass by the manufacturer.

Mr. Greenwell said that created a second question; but supposing the stamp were genuine, still a person would be liable if the measures were unjust.

Mr. Whittle said the measures were officially stamped, and, as he understood, the official stamp having once been placed upon a measure, that was recognized by the Board of Trade throughout the kingdom and no question could be raised as to the accuracy of the measures.

Mr. Greenwell said he thought the defendant was not quite correct about that; the stamp of an inspector, wherever given, would hold good throughout the United Kingdom, but that was only assuming the measures were correct.

Mr. Whittle said he understood that when a measure had once been verified by an official duly appointed in any part of the kingdom it could not be questioned. There were thousands of these glasses sold, and they had all been stamped by the official at York. He had a copy of a letter, which he produced, stating that the Board of Trade recognized that mark. The letter was as follows:—

"Town Clerk's Office,
"16, Coney Street, York.
"8th *October*, 1880.

"*Weights and Measures Act.*

"Dear Sirs,—Referring to my letter of the 24th ult., and yours of the 5th inst., I now beg leave to acquaint you that I have received a letter from the Standards Department of the Board of Trade, in which they state 'that the stamp or mark of verification used by local authorities is not required under the Act to be approved and registered by this Board.'

"The corporation of this city have, as you are aware, adopted the following mark, viz., $\overset{\text{VR}}{\text{YK}}$, to be used by their inspector for the purposes of the Act, which is a perfectly legal mark of verification, and must be recognized as such.

"Your correspondent will therefore see that he is in error in supposing that the mark requires the approval of and registration by the Board of Trade before it becomes a legal mark.

"I am, dear Sir,
"Yours faithfully,
"JOS. WILKINSON.
"*Town Clerk for St. Giles.*

"*The York Glass Co., Limited, York.*"

The Chairman said there was no question the defendant was quite in order in having these stamped glasses, but it did not at all follow that the stamps were correct.

Mr. Whittle said chemists purchasing stamped measures of course presumed they were correct, the stamps being a guarantee. He thought it would be found in the Act that a measure stamped in any part of the country could not be questioned by any other inspector.

Mr. Greenwell said that was so. The words of the section were, "A weight or measure duly stamped by an inspector under this Act should be a legal weight or measure throughout the kingdom unless found to be false or unjust, and shall not be liable to be re-stamped because used in any place other than that in which it was originally stamped." Therefore the stamp must be taken as a verification which passed throughout the United Kingdom, provided the measure were a proper measure, but not further, otherwise you might get a stamped verified measure one day and afterwards it might become impaired by use, and still it would be false and unjust. That was so especially with regard to weights, therefore the stamps did not excuse the defendant if the measures were incorrect. Did he admit they were incorrect?

Mr. Whittle said they were sold to him as stamped measures and as being made especially to carry out this Act. They were made by one of the most respectable and largest firms in England, the York Glass Company, which was well known to every chemist.

The Chairman asked if the defendant had satisfied himself of the correctness of the measures.

Mr. Whittle said be was not satisfied that the inspector had really got the best appliances for the testing of these measures. It was a very difficult thing to test these measures accurately.

The Chairman said no doubt it was.

The Inspector said the Board of Trade was perfectly satisfied with their present standards and considered them most accurate; several shapes had been tried, but the ones now supplied to inspectors had been found the most accurate. He really felt doubtful whether the mark in question were placed on the measures by an inspector or by a mechanic.

The Chairman said he did not all doubt the *bona fides* of the defendant in this case; but their inspector questioned the accuracy of the measures.

Mr. Greenwell: Not only the accuracy of the measure itself, but the accuracy of the stamp also appeared to be questioned.

The Inspector said that was so.

Mr. Greenwell said the first thing to decide would be the accuracy of the measures themselves. It was evident that chemists were liable to be very much deceived if these measures were not accurate.

Mr. Whittle said he could answer for it that a firm like the York Glass Company would not be likely send out anything spurious.

Mr. Greenwell said if the marking was done at the time of the manufacture it could hardly be called the stamp of the inspector.

Mr. Bernard suggested that it might be done afterwards under the inspector's eye.

The Inspector said the Act said that the inspector shall verify and then stamp. It did not say he should allow anyone else to do it.

Mr. Greenwell remarked that there was a penalty of £50 upon any manufacturer who sold a false measure in that way.

The Inspector then proceeded to test the measures in question before the magistrates, one graduation in each measure being tried, and the given quantity of water being put in by means of a pipette.

Mr. Whittle said it was very difficult to verify all these glasses.

Mr. Greenwell said it was no doubt misleading to the trade if they bought measures of a respectable company and found them incorrect. The practice in London was to examine every particular measure and if found correct to stamp it.

The Inspector said he believed Mr. Whittle admitted these measures were incorrect.

Mr. Whittle said no, he did not know which was correct.

The Inspector said it was not very likely the Board of Trade standards were incorrect.

The Chairman asked if the defendant would be satisfied if they sent these measures to the Board of Trade and stated the case that they did not agree with the standards of their inspector and suggesting that they should be verified.

The Inspector repeated that the standards supplied to him were issued from the Board of Trade and with each one was a parchment certificate stating it was correct, and not only so, but he was supplied with a scale of deficiences which would be allowed. He was quite aware that Mr. Whittle bought these measures in good faith believing that they were stamped measures; but at the same time the Act of Parliament said if they were found to be incorrect they were liable to be seized.

Mr. Greenwell said it was very hard on Mr. Whittle.

The Inspector said, of course it was, but at the same time the Act of Parliament must be enforced, or it would be of no use.

Mr. Greenwell said it seemed to be a question more against the York Glass Company than against Mr. Whittle.

The Chairman having again inquired if Mr. Whittle would be satisfied with the course he had suggested,

Mr. Whittle said it would be tantamount to a remand; he had only received the summons on Friday, and he thought that was a very short time.

Mr. Greenwell said there would be no objection to further time if it were required.

After some further conversation, the case was ordered to stand adjourned until the next sitting of the magistrates, which would be on Monday, December 6. In the meantime the magistrates would communicate with the Board of Trade, and if the case was not completed by that time it would be adjourned till January.

A Magistrate asked the defendant if it were not a fact that some other fluids would preserve their level in a glass tube which would render the measurement more easy; water of course had always a concave surface.

Mr. Whittle said there were fluids which would preserve a more level surface, namely, those of higher specific gravity.

The Inspector said they were not allowed to use anything but distilled water for the purpose of testing measures.

The case was then adjourned until December 6, Mr. Greenwell stating that the Bench would convey to the Board of Trade their opinion that the Board ought to inquire into the matter further.

Alleged Poisoning by Tartaric Acid.

The Coroner for Plymouth (Mr. T. C. Brian) held an inquest on Monday at the Guildhall, Plymouth, concerning the death of William Henry Skinner, Notte Street.

It appeared from the evidence that the deceased, who had been drinking, was heard to call out, saying he was dying. The landlord of the house went upstairs, met the deceased on the landing, and he asked for some water. In reply to an inquiry as to what he had done, he replied that he had taken some tartaric acid. Mr. Morris, surgeon, was then fetched.

Mr. Edwin Morris, M.R.C.S., said he found the deceased lying on a bed, suffering excruciating pain. A glass, containing a white substance, partly powder, was shown to him, and there was a fluid at the bottom of the tumbler which smelt like beer. A bag containing about 1 lb. 2 ozs. of matter, which he afterwards found to be tartaric acid, was also handed to him. The deceased admitted to him that what he drank from the tumbler was taken from the paper bag, and from what he told witness he thought that the deceased took about half an ounce of the acid. In his opinion death was caused by the violent shock to the stomach caused by the acid.

The jury returned a verdict, "That the deceased committed suicide whilst in a state of temporary insanity."—*Western Morning News.*

POISONING BY ARSENIC.

An inquest was held at Louth, on Thursday, October 28, touching the death of Charles Atkinson, aged 75 years.

Eliza Freshney said deceased had been lodging with her. On Tuesday she saw her child with a cup in his hand, and she took it from him. Deceased at the same time said "Don't let the boy have what is in that cup; it is magnesia which I am going to take to do me good." Witness saw the cup was about half filled with cold tea and a powder. She said nothing, and put the cup down, but thought if it was magnesia there must be something mixed with it. The deceased went to the mixture afterwards. Shortly before five o'clock he was sick, and witness told him she thought magnesia should not have made him vomit. He then said it was not magnesia, but something else he had taken, but would not tell her what it was, although she asked him repeatedly. The doctor came, and remained with him until he died.

Mr. Mark Smith, chemist, said that on Tuesday morning deceased purchased at his shop an ounce of powdered arsenic. He was not supplied without hesitation. He said he wanted the arsenic for some boot preparation which a man had asked him to make. Witness told him that it was very poisonous, but at last let him have it, as the man was well known to him, being in the habit of visiting the shop two or three times a week, and witness believed it would be an act of charity to the old man by which he would properly be able to earn a trifle for himself. He told deceased that he would want other things for the preparation, but he replied that he had them by him. The fact that men were in the habit of obtaining the articles for such preparations at different shops to ensure secrecy put him off his guard. Deceased was *compos mentis.* The requirements of the Act were complied with. (Book produced).

After medical evidence to the effect that death was the result of arsenical poisoning, the jury returned a verdict of "Suicide while in an unsound state of mind."—*Louth Advertiser.*

CHARGE OF FRAUD AGAINST A CHEMIST AND DRUGGIST.

On Monday, November 1, at the Worship Street Police Court, Charles James Leake, about 55, described as a chemist, was charged on remand with having obtained goods by uttering forged cheques.

Mr. St. John Wontner prosecuted for the Treasury.

The prisoner presented an order purporting to be from Mr. Leake, chemist, of Whetstone, near Barnet, asking for delivery to bearer of certain goods named, and in payment of which a cheque for £8 was enclosed. The cheque was drawn by Charles James Leake in favour of Mr. Hovenden, perfumer, etc., of City Road, on the Wandsworth Branch of the London and South Western Bank. The goods were delivered to the prisoner, who passed as carrier from Whetstone. The cheque was returned marked "account closed."

Mr. Wontner now said that he proposed to go into a second case against the prisoner, and had some six or seven cheques uttered by the prisoner under similar circumstances.

John Westfield, manager to a firm trading as Steedman and Co., of Walworth, deposed that on January 7 last, a man brought him an order from Mr. Leake, chemist, of Whetstone, for certain goods to the amount of £18 19*s.* the order being accompanied by a cheque on the bank mentioned for the amount. The goods were given to the bearer, who left with them. He, however, omitted to take up the receipt, and witness, going out to give it him, saw the prisoner in the cart with the man, who was then driving away. The cheque was returned marked "account closed." A letter written to the address at Whetstone was returned through the Dead Letter Office, endorsed "gone away."

A clerk from the London and South Western Bank Wandsworth Branch) was called to prove that Charles James Leake opened an account there in February, 1879, but it was closed in the September following.

The Prisoner cross-examined the witness to show that a sum of £65 he suggested had been paid in had not been credited to him.

The Witness knew nothing of the matter, and, in reply to Mr. Wontner, said that no complaint had ever been made to the bank of such an omission.

Mr. John Hindle, chemist, High Street, Whetstone, deposed to purchasing last year the business formerly carried on by the prisoner at Whetstone, and produced the deed of sale for a consideration of £135.

Mr. Wontner said that at the time the prisoner left Whetstone he was considerably in debt to the tradesmen about, and at Wandsworth, where he lived at the time he opened the account with the bank, he incurred similar liabilities, leaving without discharging them.

The prisoner, who reserved his defence, was committed on both charges for trial.—*Standard.*

Obituary.

WILLIAM AITKIN.

It is with much regret we have to announce the death of Mr. William Aitkin, Pharmaceutical Chemist, of 3, Pitt Street, Edinburgh, which took place at his residence, Hillhead Park, Lasswade, on the 1st inst., in his 73rd year and after a week's illness.

Mr. Aitken had been a Member of the Society since 1852. He filled the Presidential chair of the North British Branch for the year 1862–3, and he was a member of the Scottish Examining Board for many years, having to resign this appointment on account of his advancing years.

Mr. Aitkin was ever a warm friend of the Society, and a much respected member of the pharmaceutical body in Edinburgh.

Notice has also been received of the death of the following:—

On the 11th of October, 1880, Mr. John Trotter, Chemist and Druggist, East Linton, Haddingtonshire. Aged 53 years.

On the 12th of October, 1880, Mr. John Sutherland, Pharmaceutical Chemist, St. Nicholas Street, Aberdeen. Aged 73 years. Mr. Sutherland had been a Member of the Pharmaceutical Society since 1853.

On the 27th of October, 1880, Mr. John Thomas Fenn, Pharmaceutical Chemist, Regency Street, Westminster. Aged 65 years. Mr. Fenn had been a Member of the Pharmaceutical Society since 1853.

On the 29th of October, 1880, Mr. Thomas Jones, Chemist and Druggist, Great Howard Street, Liverpool. Aged 40 years.

On the 29th of October, 1880, Mr. Robert Barr, Chemist and Druggist, Paisley. Aged 67 years.

BOOKS, PAMPHLETS, ETC., RECEIVED.

SPIRIT GRAVITIES, WITH TABLES. By THOMAS STEVENSON. M.D. Lond., etc. London: Van Voorst. 1880. From the Publisher.

POISONS: THEIR EFFECTS AND ANTIDOTES. By ALBERT B. PRESCOTT, M.D., F.C.S. From the Author.

VERSUCHE ÜBER DIE WIRKUNG DES PEPSINS AUF EINIGE ANIMALISCHE UND VEGETABLISCHE NAHRUNGSMITTEL. Von FRIEDRICH KESSLER. Dorpat. 1880. From the Author.

VERGLEICHENDE UNTERSUCHUNG EINIGER INDISCHEN HANDELSSORTEN DES ARABISCHEN GUMMI. Von EMIL MASSING. 1880. From the Author.

ST. THOMAS'S HOSPITAL REPORTS. New Series. Edited by Dr. ROBERT CORY and Mr. FRANCIS MASON. Vol. x. London: J. and A. Churchill. 1880. From the Secretary.

Correspondence.

EXEMPTION FROM SERVICE ON JURIES.

Sir,—In reference to your leading article last Saturday, on "Exemption from Service on Juries," I am of opinion that undoubtedly the public safety should be the ground of exemption from service on juries, and that is the assumption of the preamble "Whereas it is expedient for the safety of the public," etc. The unintelligible fact is that any difference should be made between the several persons on the register of chemists, when there is no distinction in their duty to the public. The preamble might be supposed to read "Whereas it is expedient for the clients of pharmaceutical chemists." It appears to me to be too readily assumed that it is merely a question of a ten pound note. That it is very much so in the case of those who have entered the trade or profession since 1868 I am not concerned to dispute. That is a comparatively recent date. At a rough guess there are 800 pharmaceutical chemists who hold no diploma, and probably 7000 chemists and druggists who were in business before 1868. The former cannot boast against the latter that "with a great sum they obtained this freedom," for, unless my memory fail me, they paid two guineas each before 1853; so that these two classes are entitled, equally with the dentists, to exemption on the ground of registration, upon which rather than any other basis, exemption is founded. The assumption that pharmaceutical chemists dispense physicians' prescriptions while chemists and druggists do not, cannot be admitted, for it is contrary to fact and is arbitrary. The chemist and druggist may, and does, dispense, for "a belted earl, a marquis, duke, and a' that;" but, I believe, a common soldier demands the services of a pharmaceutical chemist. Beyond that, and possibly a berth as dispenser in a workhouse, I know of no difference in the public functions of the two. If it be granted (which I do not admit) that pharmaceutical chemists dispense for a higher class than chemists and druggists, it is a distinction unknown to the law that a duke should have greater protection to life than a mechanic. If it were a question of poisoning either, I should submit that titled drones, who contribute nothing to the country's weal or wealth, could be better spared than the worker, whose toil creates wealth. As a rule, I am inclined to think that the pharmaceutical chemist can more easily leave his business than the chemist and druggist, and exemption should operate rather in favour of the man who must stay at home for the public good, even though that public should mainly be the "working classes."

There are doubtless strong reasons for not raising a direct parliamentary issue on the question, or it may be asked why there should be any exemption at all of such valuable names from the jury list. Although exempt myself, I question whether a wiser course would not be to withdraw all such exemptions, and to insist on the exhaustion of the list before a man is called to serve a second time, so that as a ratepayer is not charged with a second rate until the first is paid up, so his time should not be taxed twice over till all had been taxed once. It would not fall on most men more than once in a lifetime, and that is not an exorbitant tribute to patriotism. But there seems to be a growing desire to shirk public duty, and an increasing craving for special privilege. Men would walk about with "*cum privilegio*" tattooed upon them, like the title page of an old bible. If the grocer wishes to take his family by rail, he bethinks him that he pays a large sum for carriage, and though he recoups himself from his customers, yet he will obtain a free pass. Duty to one's country seems to be resolving itself into a piece of permissive compulsory legislation, with power for every man to "contract himself out of the Act."

Ryde. HENRY H. POLLARD.

THE FUTURE OF PHARMACY.

Sir,—In a letter in this week's issue from "A Student," the following expression occurs:—" And pass it down as a respectable, upright and honest means of obtaining a livelihood, which is not the case at present in the majority of shops." Now, I consider the above very strong language to use unless there be adequate foundation for it, and I for one shall be much obliged to "A Student" if he will inform a fellow-worker in a more explicit manner exactly what he means by the expression to which I have referred above, as I consider that when such language is used, in common fairness a suitable explanation should be furnished.

H. WM. MORRES.

THE DISPENSING OF PRESCRIPTIONS IN THE PROVINCES.

Sir,—Please allow me to take up arms in behalf of the country chemist against the assertion of Mr. I. D. Robertson, President of the Edinburgh Chemists' Assistants and Apprentices' Association, made by him at the first meeting, this session, of the above Association, a report of which was given on page 344 of a recent Journal. He there says, in reference to the dispensing of prescriptions by medical men, that he "would excuse them doing so in country places, where unfortunately they could not depend on having their instructions faithfully carried out by the local chemist." It is now twelve years ago since the passing of the Act, which compelled all those desirous of being chemists, and not being in business for themselves before that time, to pass an examination. This Act included the whole of Great Britain. Assuming, therefore, that those being in business for themselves, whether in town or country, were sufficiently qualified by the amount of experience they had gained practically, I say that a man, although he be "only a country chemist," as those in business in large towns are apt to say disparagingly, is nevertheless just as much qualified to dispense any prescription, as the best of the "town" chemists. Why "town" chemists should look down upon their fellows, who are placed in rather different circumstances to themselves, I cannot imagine. Of course we all know that in the country there is not one-twentieth part of the dispensing to do that there is in large towns, but none the less, a "country" chemist is just as well able to do twenty times as much if called upon to do so. Besides, I should think every one knows the appearance of a bottle of medicine as sent out from a surgery. To all appearance it is a bottle of water, a badly fitting cork in it, and a printed label attached. Now a chemist, although he be a "country" one, could surely just as well put into that bottle the one or two ingredients of which most country doctors' medicine consists, and fill it up with water, as the doctor's "unqualified assistant, his boy in buttons, or his "better half." In my own town, for instance, the doctor's "better half" does the whole of his dispensing. It vexes me very much to hear that sneering tone in which country chemists are spoken of, and to see the remarks made about them in print. "Every man to his place." There are very few of your "town" chemists who would know what to give if called upon to prescribe a cow drench, physic balls, or such like "animal" medicine, but would have to consult their 'Beasley,' and tell their customers in sheer desperation, "I will send it in, it will take some time in making." I should like chemists, whether in town or country, to be more united. Surely this perpetual sneer is not one way in which this union might be effected.

I hope that these few remarks will cause town chemists to look upon their country brethren as on a par with themselves. FILIUS.

H. L. had better make inquiries of the travellers who visit him from various druggists' sundry men, and compare his notes.

J. R. Hill.—We do not think the Act applied to the sale of the salt in question.

J. C. R.—If the person referred to has not passed the Minor examination, and the circumstances attending his registration are as you state, his registration would have been illegally effected and his name could be erased by order of the Council.

G. W. J.—The zinc is plunged into a solution of ordinary commercial sal ammoniac and the carbon is tightly packed in a porous pot with a mixture of peroxide of manganese and carbon in the form of a coarse powder. Some good information respecting Leclanché's and similar batteries will be found in *Design and Work* for the present week.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Walton, Brown, McCallum, Parker, Hurst, Allen, Davenport, Covell, Richardson, Fluckiger, Christie, John, Cupidus rerum novarum, One who has passed the Minor, 374, Jacque, Stooke, Karl Sang, Omikron, Edward, S. G. W. J., L. A. U. R. A., W. R. F.

THE BOROCITRATES AND THEIR PREPARATION.*

BY EDMUND SCHEIBE.

Magnesium Borocitrates.

Of all the compounds of borocitric acid the most interesting is the salt of magnesium, since it was successfully used therapeutically more than forty years ago by Graeger, Becker† and other physicians in cases of kidney disease and stone. A subsequent treatise‡ upon the action of magnesium borocitrate in calculous disorders attributed this to the boric acid, which does not undergo any change through the secretions in the human body and is therefore able to exercise a decomposing action upon the salts of uric and phosphoric acids.

The correctness of this theory is said to be confirmed by the experiments of the author and Madsen.§ Madsen found by comparative experiments upon the solubility of uric calculus in solutions of lithium benzoate and magnesium borocitrate that the latter salt is capable of dissolving almost twice the quantity of urate that the lithium compound can. Further, when a small dose (1 gram) of the sodium or magnesium salt was administered, the author, after several hours, succeeded in detecting boracic acid in the urine by the flame reaction. In this case, in order to prevent the volatilization of the boric acid during the concentration of the urine, the operation was conducted in the presence of excess of potash or soda solution.

As to whether, when, after administration, the boric acid occurs in the urine it is combined with bases or free, the author thinks that the following experiment shows that it occurs in both conditions. After the use of larger doses of the magnesium and sodium compounds (10 to 15 grams of the mono-, di-, and triborocitrates) the urine was evaporated to perfect dryness and then extracted with absolute alcohol. Boric acid could be detected by the flame reaction both in the alcohol and the residue. Pure boric acid is soluble in alcohol; the boric salts, on the contrary, are not.

Further, according to some experiments carried out by N. Schwartz,|| magnesium borocitrate appears to be a stronger antiseptic against bacteria than pure boric acid, and indeed he proved the acid salts (those having the least proportion of boric acid) to have a more energetic action than the neutral salt.

According to Schwartz's observations the mono- and diborocitrates of magnesium appear to decompose in the presence of bacteria and ferments, and the author thinks that it may be assumed that in this case the energetic action depends upon the boric acid set free from the compound *in statu nascendi.*

The acid salts have also the advantage that in comparison with the triborocitrates their taste is more agreeable and they are more soluble in water. For these reasons the author considers the mono- and diborocitrates to be preferable to the neutral salts for therapeutic use. As will appear by analyses reported further on the preparations most frequently occurring in commerce and found by him in pharmacies are also acid salts.

Like the salts of the fixed alkalies and alkaline earths there exist three chemically constant compounds of the magnesium borocitrates. By the solution in boiling water of the constituents according to the following proportions by weight these salts can be easily obtained. As with the exception of the potassium compound the borocitrates crystallize badly or mostly not at all, the preparations are produced in scales or more suitably in the powder form.

The following are the proportions by weight given by the author:—

a. Magnesium Triborocitrate $(C_6H_5O_7)_2Mg_3 + (B_3H_3O_6)_2$.—Crystallized boric acid, 35 parts; carbonate of magnesia, 25 parts, or calcined magnesia, 12 parts; crystallized citric acid, 42 parts.

b. Magnesium Diborocitrate $(C_6H_6O_7)_2Mg_2 + (B_2H_2O_4)_2$.—Crystallized boric acid 24 parts; carbonate of magnesia, 16 parts, or calcined magnesia, 8 parts; crystallized citric acid, 42 parts.

c. Magnesium Monoborocitrate $(C_7H_7O_2)_2Mg + (BHO_2)_2$.—Crystallized boric acid, 24 parts; carbonate of magnesia, 16 parts, or calcined magnesia, 8 parts; crystallized citric acid, 80 parts.

Two preparations, which have already been used in therapeutics, have been analysed by the author. The first, obtained from Opperman's pharmacy in Revel, has been prepared during many years from an old prescription. The powder is soluble in twenty parts of cold water, but less soluble in hot water, and after cooling there is a separation of crystals of boric acid. The taste is strongly acid, and in composition it stands nearest to the monoborocitrates, but it contains more boric acid than can become chemically combined. The mean percentage composition was:—Citric acid 61·64; magnesium 6·23; boric acid 32·13.

The second preparation, also from the above pharmacy, was obtained from Schering, of Berlin. The beautiful silky scales are soluble in equal parts of cold water. According to the proportions of the citric acid and magnesium it might be described as a diborocitrate, but for this it contains somewhat too little boric acid. It consists of citric acid, 73·50 per cent.; magnesium, 8·83 per cent.; boric acid, 16·67 per cent.

Lithium Borocitrates.

All three lithium compounds are easily soluble in water, and what was stated respecting the preparation of the magnesium salts applies equally to them. As a starting point of the preparation carbonate of lithium is the most suitable.

Lithium Triborocitrate $(C_6H_5Li_3O_7 + B_3H_3O_6)$.—Crystallized citric acid, 20 parts; lithium carbonate, 11 parts; crystallized boric acid, 18 parts.

b. Lithium Diborocitrate $(C_6H_4Li_2(BO)_2O_7) + 2H_2O$.—Crystallized citric acid, 20 parts; lithium carbonate, 7 parts; crystallized boric acid, 12 parts.

c. Lithium Monoborocitrate $(C_6H_6Li(BO)O_7) + H_2O$.—Crystallized citric acid, 20 parts; lithium carbonate, 4 parts; crystallized boric acid, 6 parts.

Sodium Borocitrates.

The normal salt of sodium and both acid salts are

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* From a paper published in the *Pharmaceutische Zeitschrift f. Russland*, xix., 514.

† Magnesia usta, 30 parts; Acid. boracic., 100 parts; Acid. citric., 60 parts; Acid. hydrochloric. (sp. gr. 1·124), 30 parts.

‡ *Archiv d. Pharmacie* (1866), cxxvii., 256.

§ *Pharmaceutische Zeitschrift f. Russland*, xix., 239.

|| *Sitzungsbericht d. Dorpater Naturforscher-Gesellschaft* (1879), p. 204.

obtained by decomposition of crystallized sodium carbonate.

a. Sodium Triborocitrate ($C_6H_5Na_3O_7 + B_3H_3O_6$), etc.—Crystallized citric acid, 21 parts; crystallized sodium carbonate, 42 parts; crystallized boric acid, 18 parts.

b. Sodium Diborocitrate.—Citric acid, 20 parts; sodium carbonate, 28 parts; boric acid, 12 parts.

c. Sodium Monoborocitrate.—Citric acid, 20 parts; sodium carbonate, 14 parts; boric acid, 6 parts.

A sodium compound prepared by Schering, of Berlin, occurs as a light powder, easily soluble in water, having an agreeable acid taste, and in its composition standing nearest to the monoborocitrate. An analysis gave the following percentage composition:—Citric acid, 80·15; sodium, 8·77; boric acid, 11·08.

Ammonium Borocitrates.

The ammonium salts are most suitably prepared from the ammonium carbonate. The compounds must be carefully dried, since otherwise decomposition gradually takes place, ammonia being volatilized.

a. Ammonium Triborocitrate ($C_6H_6(NH_4)_3O_7 + B_3H_3O_6$, etc.—Citric acid, 20 parts; ammonium carbonate, 15 parts; boric acid, 18 parts.

b. Ammonium Diborocitrate.—Citric acid, 20 parts; ammonium carbonate, 10 parts; boric acid, 12 parts.

c. Ammonium Monocarbonate.—Citric acid, 20 parts; ammonium carbonate, 5 parts; boric acid, 6 parts.

A preparation made by Schrenk, in Darmstadt, has almost the same composition as the normal ammonium triborocitrate. It consists of citric acid, 51·38 per cent.; ammonium (NH_4), 14 per cent.; boric acid, 34·62 per cent.

Potassium Borocitrates.

The potassium compounds have up to the present time found scarcely any therapeutic use, but are,—as, for instance, the crystalline potassium biborocitrate,—of greater theoretic value. In this case the mono- or bicarbonate of potassium are best used in the preparation.

a. Potassium Triborocitrate ($C_6H_5K_3O_7 + B_3H_3O_6$), etc.—Citric acid, 20 parts; potassium bicarbonate, 30 parts, or monocarbonate, 20 parts; boric acid, 18 parts.

b. Potassium Diborocitrate.—Citric acid, 20 parts; potassium bicarbonate, 20 parts, or monocarbonate, 14 parts; boric acid, 12 parts.

c. Potassium Monoborocitrate.—Citric acid, 20 parts; potassium bicarbonate, 10 parts, or monocarbonate, 7 parts; boric acid, 6 parts.

Iron Borocitrates.

Numerous experiments and analyses show that the salts of the heavy metals are wanting in the power to combine chemically citric and boric acids; permanent compounds of constant composition exist only in double compounds with the fixed alkalies. The iron preparation was made by dissolving freshly precipitated oxyhydrate of iron in the acid borocitrates. The amount of iron oxide taken up amounted in the diborocitrate of sodium and iron oxide to almost 8 per cent., and in the monoborocitrate to over 16 per cent.

THE APPLICATION OF CHEMISTRY TO AGRICULTURE.*

BY J. H. GILBERT, PH.D., F.R.S., V.P.C.S., F.L.S.

(Continued from page 338.)

Thus, we have determined the nitrogen in the soil of the continuously unmanured wheat plot at several successive periods, and the results prove that a gradual reduction in the nitrogen of the soil is going on; and, so far as we are able to form a judgment on the point, the diminution is approximately equal to the nitrogen taken out in crops; and the amount estimated to be received in the annual rainfall is approximately balanced by the amount lost by the land as nitrates in the drainage water.

In the case of the continuous root-crop soil, on which the decline in the yield of nitrogen in the crop was so marked, the percentage of nitrogen, after the experiment had been continued for twenty-seven years, was found to be lower where no nitrogen had been applied than in any other arable land on the farm which had been examined.

In the case of the experiments on the mixed herbage of grass land, the soil of the plot which, under the influence of a mixed mineral manure, including potass, had yielded such a large amount of leguminous herbage and such a large amount of nitrogen, showed, after twenty years, a considerably lower percentage of nitrogen than that of any other plot in the series.

Lastly, determinations of nitrogen in the garden soil which has yielded so much nitrogen in clover, made in samples collected in the fourth and twenty-sixth years of the twenty-seven of the experiments, show a very large diminution in the percentage of nitrogen. The diminution, to the depth of 9 inches only, represents approximately three-fourths as much as the amount estimated to be taken out in the clover during the intervening period; and the indication is, that there has been a considerable reduction in the lower depths also. It is to be supposed, however, that there would be loss in other ways than by the crop alone

I would ask, Have we not in these facts—that full amounts of the different crops can be grown, provided proper soil conditions are supplied; that without nitrogenous manure the yield of nitrogen in the crop rapidly declines; and that, coincidently with this, there is a decline in the percentage of nitrogen in the soil—have we not in these facts cumulative evidence pointing to the soil, rather than to the atmosphere, as the source of the nitrogen of our crops?

In reference to this point, I may mention that the ordinary arable soil at Rothamsted may be estimated to contain about 3000 lbs. of nitrogen per acre in the first 9 inches of depth, about 1700 lbs. in the second 9 inches, and about 1500 lbs. in the third 9 inches—or a total of about 6200 lbs. per acre to the depth of 27 inches.

In this connection, it is of interest to state that a sample of Oxford clay, obtained in the sub-Wealden exploration boring, at a depth of between 500 and 600 feet (and which was kindly given to me by the President of the Association, Professor Ramsay, some years ago), showed, on analysis at Rothamsted, approximately the same percentage of nitrogen as the subsoil at Rothamsted taken to the depth of about 4 feet only.

Lastly, in a letter received from Boussingault some years ago, referring to the sources whence the nitrogen of vegetation is derived, he says:—

"From the atmosphere, because it furnishes ammonia in the form of carbonate, nitrates or nitrites, and various kinds of dust. Theodore de Saussure was the first to demonstrate the presence of ammonia in the air, and consequently in meteoric waters. Liebig exaggerated the influence of this ammonia on vegetation, since he went so far as to deny the utility of the nitrogen which forms a part of farm-yard manure. This influence is nevertheless real, and comprised within limits which have quite recently been indicated in the remarkable investigations of M. Schlösing.

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* Presidential Address delivered before the Chemical Section of the British Association, Swansea, 1880.

"From the soil, which, besides furnishing the crops with mineral alkaline substances, provides them with nitrogen, by ammonia, and by nitrates, which are formed in the soil at the expense of the nitrogenous matters contained in diluvium, which is the basis of vegetable earth; compounds in which nitrogen exists in stable combination, only becoming fertilizing by the effect of time. If we take into account their immensity, the deposits of the last geological periods must be considered as an inexhaustible reserve of fertilizing agents. Forests, prairies, and some vineyards have really no other manures than what are furnished by the atmosphere and by the soil. Since the basis of all cultivated land contains materials capable of giving rise to nitrogenous combinations, and to mineral substances, assimilable by plants, it is not necessary to suppose that in a system of cultivation the excess of nitrogen found in the crops is derived from the free nitrogen of the atmosphere. As for the absorption of the gaseous nitrogen of the air by vegetable earth, I am not acquainted with a single irreproachable observation that establishes it; not only does the earth not absorb gaseous nitrogen, but it gives it off, as you have observed in conjunction with Mr. Lawes, as Reiset has shown in the case of dung, as M. Schlösing and I have proved in our researches on nitrification.

"If there is one fact perfectly demonstrated in physiology, it is this of the non-assimilation of free nitrogen by plants; and I may add by plants of an inferior order, such as mycoderms and mushrooms (Translation)."

If, then, our soils are subject to a continual loss of nitrogen by drainage, probably in many cases more than they receive of combined nitrogen from the atmosphere—if the nitrogen of our crops is derived mainly from the soil, and not from the atmosphere—and if, when due return is not made from without, we are drawing upon what may be termed the store of nitrogen of the soil itself—is there not, in the case of many soils at any rate, as much danger of the exhaustion of their available nitrogen as there has been supposed to be of the exhaustion of their available mineral constituents?

I had hoped to say something more about soil, to advance our knowledge respecting which an immense amount of investigation has been devoted of late years, but in regard to which we have yet very much more to learn. I must, however, now turn to other matters.

I have thus far directed attention to some points of importance in connection with the sources of the constituents of our crops, and I must now briefly refer to some in connection with the composition, and to some relating to the uses, of the crops themselves.

As to composition, I must confine myself to indicating something of what is known of the condition of the nitrogen in our various crops; though I had intended to say something respecting the carbohydrates, and especially respecting the various members of the cellulose group.

As to the nitrogen—in our first experiments on the feeding of animals, made in 1847, 1848 and 1849, the results of which were published in the last-mentioned year—we found, that, in the case of succulent roots used as food, not only were they not of value as food in proportion to their richness in nitrogen, but when the percentage of it was higher than a certain normal amount, indicating relative succulence and immaturity, they were positively injurious to the animals. So marked was the variation of result according to the condition of maturity or otherwise of the foods employed, that, when reviewing the results of the experiments which had up to that time been conducted, in a paper read before this Section of the British Association at the Belfast meeting in 1852 (and which was published in full in the annual volume*), we stated that the mode of estimating the amount of proteine compounds by multiplying the percentage of nitrogen by 6·3 was far from accurate, especially when applied to succulent vegetable foods, and that the individual compounds ought to be determined. The Rothamsted laboratory staff was, however, much smaller then than it is now, and with the pressure of many other subjects upon us, it was at that time quite impossible to follow up the inquiry in that direction.

It is, indeed, only within the last ten years or so, that the question has been taken up at all systematically; but we are already indebted to E. Schulze, A. Urick, Church, Sachsse, Maercker, Kellner, Vines, Emmerling, and others, for important results relating to it.

Our knowledge in regard to the subject is, however, still very imperfect. But it is in progress of investigation from two distinctly different points of view—from that of the vegetable physiologist, and that of the agricultural chemist. The vegetable physiologist seeks to trace the changes that occur in the germination of the seed, and during the subsequent life-history of the plant, to the production of seed again. The agricultural chemist takes the various vegetable products in the condition in which they are used on the farm, or sold from it. And as a very large proportion of what is grown, such as grass, hay, roots, tubers, and various green crops, are not matured productions, it comes to be a matter of great importance to consider whether or not any large proportion of the nitrogenous contents of such products is in such condition as not to be of avail to the animals which consume them in their food?

We cannot say that the whole of the nitrogen in the seeds with which we have to deal exists as albuminoids. But we may safely assume that the nearer they approach to perfect ripeness, the less of non-albuminoid nitrogenous matters will they contain: and, in the case of the cereal grains at any rate, it is probable that if really perfectly ripe they will contain very nearly the whole of their nitrogen as albuminoids. With regard to some leguminous and other seeds, which contain peculiar nitrogenous bodies, the range may, however, be wider.

But whatever the condition of the nitrogenous bodies in the seeds we grow or sow, with germination begins a material change. Albuminoids are transformed into peptones, or peptone-like bodies, or degraded into various amido- or other compounds. Such change into more soluble and more diffusible bodies is, it is to be supposed, essential to their free migration, and to their subserviency to the purposes of growth. In the case of the germination, especially of some leguminous seeds, asparagine has been found to be a very prominent product of such degradation of the albuminoids; but it would seem that this disappears as the green parts are developed. But now the plant begins to receive supplies of nitrogen from the soil, as nitrates or ammonia, and it would seem that amides constitute a considerable proportion of the produced nitrogenous bodies, apparently as an intermediate stage in the formation of albuminoids. At any rate, such bodies are found to exist largely in the immature plant; whilst the amount of them diminishes as the plant, or its various parts, approach to maturity.

But not only have we thus, in unripened vegetable productions, a greater or less, and sometimes a very large, proportion of the nitrogenous bodies formed within the plant, existing as amido-compounds, but we may have a large amount existing in the juices as nitric acid, and some as ammonia, etc. Thus, E. Schulze determined the nitric acid in various "roots;" and he found that, in some mangels, more than one-third of the total nitrogen existed in that form, and about one-tenth as much as ammonia. In a considerable series at Rothamsted, we have found an extremely variable proportion existing as nitric acid, according to the size, succulence, or degree of maturity, of the roots; the amount being, as a rule, the least with the ripest and less highly nitrogenous roots, and the most with the most succulent, unripe, and highly nitrogenous ones. In some cases it reached as much as from 20 to nearly 30 per cent. of the total nitrogen. In many other immature vegetable products nitric acid and ammonia have been found; but, so far as I remember, in none in anything like so large a proportion as in the so-called "root crops," especially mangels. In many, however, the quantity appears to be immaterial; and it is remarkable that whilst there is so much in the "roots," little or none is found in potatoes.

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* 'On the Composition of Foods in Relation to Respiration and the Feeding of Animals.'

No wonder that, in the experiments already referred to, we found the feeding result to be the worse the more succulent and immature the roots, and the higher their percentage of nitrogen, accordingly.

But it is to the difference in amount of the albuminoid bodies themselves, in different descriptions of vegetable produce, that I wish specially to direct attention, making, however, some reference to what is known of the proportion of the nitrogen existing as amido-compounds.

In some mangels E. Schulze found only from about 20 to 22 per cent. of their total nitrogen to exist as insoluble and soluble albumin. But he found in one case 32·5, and in the other 40·8, per cent. of the total nitrogen as amides. In a large series of determinations at Rothamsted, by Church's method, we found a variation of from under 20 to over 40 per cent. of the total nitrogen of mangels to exist as albuminoids; or, in other words, from nearly 60 to over 80 per cent. of it in the non-albuminoid condition.

In potatoes Schulze found from under 50 to 65 per cent. of the total nitrogen as soluble and insoluble albumin, and from 27·7 to 49·1 per cent. as neutral and acid amides. In a series of potatoes grown at Rothamsted, under very various conditions as to manuring, and in two different seasons, we found the nitrogen as albuminoids to range from little over 50 to more than 71 per cent. of the total nitrogen, leaving, of course, from less than 30 to nearly 50 per cent. to be accounted for in other ways.

Kellner determined the amount of nitrogen as albuminoids, and as amido-compounds, in a considerable series of green foods, both leguminous and gramineous, cut at different stages of their growth. The proportion of the total nitrogen not as albuminoids was, upon the whole, greater in the leguminosæ than in the gramineæ. In both, however, the proportion as albuminoids increased as the plants approached to maturity. The proportion as albuminoids was in all these products very much larger than in roots, and generally larger than in potatoes. In the case of first crop meadow hay, we found in the separated gramineous herbage 76·4, in the leguminous herbage 82, and in the miscellaneous herbage 80·3 per cent. of the nitrogen as albuminoids; and in the second crop 86·2 per cent. in the gramineous, 88·3 per cent. in the leguminous, and 88·1 per cent. in the miscellaneous herbage. How far the higher proportion of the nitrogen as albuminoids in the second crops is to be taken as any indication of the characteristics of the autumn growth, or how far it is to be attributed to the accidental condition of the weather, may be a question.

These illustrations are sufficient to give some idea of the range and proportion of the nitrogen in different feeding crops which does not exist as albuminoids; and they are sufficient to show that a very large proportion of the non-albuminoid matter exists as various amido-compounds. The question arises, therefore, whether these bodies contribute in any way to the nutrition of the animals which feed upon them? We have but little experimental evidence on this point. As green herbage is the natural food of many descriptions of animal, we might suppose that characteristic constituents of it would not be without some value as food; but the cultivated root crops are much more artificial productions, and it is in them that we find such a very large proportion of non-albuminoid nitrogen. With respect to some of the amido-compounds, at any rate, direct experiments seem to show that they are digested in the animal body, and increase the elimination of urea. Weiske and Schrodt found that rabbits receiving, as their only nitrogenous food, either asparagine or gelatin, wasted and died; but a rabbit receiving both asparagine and gelatin increased in weight and survived to the end of the experiment, which lasted seventy-two days. From the results of other experiments made with sheep, they concluded that both asparagine and gelatin protect the albuminoids of the body from oxidation.

These considerations lead me, in conclusion, to refer briefly, and I promise it shall be as briefly as is consistent with clearness, to the two very much disputed questions of *the origin of muscular power*, and *the sources of the fat of the animal body*. These subjects Mr. Lawes and myself have frequently discussed elsewhere; but as the controversy has assumed a new phase quite recently, it seems desirable and appropriate that I should recur to it on the present occasion.

With regard to the question of the sources in the food of the fat of the animal body, Liebig originally maintained that although fat might be formed from the nitrogenous compounds within the body, the main source of it in the herbivora was the carbohydrates. In his later writings, he sharply criticized the experiments and arguments of those who have maintained the formation of fat chiefly from the proteine compounds; but he at the same time seems to attach more importance to that source than he formerly did. He gives it as his opinion that the question cannot be settled by experiments with herbivora. He adds that what we know with certainty is that, with these animals, albuminates and carbohydrates work together to produce fat; but whether the non-nitrogenous product, fat, has its origin in the albumin or in the carbohydrate, he considers it not easy to determine.

At the time when we commenced our experiments on the feeding of animals in 1847, the question whether the fat of the animals fed for human food was mainly derived from albuminoids or from carbohydrates had been scarcely raised, or at least it was not prominent. The question then was rather—whether the herbivora received their fat ready formed in their food, or whether it was produced within the body—the latter view being that which Liebig had so forcibly urged, at the same time maintaining that at any rate its chief source was the carbohydrates. Accordingly, our experiments were not specially arranged to determine whether or not the whole of the fat produced could or could not be derived from the albuminoids.

For each description of animal, oxen, sheep, and pigs, such foods as had been established by common experience to be appropriate were selected. The general plan of the experiments was, to give to one set a fixed amount of a recognized good food, containing known quantities of nitrogen, fatty matter, etc.; to another set the same amount of another food, of different characters in these respects; to other sets also fixed amounts of other foods in the same way: and then there was given to the whole series the same complementary food *ad libitum*. Or, to one set was supplied a uniform food rich in nitrogen, and to others uniform foods poorer in nitrogen, and so on, in each case *ad libitum*.

It will be seen that, in this way, a great variety of dietaries was arranged, and it will be observed that in each case the animals themselves fixed their consumption according to the requirements of the system.

As already indicated, the individual nitrogenous and non-nitrogenous compounds of the foods were not determined. As a rule, the constituents determined were—the total dry matter, the ash, the fatty matter, and the nitrogen; from which last the amount of nitrogenous compound it might represent was calculated by the usual factor. But, as already said, the results so obtained were only used with considerable reservation, especially in the case of all immature vegetable produce. Nor was the crude fibre determined; but, as in the case of the estimated nitrogenous substance, when interpreting the results, it was always considered whether or not the food contained much or little of probably indigestible woody matter.

(*To be continued.*)

PHARMACY ACT, 1868.

RECTIFICATION OF THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS.

We are requested by the Registrar to publish the following list of persons whose names will be erased from the Registers unless they communicate with him on or before 30th December next.

Those marked (*) are Pharmaceutical Chemists.

Akhurst, William Edward	60, Silchester Road, Notting Hill, London, W.
Appleby, William	Scarborough.
Armitage, Joseph Henry	Church Street, Greenwich, Kent.
Armstrong, Edward Walter	15, Princes Street, Hanover Square, London W.
Baker, James Barry	4, Derby Road, South Hackney, London, E.
Baldwin, Edwin	22, Robertson Street, Hastings.
Balfré, Juan Morday	Streatham Common, Surrey.
Barrett, William Henry	305, New City Road, Glasgow.
Battersby, Charles	Peas Hill Road, Nottingham.
Bewley, Charles Carter	182, Kingsland Road, London, E.
Blencowe, Thomas	Towcester, Northamptonshire.
Bourne, William Kemsey	78, Weedington Road, Kentish Town, London, N.W.
Bridgewater, Francis Foster	3, Eastgate, Barnsley.
*Brough, Henry James	30, Conduit Street, London, W.
Brown, Charles Hills	9, Marlborough Terrace, Upper Holloway, London, N.
Brown, James	Market Street, Droylsden, Lancs.
Brown, Leonard Flintoff	Horbury, near Wakefield, Yorks.
Brydon, Robert	6, Cambridge Street, Edinburgh.
Budgett, Arthur Edward Sydney.	Dulwich, Surrey.
Burn, John	26, Drury Lane, London, W.C.
Burn, Robert Gibbon	168, Fleet Street, London, E.C.
Burnham, Ralph, jun.	Great Grimsby, Lincs.
Campbell, Arthur	14, Hill Street, Glasgow, N.B.
Carr, Henry	67, King Richard's Road, Leicester.
Carr, John	50, High Street, Dumbarton, N.B.
Chambers, Charles	20, Newborough Street, Scarborough.
Cholwich, Thomas	Blackawton, Devon.
Clapperton, William George	140, Red Bank, Manchester.
Clarance, Felix Robert	18, Northumberland Place, Bath.
Clark, Alexander	178, Leith Walk, Edinburgh.
Clark, George Clayton	Kirkby Stephen, Westmoreland.
Clayton, Charles	156, Ashbourne Road, Derby.
Cluckie, Andrew	145, St. George's Road, Glasgow.
Cocking, Charles Cooper	Wath-upon-Dearne, Yorks.
Cooper, Daniel	Hackney, London, E.
Cottrell, Sarah	70, London Street, Reading.
Cowper, David Burgess	51, High Street, Brechin, N.B.
Cox, John	High Street, Woking, Surrey.
Cox, Oliver	33, Bath Street, Leamington, Warwickshire.
Crofts, Christopher	Burscough Bridge, Burscough, Lancs.
Crosley, James	47, Kirkgate, Leeds.
Cumine, Frederick Hill	Bagster's Plain, King's Lynn.
Dalton, Charles James	87, Islington, Birmingham.
Darley, Henry Charles	6, Russell Square, Brighton.
Davies, David	18, Lewis Street, Aberaman, Glamorganshire.
Davies, George	High Street, Great Marlow, Bucks.
Davies, Hugh	15, Prince's Square, Kennington, Surrey.
Davies, Thomas William	12, Tottenham Court Road, W.
Davies, William Evan	Porthcawl, near Bridgend, Glamorganshire.
Davis, Thomas	207, Finnis Street, Bethnal Green, London, E.
Day, William John	1, Campbell Grove, Nottingham.
Dewhurst, John Eli	Townley Street, Tonge, Middleton, near Manchester.
Diggens, Edward Daniel	Henley-on-Thames.
Dixon, William Bunting	15, Park Terrace, Tondû, Bridgend, Glamorganshire.
Dodridge, Samuel Henry Stephens	8, Shelley Terrace, Shakespeare Road, Stoke Newington, London, N.
Eastes, Frederick Thomas	Great Eastern Street, Shoreditch London, E.
Eedes, John Westmacott	Marden, Kent.
Elliott, Robert Taylor	38, Bedford Terrace, Southampton.
Emms, William Robert	28, High Street, Strood, Kent.
Evans, Arthur William	1, North Ravensworth Street, Sunderland.
Evans, Henry	Six Ways, Birmingham.
Fearnside, William Henry	5, Stockwell Place, Clapham Road, Surrey.
*Ferneley, John William	Hooper's Telegraph Works, West Ham, Essex.
Ferris, James	10, Ashley Terrace, North Road, Plymouth.
Finch, Thomas	17, Godolphin Road, Shepherd's Bush, London, W.
Fish, Joseph Perrett	5, Prospect Row, Huddersfield.
Fitzgerald, Anthony	41, Margery Park Road, Upton, Stratford, London, E.
Flanders, Henry	The Steyne, Bognor, Sussex.
Fletcher, William, jun.	7, Blucher Street, Burnley, Lancs.
Fogg, Robert	60, Deansgate, Bolton, Lancs.
Foster, Henry	Hulme Dispensary, Manchester.
Fowler, Charles March	66, Patshull Road, Kentish Town, London, N.W.
Fowler, George William	6, Townshend Road, St. John s Wood, London, N.W.
*Gibson, Thomas Armat	24, Cursitor Street, Chancery Lane, London, W.C.
Goldsmith, Joseph Lawder	68, Edge Lane, Liverpool.
Gollop, Robert Allbut	163, Strand, London, W.C.
Goodchild, Thomas Archibald	6, Magdala Street, Belfast.
Goulstone, James	Llandovery, Carmarthenshire.
Graham John	Bloomgate, Lanark, N.B.
Graham, Thomas Ross	Market Place, Guisborough, Yorks.
Greenshields, Henry David	7, Queen Street, Ramsgate.
Greensmith, Lawrence	Uttoxeter, Staffs.
Hales, George Wardle	9, Orient Street, Everton, Liverpool.
Hall, William	Tyne Dock, South Shields.
Halley, William	204, Canongate, Edinburgh, N.B.
Harding, Christmas	18, Hatfield Street, Blackfriars Road, Surrey.
Harper, Walter	12, Davis Terrace, Isle of Dogs, London, E.
Harrison, John	191, Hackney Road, London, E.
*Harrison, Robert Hooper	165, Mile End Road, London, E.
Hawker, Henry	18, St. Johnsville Road, Hornsey Rise, London, N.
Heath, Alfred	5, Alexandra Terrace, Hall Street, Moston Lane, Harpurhey, Manchester.
Hedley, John Heslop	Hexham, Northumberland.
Hemsworth, William	Elksley, Notts.
Hendy, Albert	13, Hereford Road, Bayswater, London, W.
Herbert, Henry Charles Joyce	8, Essex Street, Islington, London, N.
Hirst, Francis Octavius	Baker's Hill, Sheffield.
Hockley, Thomas	Husbands Bosworth, Leicestershire.
Holland, David	Sandy Lane, Lymm, Cheshire.
*Horner, Thomas Barker	High Street, Stockton-on-Tees.
Horner, William Blackwell	93, Bloomsbury, Manchester.
Horton, Samuel	Oak Villa, Spilsby Road, Horncastle.
Horton, Walter	Wednesbury, Staffs.
Howorth, George Buxton	1, Marine View, King Street Egremont, Cheshire.
Hudson Walter	Bloomsbury Street, Wolverhampton.
Jalland, Arthur Gibson	6, Layton's Buildings, Southwark, Surrey.
Jeanes, George	Market Place, Martock, Somerset.
Jelley, Stephen John	Calcutta.
*Jennings, John Edgell	Southampton.
Johnson, Fletcher Atkinson	13, High Street, Oldham.
Jones, David Lewis	Wincanton, Somerset.
Jones, Hugh	Corwen, Merionethshire.
Jones, John	Tan-y-Grisian, Merionethshire.
Jones, John Pitman	Prospect Cottage, Rhosesmoor, near Holywell.
Jones, Llewellyn	27, Meadow Road, South Lambeth, Surrey.
Jones, Thomas Jacob	Newport, Mon.
Kent, Edward	Gratton Road, West Kensington Park, London, W.

Kenwrick, Lucius Holden	High Street, Cradley Heath, Staffs.
Kerruish, Edward John	99, Duke Street, Barrow-in-Furness.
King, William	11, Russell Street, Brixton, Surrey.
Kirk, William	Litchurch, Derbyshire.
Knight, Edward	106, Unet Street, Birmingham.
Leake, Charles	Whetstone, Middlesex.
Letch, Henry Robert	44, High Street, Croydon, Surrey.
*Lewis, David	16, Princes Square, Kennington, Surrey.
Liddiard, William	119, Ledbury Road, Westbourne Park, London, W.
Lister, Thomas William	67, High West Street, Gateshead-on-Tyne.
Lloyd, David Llewellyn	Carnarvon.
Lucas, Robert	28, Portland Street, Huddersfield.
Lunniss, James	9, Poole's Terrace, Seven Sisters Road, London, N.
Machon, Robert	Grange-over-Sands, Lancs.
Margetts, Usher	Eastwood, Notts.
Marples, Francis	Mansfield Road, Bolsover, Derbyshire.
Martin, William	16, York Road, Lambeth, Surrey.
Mattley, Joseph	150, Yorkshire Street, Rochdale, Lancs.
Mayo, Robert William	High Street, Crickhowell, Breconshire.
Merryweather, Charles	Highgate, London, N.
Milligan, William M.	Victoria Road, Fenton, Staffs.
Mitchell, Frank	116, Porter Street, Hull.
Moreton, Edwin	Woodland Place, Nottingham.
Morgan, David	18, Hatfield Street, London, E.C.
Morris, John Dixon	76, Newtown, Whitehaven.
Munro, Robert	73, Princes Street, Edinburgh.
Murray, James Hugh	Forres, Elginshire.
Nash, Henry	1, Alexander Road, Kilburn Park, London, N.W.
Neale, Benjamin Thomas Mills	29, High Street, Hampstead, London, N.W.
Nichols, Frederick Roberts	190, Green Street, Bethnal Green, London, E.
Oakley, Robert	High Street, Sutton Coldfield, Warwickshire.
Owen, David	Rhayader, Radnorshire.
Ozanne, Albert Angel	108, Long Acre, London, W.C.
Palmer, Edward George	Millfield, Peterborough.
*Parsons, Francis Henry	Southam.
Paull, John	4, Dalston Lane, London, E.
Pearse, Ebenezer	Sherborne.
Peat, William Henry	Ryde, Isle of Wight.
Penrose, Thomas Samuel	51, Coleherne Terrace, West Brompton, London, S.W.
Percy, Hugh	Redland, Bristol.
Perrin, William	329, Eccles New Road, Manchester.
Poole, William	15, Westby Street, Lytham, Lancs.
Portello, William	11, Gilston Street, West Brompton, London, S.W.
Potts, Joseph	Military Road, South Shields.
Pountney, William Frederick	Albert Buildings, Dudley Road, Birmingham.
Pridmore, William Beeston	155, Abbey Street, Bermondsey, Surrey.
Priestley, John	57, Lord Street, Liverpool.
Pringle, William	Baker's Pool, Sheffield.
Prowse, Frederick	368, Stretford Road, Manchester.
Ragsdell, Walter	White Rock, Hastings.
Ramsay, Emma	8, Printing Office Street, Doncaster.
Rayner, Hessey	12, Russell Street, Hull.
Reeves, Henry	Beckley, Sussex.
Riches, Francis Bloye	1, George's Terrace, Kensal Green, London, W.
Riley, John Cowgill	24, Methley Street, Kennington, Surrey.
Roberts, David	7, West Square, Surrey.
*Roberts, John Lyddon	33, Heath Street, Hampstead, London, N.W.
Roberts, Thomas Hughes	Roewen, Carnarvonshire.
Robinson, Barrick Hodgson	75, Northgate, Guisborough.
Rogers, William Willcox	127, Shepperton Road, New North Road, London, N.
Ryley, Henry Ballinger	Ottery St. Mary, Devon.
Sanders, Joseph Alfred	West Row, Stockton-on-Tees.
Savell, Edward Pearce	79, Crampton Street, Newington Butts, Surrey.
Scott, David Wolsley	Church Street, Barmouth, Merionethshire.
Seifferth, Charles Benjamin	Walsall Street, Willenhall, Staffs.
Seyde, Francis Napier	Willenhall, near Wolverhampton.
Seyde, John Frederick	Willenhall, near Wolverhampton.
Shakespeare, Alfred William	37, Noble Street, Leicester.
Shaw, Francis	Chorley, Lancs.
Sheldon, Ralph Garnett	195, Vauxhall Road, Liverpool.
Shillcock, Arthur	39, Duke Street, Brighton.
Simnett, Thomas	18, Lambeth Road, Surrey.
Smith, Alexander	83, Stirling Road, Glasgow.
Smith, Anne Exall	1, High Street, Dunstable, Beds.
Smith, Anthony	69, Queen Street, Hull.
Smith, William	Radford, Notts.
Smith, William Henry	Haltham-on-Bain, near Horncastle, Lincs.
Smith, William Ross	18, Methley Street, Kennington, Surrey.
Southern, Charles William	107, St. George's Road, Surrey.
Sowden, William John	Louth, Lincs.
Staley, John	311, Chester Road, Hulme, Manchester.
Starie, William Chantler	33, Great Russell Street, London, W.C.
Stedman, Alfred John	1, Westbourne Street, London, S.W.
Stevens, Joseph	73, Camden Road, London, N.W.
Sturton, Thomas	102, Douglas Street, Deptford, Kent.
Sutherland, James John	10, King's Place, Leith Walk, Edinburgh.
Swan, Edward	Bishop Stortford, Herts.
*Swann, William Henry	Loughborough.
Tabberer, William Frederick	18, High Street, Warwick.
Tayler, Thomas Palmer	101, Drury Lane London, W.C.
Taylor, David	248, Manchester Road, Bradford, Yorks.
Taylor, George Haddah	239, Vauxhall Road, Liverpool.
Taylor, John	8, Bensham Place, Beaulah Road, Thornton Heath, Surrey.
Taylor, Johnston James	Edinburgh.
Taylor, William	Guildford Street, Chertsey, Surrey.
Teal, Thomas, jun.	Astley Bridge, Little Bolton, Lancs.
Thom, James	9, Blackstock Road, Finsbury Park, London, N.
Thompson, William Frederick Gamwell	16, Cambridge Street, Hyde Park Square, London, W.
Todrick, William	38, Hardgate Street, Haddington, N.B.
Trant, William	Chapel Allerton, Yorks.
Turner, Frank Edward	287, City Road, London, E.C.
Turner, Robert John	287, City Road, London, E.C.
Vance, Thomas Shaw	Henley Terrace, North Woolwich.
Vickerman, Edwin	12, Russell Street, Hull.
Wade, Robert Brady	24, Methley Street, Kennington, Surrey.
Wakefield, Henry Edward	53, King's Road, Chelsea, London, S.W.
Wakefield, Thomas	247, Lower Wandsworth Road, Surrey.
Wakefield, Thomas Nottage	Newport, Essex.
Walker, Ralph Dearlove	78, Lancashire Hill, Heaton Norris, Lancs.
Walton, John	High Street, Chasetown, near Walsall.
Warne, John Martin	Trellowarren Street, Camborne, Cornwall.
Waterson, John	430, Coventry Road, Birmingham.
Watson, Richard	28, Earl Street, Coventry.
Watson, Thomas Edmondson	Newcastle-on-Tyne.
Watt, John William	14, Stafford Street, Birmingham.
Whewell, William Edmund	High Street, Wordsley, near Stourbridge.
Wilkinson, William George	Addison Road, Shields Road, Byker, Newcastle-on-Tyne.
Williams, Benjamin Hughes	102, Gt. Homer Street, Liverpool.
Williams, Samuel Thomas	372, Oxford Street, London, W.
Wilmer, Frederick Joseph	18, Methley Street, Kennington, Surrey.
Wilson, James	67, St. John's Street Road, London E.C.
Wilson, Matthew	36, Howe Street, Edinburgh.
Wine, John	2, Somerset Terrace, Redcliff, Bristol.
Withers, Henry Percy	Cromer, Norfolk.
Wood, James Burdge	50, Upper Kennington Lane, Surrey.
Woodward, Edward	72, Ashton Street, Birmingham.
*Wrangham, John	14, Angell Park, Stockwell, Surrey.
Wright, Joseph	Ardwick, Manchester.

The Pharmaceutical Journal.

SATURDAY, NOVEMBER 13, 1880.

THE LOCAL GOVERNMENT BOARD ON THE ADULTERATION OF DRUGS.

There are many considerations which justify the opinion that a statute like the Sale of Food and Drugs Act is calculated to be of great advantage to the general public and also to traders who conscientiously strive to furnish their customers with genuine commodities, and for this reason we have never joined in the outcry raised against the Act by certain class journals upon the ground that it is an undue interference with freedom of trade. Inconvenience may no doubt be caused sometimes to individuals without sufficient reason, as we have on some occasions had to show, but on the whole we think the tendency of the Act is for good in every way, and the chief thing to be guarded against in its administration is the influence of exaggerated zeal on the part of excitable officials, and of that disposition to ride a hobby which is inseparable from certain natures.

In the report just issued by the Local Government Board, the results arrived at under the operation of the Sale of Food and Drugs Act are of course dwelt upon. Satisfaction is naturally expressed at the additional number of local authorities that have taken advantage of the Act, and in compliance with its provisions secured for their respective districts the services of an analyst. In like manner the passing of the Amendment Act of last year is spoken of favourably as having been the means of effecting important improvements, one of the chief being the removal of the obstacle arising from the technical construction put upon the words "to the prejudice of the purchaser."

In regard to these and other points similarly referred to in the report, we are entirely of opinion that there is reason for satisfaction, and for the expression of a hope that under the law as it now stands it will be found practicable to reduce the extent of adulteration still further than hitherto. But while concurring in the views thus put forward, we cannot but point out that there is no more certain way of frustrating the possibly beneficial tendency of the Act than by creating erroneous impressions as to the prevalence of adulteration and the danger to be apprehended from it. The craze that was produced some years ago on the subject by vapouring quacks has been followed by a reaction of profound indifference on the part of a large portion of the public, which will in a great degree account for the circumstance that private individvals do not avail themselves of the legislative provisions for their own protection.

Among the various classes of articles referred to in the report of the Local Government Board as having been subjected to the scrutiny of public analysts we find that "drugs" are mentioned, and in the tabulated statement of the number of analyses made during the past year it is stated that 613 samples have been examined. Among that number it is also stated that 171 samples were found to be adulterated. At the same time it is stated that these data are based upon the quarterly reports of analysts and not upon the number of cases in which legal proceedings were instituted. It is further stated that while in many of the samples classed as "adulterated" the amount of adulteration was so small that no prosecution was advised the proceedings undertaken in other instances broke down.

Those who have followed with attention the proceedings under the Sale of Food and Drugs Act, will be aware how often prosecutions break down for want of any maintainable case, and how often, even under other circumstances, the results arrived at by the public analyst fail to prove the existence of adulteration. It appears, therefore, especially remarkable that these facts should have been disregarded in the report of the Local Government Board to such an extent as to allow of the quarterly reports being taken as the basis whence the prevalence of adulteration could be deduced and represented in percentages. Yet such is actually the case, and—confining ourselves to drugs—the amount of adulteration to which they are subject is thus represented as being 27·8 per cent. in 1879, against 25·4 per cent. in 1878.

According to these data, there has been no beneficial effect produced by the Sale of Food and Drugs Act upon the quality of drugs, but there would appear to have been, in spite of it, some considerable increase in adulteration. It is astonishing that such obviously worthless data should find a place in the report of an important public department; still more astonishing that they should be given side by side with information which proves their worthlessness; and most of all is it astonishing that such material should be made use of with the object of pointing to a state of things demanding serious attention.

Drugs, we are informed, continue to be largely adulterated. The probable injurious results of the practice thus assumed to exist and to be growing are referred to. Instances are given to show how the health of the public may thus be prejudiced, and lastly the Board repeats the opinion expressed in former years that the "state of things demands "serious attention and that strong efforts should be "made to secure the sale of genuine drugs of proper "strength."

Such an utterance on the part of a Government department is of course likely to be of influence and ought to be deserving of respect. We regret that we cannot regard it in this light, and that on the contrary we feel bound to declare this utterance of the Local Government Board in regard to drugs to be entirely unfounded and delusive.

The very cases that are mentioned in the report as illustrative of the adulteration of drugs, viz., paregoric without opium, sweet spirits of nitre entirely destitute of nitrous ether, cream of tartar mixed with sulphate of lime (*sic*), tartaric acid with lead sufficient to injure health, fluid magnesia with only 3·3 grains of magnesia per fluid ounce, and tincture of rhubarb of half strength, suffice to show that there is a want of adequate foundation for the grave statements and the alarming opinions in the report. The cases here referred to are either outside the legitimate trade in drugs or such as have furnished evidence that public analysts are not competent to advise prosecution. They have in reality no relation to the legitimate trade in drugs beyond being, on the one hand, cases of piratical competition which call for repression by the Government, and, on the other hand, cases of mischievous interference against which traders should be protected.

So far from there being any reason for believing that the adulteration of drugs is a practice that prevails, we do not hesitate to say, as we have said on previous occasions, that few articles are so free from adulteration as the drugs sold by qualified persons. One of the chief objects of the Pharmaceutical Society since its foundation has been to discountenance sophistication in all forms and to make the good quality of drugs used or sold by pharmacists a point to be especially studied. We therefore protest against the statements contained in the late report of the Local Government Board, in so far as they may be susceptible of being construed to refer to those properly engaged in the business of pharmacy.

PHARMACEUTICAL LEGISLATION IN THE COLONIES.

New Zealand, following the example of the mother country and of other colonies, has made a first step in pharmaceutical legislation, and the Act recently passed to establish a Board of Pharmacy will be found at page 401 of the present issue.

The Act is to come into operation at the commencement of next year, and the first Board, to be appointed by the Governor in Council for a period of three years, is to consist of a President and six other persons eligible for registration as pharmaceutical chemists. At the end of that period successors are to be elected by the registered pharmaceutical chemists of New Zealand. The only grade recognized is that of pharmaceutical chemist, and the persons eligible for registration are such as had attained the age of twenty-one at the time of the passing of the Act and had carried on the business of a chemist and druggist or homœopathic chemist for at least two months, or had been employed as dispensing assistants for at least six months in a shop or for three years in a hospital, etc., in New Zealand, or lastly, such as hold certificates of competency from the Pharmaceutical Society of Great Britain or any College or Board of Pharmacy recognized under the regulations made by the Board of Pharmacy of New Zealand.

Those who do not possess any of the above qualifications for registration are to undergo examination of the same general character as that adopted in this country. The Act also provides that it shall be unlawful for any unregistered person to assume the title of pharmaceutical chemist, pharmaceutist, chemist and druggist, dispensing chemist, or other words of similar import, or to use any sign implying that he is registered under the Act, under a penalty of five pounds.

Among the miscellaneous provisions of the Act it may be mentioned, now that the amendment of our own Act is under consideration, that in regard to the carrying on of the business of a deceased pharmaceutical chemist by his executors, administrators or trustees, such continuance of the business is to be limited to a period of twelve months, except by special permission by the Board of Pharmacy, and in all cases the business is to be conducted by a registered pharmaceutical chemist.

Another provision of the Act has relation to the sale of adulterated drugs, and renders any registered person liable to prosecution as though he were aware of the adulteration found to exist, unless he be able to prove the contrary.

It is worthy of note that the Act does not contain any provision in regard to the sale of poisons, nor indeed any provision restricting the business of pharmacy to registered persons; but that it merely affords protection of the title indicating registration and thereby the possession of competent skill and knowledge.

MUNICIPAL HONOURS.

In the list of gentlemen who have been elected to fill the office of Mayor in various parts of the country we notice the following:—Mr. Edward Clark, Chemist and Druggist, Lancaster; Mr. James Floyd, Chemist and Druggist, Bury St. Edmonds; Mr. John Horsley, Chemist and Druggist, Hartlepool; and Mr. H. J. Orchard, Chemist and Druggist and Local Secretary to the Pharmaceutical Society, Newport, I.W. Besides these, Mr. John Babtie, Pharmaceutical Chemist, has been re-elected Provost of Dumbarton, and Mr. William Sarsfield, Pharmaceutical Chemist and Local Secretary of the Society, has been elected to the Municipal Council of Durham.

THE RECTIFICATION OF THE REGISTER.

Attention is particularly directed to the important notice on the front page of the present number and the list of names on pp. 393 and 394. It will be seen that nearly two hundred and fifty persons, who have failed to reply to two registered letters sent in accordance with the Pharmacy Act, are liable to have their names struck off the Register unless they communicate with the Registrar on or before the 30th of December next.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

November 3, 1880.

Present—Professor Tichborne, President; Dr. A. Smith, Vice-President; Sir G. B. Owens, Messrs. Allen, Bennett, Brunker, Collins, Doran, Grindley, Goodwin, Hayes, Hodgson, Holmes, Oldham, Payne, Pring, Ryan, Simpson and Whittaker.

Before the business of the meeting commenced,

Mr. Goodwin asked what steps had been taken to prevent pharmaceutical chemists being summoned on juries, he having received a summons in both town and county.

The President said that the Registrar furnished a list to the Collector-General of Rates, whose duty it was to make out the lists of jurors for the city, and to the Clerk of the Union, whose duty it was to prepare the panel for the county; but he was not able to explain why Mr. Goodwin was not exempted.

The Registrar (Mr. Fennell) said that a member had objected to the minutes of the annual meeting of October 4 being read, as reading at that time was irregular, and asked the President for a ruling.

The President said it had been the custom of the Society to read the minutes as soon as possible after the annual meeting, and he saw no reason to alter that course.

Mr. Allen said he was the member who objected. The minutes should be read at a meeting of the same kind, and should not be read at a council meeting, when members who had a voice only at annual meetings could not object to anything in them. The minutes of the council meeting which was held previous to an annual meeting were not read at it, but were held over to the next council meeting; it was not the rule in public companies.

The President said the idea of reading the minutes was to have them corrected, and if the reading was postponed for a year, it would be difficult for members to remember sufficiently well what had occurred at the previous meeting in order to check the record of the proceedings.

Dr. Smith suggested that the minutes might be confirmed upon the same day as the annual meeting by having another meeting for that purpose.

The President then directed that the minutes be read together with those of council meeting of October 6. Both being read and signed, the election of examiners was proceeded with, after considerable conversation as to the method of voting, which by the bye-laws must be by open voting.

Dr. Smith then asked that Mr. Allen's resolution—

> "That in the opinion of this meeting it is not desirable that any person who is engaged in preparing students for the examinations of the Pharmaceutical Society of Ireland should be appointed an examiner of this Society"

should be put to the meeting first.

Mr. Brunker said the resolution was an abstract one, and, if passed, would not affect the individual vote of any member of the Council.

The President said he believed that the intention was merely to take the opinion of the meeting, as no resolution could be binding until it had received the sanction of the Privy Council.

The election was then proceeded with. Applications were received from the following; the applications and testimonials of such candidates as had not canvassed the Council individually were read to the meeting:—

a. As Examiners in Latin, English and Arithmetic.—John William Moore, M.D., F.K. and Q.C.P.I.; Robert W. Griffin, A.M., LL.D.; Isaac Ashe, M.D., F.K. and Q.C.P.I.; Joseph Daniel M'Feeley, Sch. Cath. Univ. Irel.; Stewart Woodhouse, M.B., L.R.C.S.I.; H. Colpoys Tweedy, M.B., L.R.C.S.I.

b. As Examiner in Materia Medica and Botany.—George F. Duffey, M.D., F.K. and Q.C.P.I.

As Examiner in Chemistry.—Edmund W. Davy, M.D., M.R.I.A.; Peter F. Baikie, L.P.S.I., M.P.S.G.B.

d. As Examiner in Pharmacy.—Charles Evans, M.P.S.I.; Robert W. Harley, L.A.H. Dub., L.R.C.P. and L.R.C.S. Edin.; George M. Foy, L. and F.R.C.S.I.

For Examiner in Arts.—Dr. J. W. Moore was proposed by Sir G. B. Owens, seconded by Dr. Smith.

Dr. Griffin was proposed by Mr. Holmes, seconded by Mr. Pring.

The remaining four applicants were not nominated. The voting was taken by a show of hands. Dr. Moore received 11 votes, and Dr. Griffin 8 votes. Dr. Moore was declared elected.

For Examiner in Materia Medica and Botany.—Dr. George F. Duffey was proposed by Dr. Collins, seconded by Mr. Goodwin, and elected unanimously.

For Examiner in Chemistry.—Dr. E. W. Davy proposed by Dr. Collins, seconded by Mr. Grindley, was elected without dissent, and declared duly elected. Mr. Baikie's nomination did not go to the vote.

For Examiner in Pharmacy.—Mr. Evans was proposed by Sir G. B. Owens, seconded by Dr. Smith; Dr. Harley by Mr. Grindley, seconded by Mr. Allen; Dr. Foy by Mr. Payne, seconded by Mr. Simpson. Upon the first voting, the numbers recorded for each candidate were—for Mr. Evans, 7; Dr. Harley, 9; Dr. Foy, 3. The two first were then voted for again, Mr. Evans receiving 7, and Dr. Harley, 11 votes. Dr. Harley was declared elected.

The report from the Belfast members of Council, deputed to visit the Chemical School of the Working Men's Institute, Belfast, as follows, was read to the meeting:—

"Belfast, *October* 29, 1880.

"We have to report that, in compliance with the resolution of the Council of the Pharmaceutical Society, passed on the 6th inst., we have inspected the School of Chemistry, held in the Working Men's Institute, in this town, and conducted by Mr. Barklie. We found the premises in every way suitable for the purposes for which they are intended. The appliances were good in quality and sufficient in number. There is every accommodation for pupils, and we have no hesitation in expressing our belief that it is a school which might fairly be recognized by the Society, and which has complied with the regulations thereof.

"Signed, RICHARD W. PRING.
"J. C. CHARLES PAYNE.
"HENRY WHITTAKER, M.D."

It was proposed by Mr. Hayes, seconded by Mr. Simpson, and passed—

> "That the report from the Belfast members of Council upon the Chemical School of the Working Men's Institute, Belfast, be entered upon the minutes, and a copy forwarded to the Privy Council for the recognition of the School."

A Member reported a case of alleged illegal dispensing, and on the motion of Mr. Brunker, seconded by Mr. Simpson, the following resolution was put to the meeting, and passed:—

> "That the case of illegal dispensing, mentioned by —— be referred to the Law Committee, and a special meeting of that Committee be summoned for the purpose of considering it."

(For obvious reasons it is not desirable to publish the particulars of cases mentioned for prosecution).

Owing to the lateness of the hour, and the amount of time which the elections occupied, it was suggested that the remainder of the business, which was considerable, should be postponed. It was, however, arranged that Mr. Payne should proceed with his resolutions. The first—

> "That the sixth regulation, page 44 of the 'Calendar,' be amended, so that it may conform to the resolution passed by the Council, November 7, 1877."

The resolution was of a technical character, and was for the purpose of making uniformity in the regulations. After some discussion, an amended resolution was proposed by Mr. Payne, seconded by Mr. Brunker, and passed—

> "That the Editor of the 'Calendar' be requested to alter clause vi., page 43, so as to conform to the resolution of November 7, 1877, page 71; also to alter the hour of meeting, in accordance with resolution of July 3, 1878, page 72."

Mr. Payne being unable to remain, and the meeting not deeming it desirable to have his remaining resolutions proposed by another member, the whole of the remaining resolutions were postponed.

A new certificate, in lieu of the one torn in transit through the post, was signed and ordered to be sent to Mr. Bacon, Londonderry, the injured certificate being destroyed by the President.

The report of the examination for the licence of Pharmaceutical Chemist, held October 6, was laid before the meeting. The following five presented themselves, all of whom passed:—

George Dimond	Maryborough.
William Henry Gamble	Fairview.
John M'Murray	Warrenpoint.
Joseph Stewart	Limerick.
Richard Sunner	Cork.

The meeting then adjourned.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The opening meeting of this Association for the present session was held in the Manager's Library, Anderson's College, 204, George Street, the new President, Mr. Robert McAdam (Glasgow Apothecaries' Company), in the chair.

After the Secretary, Mr. John C. Hunter, had read the minutes of the previous meeting, which were approved of by the members,

The President gave a short address, in which he thanked the members for conferring that honour on him. He added that he must crave their indulgence, as he was no great speaker, and on that account he would introduce Mr. John Walker, who had kindly volunteered to read a paper.

Mr. Walker then read a paper entitled "Man: his Place in Nature."—He could not say whether man appeared at once, as given in the Mosaic record, or after a great period of time and many changes, as required by the evolutionists; but there was no doubt that man was not placed here simply to satisfy his physical wants and nothing else; but having been gifted by his Creator with mental abilities of varying qualities, these gave him the power of enjoying and following out any of the various subjects in science, art, or literature, and by cultivating these mental faculties he would be forming a source of enjoyment for himself and others all the days of his life. Mr. Walker then touched upon the relation of the vegetable kingdom to animal life; also on chemistry, as showing by its teaching the laws which govern matter in its various changes of state. Mr. Walker concluded his paper by reading a passage from one of Pope's poems giving a poet's idea of matter.

After the election of members and other business, a hearty vote of thanks was awarded to Mr. Walker for his instructive paper; also a vote of thanks was given to the new President, after which the meeting closed.

DOVER CHEMISTS' ASSOCIATION.

The annual meeting of the above was held November 8. Mr. H. Peake was elected Chairman in place of Mr. Cotterell, who resigned that office, and Mr. J. Wilford was re-elected Secretary and Treasurer for the ensuing year. The usual routine business was then proceeded with, consisting principally of the revision of prices and other trade matters.

The annual supper was held after the meeting. In proposing a vote of thanks to Mr. Cotterell for so ably filling the office of Chairman during the four years' existence of the Association, Mr. Bottle referred much of its success to the energy and tact displayed by the Chairman, and in the name of the members of the Association he wished him health and happiness on his retirement from active co-operation among them.

In reply Mr. Cotterell thanked the members for their assistance at all times in carrying out the objects of the Association. He thought these meetings had done a great deal of good in promoting harmony and unity of action, and though he should shortly be removed out of the neighbourhood of Dover, yet he should always feel a deep interest in the future of the Association; he should look back with great pleasure to the many pleasant evenings spent with them and hoped in the future now and then to take his place among them.

"Success to the Dover Chemists' Association," was proposed by Mr. Hambrook and responded to by the new Chairman, Mr. Peake.

LIVERPOOL CHEMISTS' ASSOCIATION.

The second general meeting of the thirty-second session was held at the Royal Institution on Thursday evening, October 28th, the President, Dr. Charles Symes, in the chair.

The paper for the evening, on "The Hygroscopic Power of Sulphuric Acid," was read by Mr. Thomas Williams, F.C.S. The author produced the results of some hundreds of weighings which he had conducted since the beginning of last March, with the object of ascertaining, on the one hand, to what extent sulphuric acid, would, when exposed for a continued length of time, absorb the moisture of the atmosphere, and, on the other hand, to ascertain to what extent diluted sulphuric acid would evaporate when exposed to ordinary atmospheric influences. Mr. Williams's experiments showed that, in round numbers, a limit to both the absorption and the evaporation was reached when the proportions were one part of the strong acid to two parts of water. From numerous experiments, he concluded that sulphuric acid does not absorb fifteen times its weight of water when exposed to an atmosphere saturated with moisture, as given in standard works to have been found by M. Gay Lussac.

A lengthy discussion on the paper took place, in which the President, Messrs. Chubb, Conroy and Watt took part, and at the close a hearty vote of thanks was given to Mr. Williams.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, November 4, Professor E. H. Roscoe, President, in the chair.

The following certificates were read for the first time:—J. A. Arnold, A. E. Barclay, A. C. Cockburn, P. H. Cathcart, T. Farrington, P. F. Frankland, A. E. Garrod, R. Holliday, A. Jesseman, J. A. Macfarlane, W. B. Mason, R. T. Plumpton, C. H. Sharples, F. M. Sexton, B. H. Thwaite, J. M. Wyborn.

The President congratulated the Society on having thirteen papers down for reading on the first evening of the session.

During the reading of the first paper, which was communicated by the President, Dr. Frankland took the chair.

On the Sulphides of Vanadium. By W. E. KAY.—Berzelius describes in his original research on vanadium two sulphides, VS_5 and VS_3. From the researches of Roscoe it follows that their real formulæ should be $(V_2O_2)S_2$ and $(V_2O_2)S_3$. The author has repeated the experiments of Berzelius, analysed the compounds formed, and investigated the whole subject. He also gives details of the method employed to estimate the sulphur, *i.e.*, ignition in a hard glass tube in a stream of oxygen, the products of combustion passing successively through two Liebig's potash bulbs, the first filled with bromine water, the second with distilled water. Berzelius obtained his compounds by precipitation, and one of them by a dry process. The substances formed in the wet way are oxy-compounds, but do not seem to have any definite composition. The dry process, *i.e*, heating V_2O_3 to redness in sulphuretted hydrogen, forms curiously enough V_2S_3, which gives the same increase in weight over that of the V_2O_3 as $(V_2O_2)S_2$; so that if Berzelius had but estimated the sulphur in the product, instead of being satisfied with the increase of weight, the true constitution of the vanadium compounds would probably have been ascertained by him. The author has obtained and studied three sulphides, V_2S_2, V_2S_3, and V_2S_5. V_2S_2 is obtained by reducing V_2S_3 in a current of hydrogen, as glistening black scales or a blackish powder. It absorbs oxygen with avidity. Hot strong sulphuric acid gives a greenish-yellow solution. Hot strong nitric acid oxidizes it with violence. Colourless ammonium sulphide gives a splendid purple solution. It is acted upon but slightly by caustic alkalies. V_2S_3 is prepared as above, or by the action of SH_2 or CS_2 at a red heat, or V_2O_5. In its properties it resembles V_2S_2, but oxidizes less readily. V_2S_5 is prepared by heating a mixture of S and V_2S_3 in a sealed tube to 400° for three hours. It resembles the other sulphides, but is readily dissolved by caustic soda. The author remarks on the inferior stability of the sulphides as compared with the oxides, V_2S_5 when heated giving off sulphur and forming V_2S_3, whilst V_2S_3 in an atmosphere of hydrogen is reduced to V_2S_2.

On the Action of Zinc Ethyl on Benzoylic Cyanide. By E. FRANKLAND and D. A. LOUIS.—The cyanide was gradually added to zinc ethyl diluted with three times its volume of dry ether, and the reaction completed by heating in a water-bath. The product of the reaction, an amber coloured jelly, was decomposed, and then extracted with alcohol. Tufts of colourless needles were obtained, which gave on analysis $C_{24}H_{19}NO_2$. The authors propose the name benzcyanidin. The yield is small, about 3 per cent. of the cyanide. Another substance, boiling between 200° and 220°, was obtained; but the authors did not succeed in purifying it so as to procure a liquid with a constant boiling point. It was oxidized with bichromate and dilute sulphuric acid, when propiophenone, $C_9H_{10}O$, was obtained, which the authors believe was formed directly by the action of zinc ethyl on the benzoylic cyanide— $2\left\{\begin{matrix}C_6H_5\\CO(CN)\end{matrix}\right. + ZnEt_2 = 2\left\{\begin{matrix}C_6H_5\\COEt\end{matrix}\right. + Zn(CN)_2$. Much zinc cyanide was also formed. The halogen nature of the compound radical cyanogen is thus shown to extend to its replacement by an electro-positive hydrocarbon radical.

On the Action of Zinc Ethyl on Cyanogen. By E. FRANKLAND and C. C. GRAHAM.—The zinc ethyl rapidly absorbs the cyanogen, and is finally converted into a solid mass. This mass was heated to 120° in an oil-bath, and furnished a colourless liquid, which was freed from traces of zinc ethyl, and re-distilled. It then boiled at 96°. Analysis indicated the formula C_3H_5N, and it had all the properties of propionitrile. The solid residue remaining after the distillation consisted almost entirely of zincic cyanide. The reaction is therefore—

$$2\left\{\begin{matrix}CN\\CN\end{matrix}\right. + ZnEt_2 = 2Et(CN) + Zn(CN)_2.$$

It is to be noted that a separation of carbon from carbon occurs, accompanied by a simultaneous union of carbon to carbon.

Report on the Atmospheric Oxidation of Phosphorus and some Reactions of Ozone and Peroxide of Hydrogen. By C. T. KINGZETT.—The author commenced with a historical *résumé* of previous researches by Schönbein, Andrews, Marignac, Corne, Boehe, Leeds, MacLeod and himself. The author in the present research employed a series of glass bottles stoppered, each fitted with two glass tubes ground into holes in the stopper, thus avoiding altogether the use of cork and indiarubber. He concludes that both ozone and peroxide of hydrogen are produced by the oxidation of phosphorus, the peroxide of hydrogen remaining almost entirely in the water in which the phosphorus is oxidized. The ozone passes on in the air current and after washing and drying with strong H_2SO_4 was estimated by the amount of iodine liberated in an acidified solution of potassium iodide. A large number of experiments were made; in several cases the proportion of peroxide of hydrogen to the ozone produced was approximately 1 to 2. The ozone was entirely destroyed at 240°, and by passing through oil of turpentine. It was, however, not destroyed by passing through a ten-volume solution of hydric peroxide. Ozone when it acts on oil of turpentine gives rise to the same peroxidized compound as is formed by the absorption of oxygen. The turpentine which has absorbed ozone when treated with water produces an equivalent amount of peroxide of hydrogen. Similar observations are recorded with ether. As regards the estimation of peroxide of hydrogen, the author finds that the ordinary process with potassic iodide and starch may be much shortened by employing a large excess of dilute sulphuric acid. When it is estimated by the amount of oxygen evolved with potassium permanganate, the author advises that no acid be added, as a mixture of potassic permanganate and dilute sulphuric acid gradually gives off oxygen until all the permanganate is decomposed.

After a few remarks from the President and Dr. Armstrong,

The Secretary read a paper—

On Bismuth and Bismuth Compounds. By M. M. P. MUIR, G. BERNARD HOFFMEISTER and C. E. ROBBS.—The preparation of the various oxides, hydrates, and halogen salts is discussed and previous work is criticized and experimentally examined. The oxides and hydrates certainly known to exist are Bi_2O_2, Bi_2O_3, Bi_2O_4, Bi_2O_5, $Bi_2O_3H_2O$, Bi_2O_3, $2H_2O$ and $3H_2O$, $Bi_2O_4H_2O$ and $2H_2O$, $Bi_2O_5H_2O$ and possibly $Bi_2O_2H_2O$ and $2H_2O$ and $Bi_2O_53H_2O$. The relative stabilities towards heat and reducing agents of the oxides and towards heat of the hydrates are discussed. The action of chlorine and bromine on the oxides is described. The hydration of the oxides in moist air is measured; $Bi_2O_32H_2O$ is shown to be the hydrate into which the others tend to pass. BiI_3 is much more stable, and more indifferent to reagents than the corresponding bromide or chloride. There is apparently no tendency to form complex oxyiodides. By the action of HF on Bi_2O_3, BiF_3 and BiOF are formed. The following equations represent the final distribution of salts in each reaction.

$$\left\{\begin{array}{l}1.\ Bi_2O_3 + 2HCl + xH_2O = 2BiOCl + (x+1)H_2O.\\ 2.\ Bi_2O_3 + 6HI + xH_2O = 2BiI_3 + (x+3)H_2O.\end{array}\right.$$

$$\left\{\begin{array}{l}1.\ 3BiOCl + xHi + xH_2O = 2BiI_3 + BiCl_3 + (x-6)HI\\ \qquad + (x+3)H_2O.\\ 2.\ 4BiOI + xHCl + xH_2O = 3BiCl_3 + BiI_3 + (x+4)H_2O\\ \qquad + HI + (x-9)HCl.\end{array}\right.$$

An attempt is made to condense the leading relations between oxides and hydrates in structural formulæ, in all of which the bismuth atom is represented as trivalent.

On the Colour, Properties, and Relations of the Metals Copper, Nickel, Cobalt, Iron, Manganese, and Chromium. By T. BAYLEY.—These metals form a group of elements with atomic weights progressing from 52·2 to 63·00; they are characterized by salts corresponding to their normal oxides, which in dilute solution possess strongly developed and characteristic colours. Standard solutions were prepared, containing 5 grams of each metal per litre; the iron was oxidized with nitric acid, after solution in dilute sulphuric acid; the other solutions contained excess of both these acids. By mixing 20 parts of the copper solution, 7 of the iron and 6 of the cobalt, a colourless liquid was obtained, appearing, however, slightly grey from the partial suppression of the white light passing through; the colour equivalents of cobalt, iron, and copper, are therefore respectively 20·7 and 6. The colour equivalents being the numbers expressing the quantities of the metals required to produce an optically neutral mixture; the colour co-efficients are the reciprocals of the colour equivalents reduced to terms of the co-efficient of copper as unity. The colour co-efficient expresses the specific chromatic power of the element in the particular combination. These numbers vary slightly with the temperature; thus the above neutral solution (at 18°) when boiled appears to be yellow. By mixing iron and copper we can simulate exactly a nickel solution. A copper solution is complementary to a mixture of iron and cobalt, and to the reflection from a surface of copper. The mean wave length of the light absorbed by iron, nickel, cobalt, and copper increases as the atomic weight increases; the mean wave lengths of the light absorbed by nickel and cobalt are nearly identical. Generally the affinity of the metals of this group for oxygen increases with the colour co-efficients; the co-efficients are Cu 1, Ni 1·05, Fe 2·85, Co 3·33, Cr, Mn(?). The oxides studied are the so-called normal oxides, *i.e.* neither protoxides nor peroxides. The following table exhibits the colour properties of these elements as studied up to the present time. Elements with solutions of similar colour being placed in the same column:—

Yellow.	Orange.	Pinkish red.	Violet.	Blue.	Green.
Fe	7 Fe+6 Co	Co	20 Cu+6 Co	Cu	20 Cu+7 Fe
Mn (?)	Copper reflection	Cr	Cr	Cr	Cr
			mixtures		
	Mn (nearly)	Mn			Ni (nearly)

The following combinations give grey, partially opaque, liquids: cobalt, iron and copper; copper solutions and copper reflections; chromium (blue) and copper reflection; copper, iron and chromium (red); copper, iron and manganese (red); chromium (green) and chromium (red); chromium (green) and cobalt. The author has specially examined only the first of these combinations. He gives diagrams showing the absorption spectra of cobalt, copper, and iron, the solutions being of equivalent chromatic strength, *i.e.*, equal volumes give, when mixed, a grey liquid.

On the Action of Diazonaphthalene upon Salicylic Acid. By P. F. Frankland.—Although numerous azo bodies have been prepared, yet only a few thereof are compounds of the oxybenzoic acids, and in none has the position of the phenylazo group been ascertained. The author's object was therefore twofold, the preparation of a new azo compound and the determination of the place of entry of the diazo group into the benzene nucleus of salicylic acid. The diazo group was introduced in the form of diazonaphthalene, naphthylazosalicylic acid being formed. This substance, on treatment with tin and hydrochloric acid, yielded naphthylamine and amidosalicylic acid. The latter was then converted by means of its diazo compound into iod-salicylic acid, which by its melting point, reactions, and conversion into oxysalicylic (quinolcarboxylic) acid proved to be the iodsalicylic acid, already known. The diazo group of the diazonaphthalin thus attached itself to the benzene ring of the salicylic acid in the para position to the hydroxyl, and in the meta position to the oxatyl. In the preparation of naphthylazosalicylic acid, an amorphous brown body was obtained, insoluble in water. This proved to be a mixture of two substances, one soluble in alkalies with the formula $C_{10}H_8NO$, the other insoluble in alkalies, $C_{30}H_{33}N_5O_2$.

On the Basic Sulphates of Iron. By Spencer Pickering.—The author has investigated the numerous sulphates said to exist; but of the existence of fifteen of them he can find no proof, there being apparently but one definite chemical compound.

Fourth Report to the Chemical Society on Some Points in Chemical Dynamics. By C. R. A. Wright, E. H. Rennie, and A. E. Menke. The authors have determined the rate at which reduction of certain metallic oxides is effected under conditions varying as to temperature, but otherwise constant, with the view of finding out how far abrupt alterations in the rate occur when a higher is reduced to a lower oxide, the heat of formation of which differs from that of the higher oxide. They show that these alterations are readily distinguishable, at any rate at certain temperatures. Thus samples of ferric oxide in different states of physical aggregation were reduced under constant conditions by hydrogen and by carbon oxide; curves were then plotted, the amounts of reduction being taken as ordinates and the times as abscissæ. It was seen that as soon as one-ninth of the oxygen had been removed (so that the partially reduced oxide had the composition Fe_3O_4) a marked slackening in the rate of reduction was always observed, particularly at lower temperatures, a sort of angle being thus produced in the curve. No such angle exists at points representing either removal of one-third of the oxygen (reduction to FeO) or any other stage of reduction. The results with carbon oxide are complicated by its tendency to bring about reoxidation. $Fe_xO_y + CO = Fe_xO_{y+1} + C$. The effect of this is to diminish the rate of reduction; nevertheless it was found, almost invariably, that the rate of reduction of carbon oxide was c.p. greater than that of hydrogen, as was expected from the greater evolution of heat in the former case. Manganese dioxide was examined in the same way with similar results. A distinct angle was exhibited by the curve when the composition was Mn_3O_4 and another angle when it was MnO. The reducing action of both hydrogen and carbon oxide then ceases up to a bright red heat. In every case the angle indicates a decrease in the rate of reduction and that consequently the heat of formation of the lower oxide is greater than that of the higher oxide. From the present and previous experiments the authors deduce the general law that in any two comparable cases of reduction, in which the heat evolutions differ from one another, the case in which the heat evolution is algebraically the greatest (*i.e.* the greatest evolution or least absorption) is the case in which "a" the length of time requisite to produce a given amount of reduction at a given temperature is the least, "b" the amount of reduction produced in a given time at a given temperature is the greatest, and "c" the temperature requisite to produce a given amount of reduction in a given time is the lowest. Certain apparent minor exceptions to this law have been noticed and are explained by the non-identity of conditions, *e.g.*, when carbon oxide reduces ferric oxide the action is retarded by the tendency, above alluded to, of carbon deposition; and again when the oxide is coated with a film of reduced substance the carbon oxide diffuses much more slowly than hydrogen under similar circumstances, the reducing action of carbon oxide being thus much retarded. Again, when metallic copper is oxidized a similar retardation takes place owing to the formation of a film of oxide. The general law stated above may be represented graphically by constructing curved surfaces about 3 rectangular axes, the co-ordinates of any point on a surface representing time, temperature and amount of reduction. The surface representing the values obtained with the substance the reduction of which is accompanied by the greatest heat evolution always lies outside.

On some Derivatives of Naphthalene. 1. *On β*

Naphtholsulphonic Acid. By H. E. ARMSTRONG and W. C. GRAHAM.—The authors were led on certain theoretical grounds to re-examine the β naphthol-sulphonic acids prepared respectively from β naphthol and from the so-called naphthalene β disulphonic acid by fusion with caustic potash. They have prepared and examined various salts, and conclude that Ebert and Merz were right in asserting the identity of the two products. They have also studied the action of bromine on β naphthol-sulphonic acid.

On Acetylorthoamidobenzoic Acid. By P. D. BEDSON and A. J. KING.—Acetorthotoluidine was first prepared by heating orthotoluidin with glacial acetic acid for several hours and recrystallizing from aqueous alcohol; it was thus obtained in white needle-shaped crystals melting at 107°-109°. This compound was oxidized by the addition in small quantities at a time of potassium permanganate, the whole being warmed in a water-bath. The MnO_2, etc., was filtered off and the acid precipitated directly by concentrated hydrochloric acid or as a lead salt with lead acetate. The authors have studied the acid and some of its salts. The physical and chemical properties are given in the original paper.

A paper, on the Formation of Sodium Hydrate from Sodium Sulphate, by Messrs. Cross and Bevan, was taken as read.

The Society then adjourned to November 18, when the following papers will be read:—

"Notes on the Oxides of Manganese," by Spencer Pickering; "Aluminium Alcohols. Part I. Their Preparation by means of the Aluminium Iodine Reaction," by J. H. Gladstone and A. Tribe.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association held at the rooms, George Street, Hanover Square, on Wednesday, October 27, a paper on "Electro-Metallurgy" was read by Mr. L. B. Miller.

After giving a brief outline of the general subject of electrolysis, the lecturer divided his paper into electroplating, electrotyping, and the reduction of refractory metals in the electric arc, treating each in detail. In speaking of electroplating, great stress was laid on the necessity of a thorough cleansing of the article before deposition on its surface, and then the composition of the more commonly used solutions for silver, copper and gold were given. Under electrotyping, the lecturer mentioned the manner in which casts of different objects were made, and their surfaces rendered conducting, and stated the way in which set up type and engravings were reproduced by deposition. Under the last division of his subject, he described, with the aid of a diagram, Dr. Siemens's recent demonstration of the fusion of steel in the electric arc, by making the metal to be melted contained in a crucible, the positive pole of a current from a dynamo-machine, the other pole being a carbon rod, the arc being formed between the carbon and the metal, the latter undergoing fusion.

During the discussion experiments were given, and at the close of the lecture the usual vote of thanks was carried.

Parliamentary and Law Proceedings.

PHARMACY ACT FOR NEW ZEALAND.

AN ACT TO ESTABLISH A BOARD OF PHARMACY IN NEW ZEALAND. [*19th August*, 1880.]

Be it enacted by the General Assembly of New Zealand in Parliament assembled, and by the authority of the same, as follows:—

1. The short title of this Act is "The Pharmacy Act, 1880."

2. This Act shall come into operation on the first day of January, one thousand eight hundred and eighty-one.

3. It is divided into Parts as follows:—

Part I.—Pharmacy Board of New Zealand.
Part II.—Pharmaceutical Register of New Zealand.
Part III. Registered pharmaceutical chemists.
Part IV. Miscellaneous.

4. In this Act, if not inconsistent with the context,—

"Chemist and druggist" means all persons who, within two years before the passing of this Act, have carried on in New Zealand the business of a chemist and druggist, in the keeping of open shop for the compounding of the prescriptions of duly qualified medical practitioners, and also of all such persons as may be duly registered under this Act:

"Register" means the Pharmaceutical Register of New Zealand:

"Registrar" includes the Deputy-Registrar under this Act:

"Drug" or "drugs" means drugs for internal or external use, and shall extend to all articles taken or sold as medicines.

PART I.

Pharmacy Board of New Zealand.

5. Subject to the provisions of this Part of this Act, the Governor in Council may appoint a Board, consisting of a President and six other members, under the style of "The Pharmacy Board of New Zealand," hereinafter in this Act termed "the Board."

6. No person shall be elected or appointed President or member for more than three years, but shall be eligible for re-election or reappointment, and the Governor in Council may from time to time remove the President or any other member of the Board.

7. The first President and other six members of the Board shall be appointed by the Governor in Council, without previous election, provided that no person shall be so appointed who does not appear to be eligible for registration as a registered pharmaceutical chemist.

Such President and members shall be appointed for a period of three years.

If any vacancy occur in the Board during such period, the Governor in Council may appoint thereto, without previous election, any registered pharmaceutical chemist; and the person so appointed shall hold office until the expiration of three years from the date of the appointment of the first members of the Board under this Act, and no longer.

8. At the expiration of the period for which the first President and members of the Board shall be appointed to hold office, no person shall be a member of the Board unless he be a registered pharmaceutical chemist, and unless he shall have been elected to act as a member of the Board by the registered pharmaceutical chemists of New Zealand; and no person shall be appointed as President unless he be a member of the Board, and shall have been elected by the other members to act as President.

Every election shall be held in manner prescribed by regulations to be made by the Board, subject to the approval of the Governor in Council.

9. A quorum of the Board shall consist of not less than three members thereof, and, in the absence of the President from any meeting of the Board, one of the members present shall be elected chairman of that meeting.

10. The Board may from time to time appoint a registrar, deputy-registrars, and any other officers whom they may require for the purposes of this Act, and shall have power to remove the same at any time.

11. The Board may from time to time make, alter, or rescind regulations for the purposes of carrying this Act into effect: Provided that such bye-laws shall be confirmed and approved by a special general meeting of pharmaceutical chemists. Such regulations shall not have any effect if they be repugnant to any law in force in New Zealand or to the provisions of this Act, nor until they shall have been published in the Government *Gazette.*

PART II.

Pharmaceutical Register of New Zealand.

12. The Board shall from time to time cause the names of all persons certified by the Board as duly qualified for registration as registered pharmaceutical chemists to be registered, with their residences and qualifications, in a book to be kept by the Board for that purpose in the form in the first schedule to this Act, or to the like effect, and such register shall be called "The Pharmaceutical Register of New Zealand."

All persons, so long as their names continue to be enrolled in such register, may be described in this or any other Act or any regulations as "registered pharmaceutical chemists."

13. Previously to registration or examination under this Act, such fees shall be payable as are set out in the second schedule to this Act, or such other fees as may from time to time be fixed and determined by any regulation hereafter to be made by the Board in accordance with this Act; and the said fees shall be paid to the Registrar of the Board for the purposes of this Act.

14. The Board may from time to time make the necessary alterations in the registration of the qualifications and addresses of the persons registered under this Act, and may from time to time write or cause to be written a letter to any registered pharmaceutical chemist, addressed to him according to his last known address, to inquire whether he has changed his place of business; and if no answer be returned to such letter within the period of six months from the sending thereof, the Board may erase the name of such person from the Pharmaceutical Register, and may restore the same to such register upon the personal application of such person and production of his certificate or satisfactory proof of his former registration.

15. Every registered pharmaceutical chemist on changing his place of business shall intimate the same to the Board, and the Registrar shall correct the entry in the register accordingly, and every Deputy-Registrar of Births and Deaths in New Zealand on receiving information of the death of any registered pharmaceutical chemist shall forthwith transmit notice thereof by post to the President of the Pharmacy Board, and on the receipt of such notice the Board shall erase the name of such chemist from the Pharmaceutical Register of New Zealand.

16. If any registered pharmaceutical chemist be convicted of any offence under this Act which in the opinion of the Board renders him unfit to be on the Pharmaceutical Register of New Zealand, the Governor in Council may, upon the application of the Board, order the name of such person to be erased from such register; and such erasure shall be a disqualification as a registered pharmaceutical chemist within the meaning of this Act, and it shall be the duty of the Board to erase such name accordingly.

17. The Board, shall, in the month of January in each year, cause to be printed, published, and sold, a correct register of the names of all the registered pharmaceutical chemists, and in such registers respectively the names shall be in alphabetical order, according to the surnames, with the respective residences of such chemists; and such printed register shall be called "The Pharmaceutical Register of New Zealand for 18 ," and for every succeeding year.

18. A printed copy of such register for the time being, purporting to be printed and published with the authority of the Board as aforesaid, or a copy of the Government *Gazette* purporting to contain regulations made by the Board, shall be *primâ facie* evidence in all courts of justice and in all legal proceedings whatsoever that the persons specified in such printed register are registered according to the provisions of this Act, or that such regulations were duly made; and the absence of the name of any person from such printed register for the time being shall be evidence until the contrary shall be made to appear that such person is not a registered pharmaceutical chemist.

PART III.

Registered Pharmaceutical Chemists.

19. Any person who, at the time of the passing of this Act, shall have attained the age of twenty-one years, and

(1.) At any time before the date of the commencement of this Act shall for not less than two months have carried on the business of a chemist and druggist or homœopathic chemist, in the keeping of an open shop for the compounding and dispensing of the prescriptions of legally qualified medical practitioners; or

(2.) At any time before the date of the commencement of this Act shall for not less than six months have been employed as a dispensing assistant in an open shop in New Zealand for the compounding and dispensing of the prescriptions of legally qualified medical practitioners, or shall have been for not less than three years employed as a dispensing chemist in an hospital, charitable institution, or other public institution in New Zealand; or

(3.) Holds a certificate or diploma of competency as a pharmaceutical chemist, or as a chemist and druggist, or homœopathic chemist, from the Pharmaceutical Society of Great Britain, or any college or Board of Pharmacy recognized by the Board under any regulations made under this Act,—

shall be entitled to be registered as a pharmaceutical chemist without being subjected to examination.

A certificate of qualification, in the form of the third schedule hereto, shall entitle the person named therein, on payment of the proper fee, to be registered under this Act at any time within six months after the date of such certificate.

20. The Board shall have full power and authority, and are hereby authorized and empowered to examine all persons who shall present themselves for examination under the provisions of this Act in their knowledge of the Latin language, in botany, in materia medica, and in pharmaceutical and general chemistry, and such other subjects as may from time to time be determined by any bye-law: Provided that such examination shall not include the theory and practice of medicine, surgery and midwifery; and the said examiners are hereby empowered to grant or refuse to such persons, as in their discretion may seem fit, certificates of competent skill and knowledge and qualification to exercise the business or calling of pharmaceutical chemists: Provided, further, that all duly registered medical practitioners shall on application be entitled to be registered as pharmaceutical chemists.

The Board may from time to time appoint examiners to carry out the examinations under this Act.

21. Every person who desires a certificate of qualification for registration under this Act, or to be examined by the Board, shall furnish the Board with a statutory declaration according to the fourth schedule, or to the like effect.

Where a person applies for such certificate under subsection 1 of section 19 his declaration must be accompanied by the statutory declaration of a justice or legally qualified medical practitioner, in the form in the fifth schedule or to the like effect, that such justice or practitioner from his own knowledge believes the statement of the applicant to be correct and true.

Where a person applies for such certificate under subsection 2 of section 19 his declaration must be accompanied by a statutory declaration, in the form in the sixth schedule or to the like effect, of the person in whose shop he was employed, or of the governor or superintendent of the public institution in which he served, that the statement of the applicant is correct and true.

Where a person applies for such certificate under sub-section 3 of section 19 his declaration must be accompanied by the certificates or diplomas on which he base his application. Such certificates or diplomas shall be returned to the applicant by the Board.

PART IV.

Miscellaneous.

22. Any person registered under this Act who sells or offers for sale any drug which is adulterated, shall, notwithstanding any enactment to the contrary, be deemed to have knowledge of such adulteration unless the contrary be proved by such person.

23. Nothing herein contained shall extend to or interfere with the business or with any rights and privileges of any legally qualified medical practitioner, or of any member of the Royal College of Veterinary Surgeons of Great Britain, nor with the business of wholesale dealers in supplying drugs and chemicals in the ordinary course of wholesale dealing; and upon the decease of any registered pharmaceutical chemist actually in business at the time of his death it shall be lawful for any executor, administrator, or trustee of the estate of such pharmaceutical chemist to continue such business for a period of twelve months and no longer, unless by permission of the Board of Pharmacy of New Zealand, if and so long as such business is *bonâ fide* conducted by a registered pharmaceutical chemist.

24. Any registrar or other person who shall wilfully make or cause to be made any falsification in any matter relating to the Pharmaceutical Register of New Zealand, or the Pharmaceutical Register of New Zealand for any year, and any person who shall wilfully procure or attempt to procure himself to be registered under this Act by making or producing or causing to be made or produced any false or fraudulent representation or declaration, either verbally or in writing, and any one aiding or assisting therein, shall be deemed guilty of a misdemeanour punishable by fine or imprisonment, and shall on conviction be liable to a penalty not exceeding twenty pounds, or to imprisonment for any term not exceeding twelve months.

25. From and after the passing of this Act, it shall not be lawful for any person, not duly registered as a pharmaceutical chemist according to the provisions of this Act, to assume or use the title of pharmaceutical chemist, pharmaceutist, chemist and druggist, dispensing chemist, or other words of similar import, in any part of New Zealand, or to assume, use, or exhibit any name, title, or sign implying that he is registered under this Act, or that he is a member of the said Society; and if any person, not being duly registered under this Act, shall assume or use the title of pharmaceutical chemist, pharmaceutist, chemist and druggist, dispensing chemist, or other words of similar import, or shall use assume, or exhibit any name, title, or sign implying that he is a person registered under this Act, or that he is a member of the said Society, every such person shall be liable to a penalty of £5.

26. All offences under this Act shall be adjudicated on and all penalties imposed by this Act shall be recovered in a summary manner before a resident magistrate or two justices of the peace, and all penalties when recovered shall be paid to the Board to be applied towards the expenses of carrying this Act into effect.

SCHEDULES.

FIRST SCHEDULE.

Register of Pharmaceutical Chemists.

Name.	Residence.	Qualification.	Date of Registration.

A. B., President } of the Pharmacy
C. D., Member } Board of New
E. F., Member } Zealand.

SECOND SCHEDULE.

Fees Payable under "The Pharmacy Act, 1880."

	£	s.	d.
For every examination before the Board	3	3	0
On registration as a pharmaceutical chemist without examination—section 19, sub-sections (1), (2), and (3)	2	2	0
On registration in every other case . .	1	1	0

THIRD SCHEDULE.

Certificate of qualification for registration as a registered pharmaceutical chemist under "The Pharmacy Act, 1880."

We do hereby certify that , residing at , in the provincial district of New Zealand, is duly qualified for registration as a registered pharmaceutical chemist on the grounds set forth at the foot of this certificate.

Dated at , this day of 188 .

President. (L.S.)
Member. (L.S.)
Member. (L.S.)
Registrar. (L.S.)

FOURTH SCHEDULE.

"Pharmacy Act, 1880."

Declaration by a person who was in business as a chemist and druggist, or who was employed as a dispensing assistant in some pharmacy before the date of the commencement of "The Pharmacy Act, 1880."

I, , residing at , in , do solemnly and sincerely declare that I have attained the age of twenty-one years, and that I carried on the business of a chemist and druggist [*or* homœopathic chemist] in the keeping of an open shop for the compounding and dispensing of the prescriptions of legally qualified medical practitioners [*or* was employed as a dispensing assistant in an open shop for the compounding and dispensing of the prescriptions of legally qualified medical practitioners] at the places and during the periods undermentioned, on or before the day of , 18 , to wit

And I make this solemn declaration, etc.

A. B.

Declared at , in the , this day of 188 , before me.

C. D.

FIFTH SCHEDULE.

Declaration to be signed by a justice of the peace or legally qualified medical practitioner respecting a person who was in business as a chemist and druggist before "The Pharmacy Act, 1880."

To the Pharmacy Board of New Zealand.

I, , residing at , in the provincial district of , do hereby declare that I am a justice of the peace for the colony of New Zealand [*or* a legally qualified medical practitioner], and that to my knowledge , residing at , in the provincial district of , was in business as during the period or periods stated in his declaration dated the , 188 , and set out in the margin hereof, and that I believe the statements in his declaration to be true and correct.

And I make this solemn declaration, etc.

A. B.

Declared at , in the , this day of , 188 , before me.

C. D.

SIXTH SCHEDULE.

Declaration to be signed by master chemist and druggist as to service of dispensing assistant or apprentice.

To the Pharmacy Board of New Zealand.

I, , residing at , in the provincial district of , do hereby declare that I am a registered pharmaceutical chemist [*or* a pharmaceutical chemist and druggist, *as the case may be*], and that

, residing at , in the provincial district of , was employed as a dispensing assistant [*or* as apprentice] in my open shop at during the period undermentioned:—

From , 18 ,
To , 18 .

And I make this solemn declaration, etc.

A.B.

Declared at , in the , this
day of , 188 , before me. C.D.

Review.

Die Quebracho Rinde. Botanisch-Pharmakognostische Studie von Dr. Adolph Hansen. Berlin: Julius Springer. 1880. Small 4to. 26 pp., with 3 lithographic plates.

This is one of those exhaustive treatises, hardly expected from any other quarter than Germany, which deal with a subject thoroughly and from every point of view; but which are in consequence often ignored or pooh-poohed as being too prolix. It has the advantage, however, of having for its topic a substance about which there existed previously very little definite information, a lack which has led to such confusion that perhaps it is no exaggeration to say that the sudden demand for quebracho blanco bark, which sprang up in consequence of Dr. Penzoldt's researches, has been met in a large proportion of cases by the supply of another article.

The author, who is an assistant in the Botanical Institute at Erlangen, deals in the first section of his treatise with the history and source of the bark. It appears that attention was first directed to it in 1878, by its occurrence in a parcel of vegetable drugs sent from the Argentine Republic to the Erlangen University for investigation, with a statement that it had been in use during several years as a febrifuge and that it was looked upon as equal in activity to the cinchona barks. A chemical examination undertaken by Herr Fraude resulted in the separation from it of an alkaloid, which he named aspidospermine, but which a later investigator thinks identical with Hesse's paytine. Therapeutic experiments with the bark were carried out by Dr. F. Penzoldt, who though he was unable to confirm the allegation as to it possessing antifebrile properties announced that it had an extraordinary power of relieving dyspnœa. This statement caused many inquiries for the bark, and the fact that it was almost unknown and bore a name common to at least three other barks gave rise to the confusion before referred to.

"Quebracho" is a word meaning literally "to break the axe," and appears to have been applied to certain trees because of the hardness of their wood. The principal were "quebracho blanco" and "quebracho colorado," and one traveller, Jacques, speaking in 1867 of these two kinds together, says that the wood is so extraordinarily close in texture and hard that it might be substituted for iron in the axles of waggons and the rollers in sugar-cane pressers. The adjectives have reference, however, not to the colour of the bark, as is sometimes assumed, but to the colour of the wood, which in the case of the "colorado" is described by Burmeister as being of a blood-red colour and becoming after a time quite black, whilst the "blanco" wood remains quite white. This traveller met with both kinds of tree in the La Plata States, and being unable himself to determine them botanically he sent specimens of branches and fruit of quebracho blanco to Schlechtendal, who identified them as belonging to a species of *Aspidosperma* (Apocynaceæ), which he named *A. Quebracho-blanco*; but he also assumed that the quebracho colorado, bearing the same trivial name, must belong to the same genus, and without seeing any specimens named it *A. Quebracho-colorado*. This error was pointed out in 1872 by Grisebach, who eventually referred this tree to the terebinthaceous genus *Loxopterygium*, and named it *L. Lorentzii*, so that the confusion with respect to the bark is only a repetition of this mistake concerning the parent tree.

The *Aspidosperma Quebracho-blanco*, to which our attention must be limited in this notice, is described as being a tall tree having a perfectly straight stem of about 2 to 3 feet in circumference, and a moderately sized oval crown, which, however, can be seen through in every part; the extremities of the branches are pendent something like those of the *Salix babylonica*. The leaves are in triple whorls, leathery, lanceolate, entire, smooth, with scarcely prominent nerves, on both sides alike, and ending in a sharp thorn. The flowers are in cymes. In its inflorescence it approaches most closely to *Aspidospermum nobile*, *A. pyrifolium*, *A. subincanum*, and *A. tomentosum*, while in its leaves it resembles *A. parvifolium*, but differs from it in the thorny spine and the whorled arrangement.

The author next proceeds to a description of the bark, for which he was able to use some of the same parcel as that used by Fraude and Penzoldt, as well as specimens obtained from other sources, and as this section presents the most practical interest to the pharmacist we shall quote from it rather fully. In the original work, however, the descriptions are greatly assisted by a large number of admirably drawn and some coloured figures.

The *Aspidosperma* bark which comes into commerce is taken from old trees, which might be seventy or eighty years of age. The pieces have a thickness of from 20 to 30 millimetres. In proportion to its dimensions the development of corky layer is very great, extending sometimes to one-half or even more of the entire substance of the bark. Young pieces of bark in which cork has not yet formed are seldom met with. Externally the tissue converted into cork differs from the unchanged tissue very sharply and distinctly. A smoothly cut transverse section through the entire bark shows two layers, differing much in colour and structure, separated by a sharp boundary line, and usually nearly equal in thickness.

The outer layer is deeply fissured, rough, and ridged, whilst the inner layer forms a band of nearly uniform breadth. Under a lens these layers are seen to be not homogeneous in structure. The outer corky layer is externally of a smutty grey colour, covered here and there with remains of lichens; where the grey covering is removed it is reddish-yellow. The bulk of the corky layer consists of an ochre-yellow mass, through which run tangentially serpentine lines of nearly uniform breadth and approximately in the same direction. Between these dirty yellow lines numerous whitish granules are scattered throughout the mass.

The inner layer shows, when slightly magnified by a lens, only two constituents: a clove-brown mass, through which a large number of whitish granules are scattered as in the corky layer. These characters appear more distinct when the surface of the section is slightly moistened.

Whilst the cork of bark taken from different trees always presents a similar appearance, the colour of the inner layer of the bark varies frequently, the pure clove-brown often showing lighter or impure shades, or being quite light or almost yellowish-white. This under the microscope is seen to be due to the absence of colouring matter from the parenchyma cells, which usually are cinnamon-brown coloured, very variable in size, with unequal and irregularly thickened walls, and contain much starch and a light brown granular substance.

The bark is tolerably hard, easily crumbling when cut; the inner side, which originally was nearest the trunk, shows a fibrous splintery fracture. These details, especially with the help of the drawings, show that recognition of the bark is easy, as it does not resemble any other known. The exterior corky layer, especially, is characteristic, on account of its constant colour and structure.

The principal microscopic features of the bark are the numerous cork bands and the sclerenchymatous cells. The latter constitute the whitish points before referred to as being apparent in both layers. They occur in groups and in both layers are alike in form and general appearance; but those in the inner bark have dark yellow contents, the chemical nature of which has not yet been cleared up. The principal mass of these cells are compressed, with strongly thickened membranes, clearly showing layers, and nearly equal in dimensions in each direction, and consequently are what are sometimes called short stone cells. Among them, however, are some cells that are nearly circular in transverse section and in longitudinal section are seen to be bast cells of considerable length and spindle-shaped at both ends. They occur not only in the groups of sclerenchymatous cells, but also isolated, though in considerable number, in the parenchyma. Each of these bast cells is closely covered with a kind of sheath made up of angular cells each containing a crystal of oxalate of lime. Dr. Hansen calls them, therefore, "sclerenchymatous fibre" and considers them to form a most characteristic feature of the bark when examined microscopically. But the appropriateness of this name has been recently questioned by Mr. Greenish, and it may be mentioned that Professor Flückiger, who first observed this peculiar feature in a false cinchona bark, speaks of it as a bast tube accompanied by crystal-bearing parenchyma (*"jede Baströhre begleitet ist von krystallfuhrenden Parenchyma"*).* Moreover, it is worthy of note that in a paper which recently appeared in this Journal,† Dr. Wulfsberg speaks of the crystalline sheaths of the bast fibre as characteristic of species of *Asp·dosperma* and not of quebracho blanco alone.

Passing by a histological chapter on the development of the bark, we come to one on false quebracho barks, in which the author describes two that have been met with in commerce substituted for *Aspidosperma* bark. One of these is copalchi bark, from the *Croton Pseudochina*, Schlecht., of the family Euphorbiaceæ. This bark, which presents no similarity to quebracho bark, though at first it was freely substituted for it, occurs in commerce in tolerably long quills, 1 to 5 millimetres thick, covered externally with a dirty white cork that is more or less fissured and can be rubbed off in powder. A section shows a yellowish-white outer bark and a dark brown inner bark, formed from the bast portion of the stem. The other false bark is a hard, uniformly dark brown bark, covered with a whitish to greyish-brown cork, and having numerous furrows upon the inner side. Its botanical origin is unknown.

There is also another chapter on the wood of *Aspidosperma Quebracho*, which is said to have an action similar to that of the bark, but weaker, and to be sometimes used instead of it. Altogether the work is an admirable contribution to the history of the subject, and those who may wish to know more of the bark, even if they cannot read German, will be able to consult the capital drawings with profit.

Obituary.

Notice has been received of the death of the following:—

On the 19th of October, 1880, Mr. Verdon Dearden, Chemist and Druggist, Heeley, near Sheffield. Aged 62 years.

On the 31st of October, 1880, Mr. James Border Searle, Chemist and Druggist, Gunnislake, Cornwall. Aged 71 years.

On the 6th of November, 1880, Mr. John Douglas, Chemist and Druggist, Dale Street, South Shields. Aged 69 years.

On the 7th of November, 1880, Mr. Joshua Stephen Fletcher, Chemist and Druggist, Breck Road, Everton, Liverpool. Aged 38 years.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[449]. With reference to your note on the "hypophosphites" in "The Month," I beg to say that the liq. hypophosph. co. is prescribed by Dr. Churchill, who published the formula in the *British Medical Journal* of March 27, 1880. W. H. Richardson.

[451]. If any further testimony in support of the Editor's opinion as expressed in "The Month" is required, perhaps the following prescription by an eminent Edinburgh practitioner, just handed in to be dispensed, may suffice:—

℞ Calomelanas . . . . grs. vj.
Ung. Petrolei . . . . ℥ss.
M. Sig. Eye Salve. To be used at bed time.

D. F. McD.

[451]. The British Pharmacopœia, 1864, under "Hydrarg. Chloridum," says, see Hydrarg. Corrosiv. Sublimat. In Pereira's 'Materia Medica' (1849) hyd. chlor. is given as a synonym of both the sub- and perchlorides. In the same work (p. 847) occurs the following statement:—"One of the inconveniences attending the alteration of the atomic weights is that the name (chloride of mercury) formerly applied to calomel) is now transferred to corrosive sublimate."

On the other hand, most of the Pharmacopœias, including the B.P., 1867, P.L., 1851, U.S.P. (5th revision), the French, German and Indian, either do not mention hyd. chlor. unqualified, or else indicate clearly that the subchloride only is meant by that name.

Consequently, although there are authorities for both renderings, the weight of evidence on the ground of nomenclature is certainly in favour of hydrarg. subchlor. being used in the prescription submitted by J. G. P. S.

But the question must also be regarded from a physiological point of view, which in the case of hyd. chlor. is far more important than that of nomenclature.

Both calomel and corrosive sublimate are used in diseases of the eye. I can find no record of the former having been used otherwise than in the dry state, half a grain or more being used for each application. Pereira says, "It is sometimes blown into the eye to remove spots on the cornea."

With reference to corrosive sublimate the same author remarks, "A solution has been employed as a collyrium in chronic diseases of the eye, especially those of a venereal nature."

Mr. Henry Brown instances the use of a solution of perchloride 2 grains to the ounce. The strength of that under consideration is 2½ grains to the ounce. Assuming that calomel was intended, the quantity instilled with a few drops would be out of all proportion to the amount generally employed, viz., half a grain; moreover, this substance appears to be always used dry.

Considered physiologically then, it seems plain that corrosive sublimate was intended, and this evidence, I think, far outweighs a literary quibble over nomenclature.

The diametrically opposite opinions expressed on this question, the only definite solution of which would be the decision of the prescriber, clearly indicate how essential it is that every dispenser should be thoroughly grounded in the general principles of therapeutics.

R. H. Parker.

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* *Neues Jahrbuch f. Pharmacie*, vol. xxxvi., p. 293.

† *Ante*, p. 269.

[451]. I do not doubt at all but that calomel was intended in this prescription, but as some of our friends seem to ignore the idea that chloral is used in lotions for the eyes, I may state that I have dispensed three prescriptions similar to the following within the last three months, the directions on each being different, but I only give one, for a young lady:—

℞	Chloral Hydrate	ʒj.
	Aquæ	℥vj.
M.	Ft. lotio.	

The lotion is to be applied to the eyes at night or when in pain.

JACQUE.

[451]. Your readers know that as a rule I have taken only up knotty or debatable points in all my contributions. I have always stuck to my text, or, if I diverged, it was in the form of a more lucid mode of explanation so as to elucidate the point at issue. I find your reviewer in "The Month" is scarcely up to the good standard of his general criticisms upon debatable points. He says I state "that hyd. chlor. is hyd. perchlor. or corrosive sublimate; such a statement must not be allowed to pass without comment." I suppose Sir Robert Kane is an authority. Let anyone refer to his treatise on chemistry. Chloride of mercury is corrosive sublimate, calomel is subchloride of mercury, as in our day so designated in the B.P. I place no reliance in the London Pharmacopœia in the decision of this question. The compilers when they changed the good old name of calomel from "submurias" into "chloridum," only opened up a door of discussion in pharmacy, which we, after more than a generation, still find practically unclosed. Although not in the trade I feel, after many years medical practice, how a simple change may give effect to discussion of the character now before us. If anything were wanted to prove the usefulness of your "Memoranda," the discussion in regard to query 451 would, I think, suffice.

J. G. P. S. asked a question concerning a lotion, and in the Journal for October 30, Messrs. Coppock, Cowap, Karl Sang, "Hydrarg," Mr. Hyslop, A. C. and J. W. all speak of calomel being blown into the eyes. I was perfectly well aware of the fact; but what has dry calomel blown into the eye to do with a lotion? Dupuytren, Klugl, van Siebold, Dr. Wells and Mr. Brudenel Carter have used calomel, as described by your correspondents. My argument is, and was, that it is corrosive sublimate that is intended in this instance as hyd. chlor.

Your reviewer of "the Month," as well as all your correspondents, have overlooked my last paragraph. In it I distinctly say, "but there can be little doubt that hyd. chlor. in this case means hyd. perchlor., B.P.

I think the argument of the reviewer in "The Month" that if calomel, hyd. subchlor., be used in the dry state in eye affections "there is no reason why the same end should not be sought by dropping the calomel diffused in fluid into the eye," is not altogether to the point. He then expatiates upon the danger, etc., of taking the U.S. Pharmacopœia, as a guide. I now reply the U.S. is a far more excellent guide as a pharmacopœia, than the British in many matters. Hyd. chlor. is now only given as a synonym in the B.P., calomel being called hyd. subchloridum. I am not disposed to think that any medical man who intended to use calomel in any eye affection would order 5 grains with 2 grains of extract of opium to be diffused in 2 ounces of water. To diffuse 1 grain in 192 minims of fluid, and use this as a lotion, when even in infants half a grain or more of calomel is inserted by insufflation between the eyelids, is what I do not think the prescriber intended. I think no man would be so ignorant as to give corrosive sublimate in 2 grain doses, as suggested might be the case by Mr. Cowap, by always supposing hyd. chlor. meant corrosive sublimate. With so many synonyms, dispensers must be guided by their own knowledge of the doses of the two chlorides of mercury, and also their uses. The recent chemical names of mercuric and mercurous chlorides have not solved the difficulty. I believe the old names of bichloride and submuriate are the best, and most free from the possibility of a mistake as to which chloride is meant. It might have been better had I added the words "I think" before hyd. chlor., in the Journal of October 23; still, I have most excellent authority for stating what I did. I quite agree that many medical men are very prone to write hyd. chlor. where calomel is intended, it being the last P.L. name; but I think the intelligent pharmacist may be left to judge which chloride is meant in most instances; but this discussion upon the subject will be beneficial, I have no doubt, in more ways than one.

One word more in regard to the remarks in "The Month."

The solution is not of excessive strength, as there indicated. I stated that Dr. Mackenzie used a solution containing 2 grains to the ounce, and in No. 451, if hyd. perchlor. was used, 5 grains are in 2 ounces. In many cases of eye affection a less strength would be of no use.

In Thomson's 'Dispensatory' some useful hints are given, but I think Pereira's observation is well worth quoting: "One of the inconveniences attending the alteration of the atomic weight is that the name (chloride of mercury) formerly applied to calomel is now transferred to corrosive sublimate." I find as synonyms, chloride, bichloride, hydrochlorate, muriate or oxymuriate (hydrargyrum chloridum, bichloridum), etc. I may state I am not disposed to deny that hyd. chlor. may mean calomel, but I altogether dissent from your reviewer's remarks upon the point at issue in "The Month," and not one of your correspondents has touched the question in the Journal of October 30, as dry calomel has nothing to do with either calomel in a lotion or corrosive sublimate.

Northallerton. HENRY BROWN.

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[461]. B. J. Kent will find salicylic acid the best solvent for quiniæ salicylas. Should quin. salicylas be prescribed with iron, the iron ought to be used as a solvent then.

"374."

[461]. The best solvent for "quinæ salicylas" is the common acetum of the British Pharmacopœia.

L. A. U. R. A.

[461]. Mr. J. B. Kent asks, what is the best solvent for quinæ salicylas? He may either use alcohol, tinct. aurant., or any other suitable tincture. Heat adds much to the facility of solution. Water can then be added. I may state I have found hydrobromic acid a most excellent solvent, and in cases of headache the combination in my hands has been most successful. In rheumatism the salicylate of quinia is useful as a tonic towards convalescence.

Northallerton. HENRY BROWN.

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[463]. The other night I had a prescription as follows:—

℞	Ext. Belladon.	ʒj.
	Plumb. Acet.	ʒj.
	Decoct. Papav. . . . . , .	℥xij.
M.	Ft. lotio.	

I had to use the dec. pav. warm, but in adding the plumbi acet. an opaque jelly formed. Was it owing to any mucilaginous principle in the decoct.?

STOOKE.

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[464]. What is the dose of carbolate of soda, for internal use. The sulpho-carbolate is 1—20 grs. But as the carbolate must apparently be stronger, I should be obliged if you could inform me of the dose.

OMICRON.

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[465]. I had the following prescription to dispense the other day. Was I right in using cold water, and putting

on a "shake the bottle" label? As the chlorate did not all dissolve the customer brought it back, saying it was quite free from sediment the first time he had it made up.

℞	Potass. Chlorat.	76 gr.
	Glycerine	ℨiv.
	Aq. Bull.	ad ℥ij.

Ft. mist. A teaspoonful for a dose.

JOHN.

[466]. Can the following prescription be dispensed, without addition or alteration, to form a good permanent creamy lotion?

As I make it a separation takes place in the course of a few hours, and in a week or ten days decomposition sets in; all flavour of rose is destroyed and from bad it goes to worse, until unfit for use. It is said to have been dispensed to keep without separation or change.

℞	Liq. Potassæ	ℨij.
	Aquæ	ℨj.
	Ol. Olivæ	ℨiij.
	Attar Rosæ	♏ iv.
	Aquæ	ad ℥viij.

Ft. lotio, nocte maneque utend.

KARL SANG.

[467]. The other day a liniment was dispensed by me containing—

℞	Acid. Acet. Glacial.	ℨiij.
	Ol. Terebinth.,	
	Lin. Camphoræ	āā ℨiss.

I dispensed it, and it was quite transparent. The lady for whom it was said that the last time she had it made it was very nearly opaque; so I thought I would try exactly reversing the order in which they were placed, and the result was that I got a very nearly opaque liniment. Can any reader kindly inform me how this is?

FRED. G. WALTON.

Notes and Queries.

[685]. Mr. W. M. Covell's question relating to his experiment is very indefinite. Mr. C. ought to question himself about the nature of H_2O_2 before trying such an expensive experiment. Perhaps his object is to convert aqua rosæ into peroxide of hydrogen, and receive the price of H_2O_2 from his patient or customer—a good idea, if it could be accomplished. He may have written his symbol wrong for rose water, ℥x instead of ℨx. I am not surprised he failed to accomplish his object. Unless Mr. C. requires the rose water simply as a perfume, I do not understand what his question is; supposing he desired the preparation perfumed with roses, why not use a few drops of otto of rose, and then his ideas could be carried into effect for his perfumed hair dressing preparation successfully?

I should recommend Mr. W. M. Covell to consult Dr. Attfield's formula on the subject, *i.e.*, peroxide of barium (BaO_2) is formed on passing air over baryta heated to low redness. By the action of dilute hydrochloric acid it yields solution of peroxide of hydrogen (H_2O_2) or oxygenated water.

JNO. H. EDWARD.

[686]. MARKING INK.—"Agnos" would be glad of a good form for a marking ink, well proved, easily made, and that will not burn the linen or wash out. "Agnos" has tried a formula of Professor Redwood's, in Beasley; but finds this does not turn a good black when ironed, and washes either quite out or yellow. As this form is held to be exceptionally good, he would be glad to know whether there is any chance of an error in the mixing, or whether the ingredients may have caused some unexpected reaction.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE BENEVOLENT FUND.

Sir,—I am frequently being reminded by circular from the Secretary of the Society, appealing on behalf of the Benevolent Fund. I for some time was a subscriber (certainly not a heavy one), but latterly have discontinued for the following reason:—I do not feel justified in assisting those who do nothing to further the good ends of pharmacy. I contend that those who have been supporters of the Society or its funds, and have by unforeseen circumstances failed to secure a fund of their own, wherewith to support infirmness, old age, etc., have a prior claim on our charity to those who have done nothing whatever but plod along the road of buying and selling, making no advancement in the sciences, subscribing to none of the funds, following up by abusing the Pharmaceutical Society, brooding over the laws of our constitution as affecting their interests, encouraging an inherent spirit of dissent, and failing to see the vast advantages of supporting the cause of unity; and when poverty comes down upon them the bitter feeling invariably adheres to them, that the Pharmaceutical Society is a nuisance. Still after all this, they put in a claim, and at present an equal claim to the Society's supporters, for the benevolence of those to whom they bear an amount of animosity. I do not, therefore, feel myself justified in subscribing to those funds under the existing rules. After those who have supported the cause and have become candidates have been elected, give outsiders a chance if there is room after their election; then I will again become a supporter of the Benevolent Fund.

W. R. F.

EXEMPTION FROM JURY SERVICE.

Sir,—In reading the leading article of the *Pharmaceutical Journal* for October 30, I was struck with the apparent dissimilarity of views contained therein. On page 355, I read "In the abstract the Council of the Pharmaceutical Society has recognized the principle that chemists and druggists, like pharmaceutical chemists, should be exempt from serving on juries," and "The Council has also obtained recognition of this principle by the Legislature."

On page 356, whilst admitting the justification for exemption, the writer refuses to recognize the assumption that there is a close similarity or identity between the duties in which both classes are engaged as servants of the public. Why does he not state "what the principle of our claim is" according to his view? He is correct probably in saying our trade chiefly consists in the sale of proprietary articles and patent medicines; but we country chemists also enjoy a fair proportion of dispensing of prescriptions from London physicians and others, though there is room for a larger share; it is in a large measure a question of degree only. I am proud to say I lived with a London chemist who was a shining star in the pharmaceutical world. But did we not sell proprietary articles and patent medicines and cattle medicines also? Yes, and I doubt if his business in these articles was second to any in London. We country chemists welcome the day when "chemists only" shall dispense, then let "doctors only" prescribe. I have troubled you with this correspondence having had to obey a jury summons myself, but fortunately was released after the first day, through writing to the judge and handing in a letter from a doctor; it was with great reluctance and after some hesitation that I was permitted to stay away. Had I served "during the assizes" as ordered, I should have been wholly prevented from attending to my business for three days, which is rather severe, no matter how humble a chemist's business may be.

I trust the Trade Association will succeed in passing a bill to exempt all chemists, whether in England, Scotland or Wales, from serving on juries now that there is a complete list of all who are in business.

Milton.

ARTHUR STOOKE.

The Future of Pharmacy.

Sir,—Perhaps you will allow me to make a few remarks upon the inaugural address delivered by the President of the Metropolitan Chemists and Druggists' Assistants' Association, on October 13. Touching upon the future of pharmacy, Mr. F. W. Branson states that "without the improved condition of the pharmacist himself, legislative protective enactments will avail but little." If Mr. Branson had just reversed his statement, I think, he would have come nearer to the great evil existing at present, for I am of opinion that, without "legislative protective enactments," or an amendment of the Pharmacy Act, our well-earned qualifications will "avail but little;" and if Mr. Branson would take the trouble to inquire regarding the education of chemists and pharmacists throughout Britain, he will find, perhaps to his own surprise, that we are abreast of the age so far as our business, "scientific pursuit" or profession is concerned. Mr. Branson suggests some "brilliant improvements" in the examination code, from which one might safely conclude that he (Mr. Branson) has passed the required examinations; nevertheless, there is no reason, except that of selfishness, for supporting or allowing to pass unnoticed such uncalled-for proposals. I presume to say, that the examinations, as they are now conducted, give ample proof of the safety which both the profession and public enjoy, and if Mr. Branson (so full of suggestions) could devise a sure method of widening the minds of a great portion of our medical brethren, and securing their co-operation, we might be able, with our present amount of pharmaceutical education, to raise our calling considerably in the eyes of the public.

G. S. I., *Associate.*

The Dispensing of Prescriptions in the Provinces.

Sir,—A champion has been found "to take up arms in behalf of the country chemist" when no such person was required. I refer to the position taken up by "Filius" in his letter in Journal of date November 6. The "assertion" I made was borne out by facts which have come under my own notice, and did not, as "Filius" seems to imply, from his taking "up arms in their behalf," apply to country chemists as a body; but, of course, "Filius" seems to forget that there are "black sheep" in our flock alike in town and country, and immediately "takes up arms in behalf of the country chemists."

I do not wish to discuss the question why "town chemists should look down upon their fellows," it being a question requiring a good deal of proof, nor follow "Filius" deeply into his calculation about dispensing. merely giving it as my idea that in the case of dispensing it is the quality, and not the quantity, that will establish a chemist's reputation, but shall borrow from his reference to the "doctor's better half" in "his own town" doing all the dispensing, and give it as a "wrinkle," only from an economic point of view, however, to the trade at large. I would humbly suggest to "Filius," when "it vexes him very much to hear that sneering tone in which country chemists are spoken of," to refrain from "sneering" at his "town brethren" on account of, according to his idea, their want of knowledge of "animal" medicines, and to bear in mind that, strictly speaking, it is as little the province of the country chemist as it is of the town to "prescribe" animal or other medicines.

Much against my inclination, and in spite of a strong aversion to take notice of anonymous correspondence, I have considered it necessary so make these remarks on the letter in Journal of November 6, by "Filius."

Edinburgh. James D. Robertson.

Sir,—I am in the habit, from time to time, of reading, with pleasure, the *Pharmaceutical Journal* but I must say that your impression of last week was read, by me with very different feelings when I came to the letter signed "Filius;" and if this be a sample of the country chemist, I can well understand his brothers of the "town" looking down upon him.

"Filius" is not content with differing from Mr. J. D. Robertson, but he must needs defend himself by most unwarrantable and false remarks on the dispensing of the country medical man.

"Filius" admits that there is not one-twentieth part of the dispensing to do in the country as in town, and he assumes that those in practice before the passing of the Act are qualified by experience to dispense as well as the doctor's "unqualified assistant" or "boy in buttons," and I will add, perhaps no better. Does 'Filius" not know that a medical man with a large mixed country practice puts up more prescriptions in one day than he does, in perhaps three months, and on that account alone, to say nothing of his three or five years' apprenticeship, gets more experience in dispensing than "Filius" appropriates to himself?

I should like to know how "Filius" obtained his experience of the contents of a bottle of medicine "as sent out from a surgery," and put up or prescribed by a medical man. It surely cannot be as an eye-witness, as I should think no medical man would allow "Filius," if he knew him by name, on his premises.

"Filius" must continue to be vexed by the "sneering tone in which country chemists are spoken of," if he continues to write in such a manner of medical men, who are as superior to him, as from the tenor of his letter, I should say, town chemists are; for I feel sure that no London chemist would have written in such a manner to your Journal.

A (sometime) Country Doctor.

The Prescribing of Special Preparations.

Sir,—Considerable discussion has recently taken place on the subject of pharmaceutical education and the adoption of a compulsory curriculum, with the object of training up a body of men who shall be competent to make pharmaceutical preparations and dispense the prescriptions of medical men.

The following prescription was handed to me a day or two ago:—

℞ Tinct. Cinch. : . . . . ℥iv.
Special. (T. W. N.)
Corbyn and Co.

Do you not think ten months' study and the passing of two stringent examinations will be so much time wasted, when I am asked to prepare prescriptions like the above, for it is evident the medical man who wrote the prescription doubts the competency of chemists in general being able to prepare tincture of bark? Certainly such prescriptions will not stimulate me to pass the "Major," as I am already

"One who has passed the Minor."

A. E. Lomax.—Recipes for the preparation of weather glasses will be found in vol. i. of the present series of this Journal, p. 437 (requiring proof spirit instead of rectified spirit) and p. 457.

J. B.—See Mr. Thresh's paper on "Soluble Essence of Ginger," in vol. x., p. 193.

H. A.—The following are the standard works on the subject; but it should be remembered that introductory works are required by a beginner:—Wilson's 'Bryologia Britannica (scarce); Mudd's 'Manual of British Lichens' (scarce); Leighton's 'Handbook of British Lichens' (scarce); Cook's 'Handbook of British Fungi,' 2 vols.; Berkeley's 'Outlines of British Fungology.' Braithwaite's 'Monographs of British Mosses' is in the course of publication in parts. (1) *Lunularia vulgaris;* (2) *Parmelia physodes;* (3) *Cladonia pyxidata;* (4) *Xylaria hypoxylon;* (5) *Polyporus versicolor;* (6) *Stereum,* probably *rugosum;* (7) Oak spangles: see Museum Catalogue, p. 254, No. 778.

Irwin.—*New Remedies* could probably be obtained direct from the publishers, Messrs. Wood and Co., Great Jones Street, New York, or through Messrs Trubner, of Ludgate Hill, or any other foreign bookseller.

Messrs. Newman and Co.—We are not aware that the paragraph you refer to does you any injustice, or that it has any relation to you.

A. P. B.—The following is the equation given in Watts's Dictionary, vol. iii., p. 202: $5PH_2 = P_2H + 3PH_3$.

F. W. E. S. is recommended to address his question to the Inland Revenue authorities.

A. L. T.—See Mr. Howden's paper on "Pharmacy in the United States," *Pharm. Journ.*, [3], vol. i., p. 461.

Alpha.—Rosolic acid is produced by the oxidation of phenol in the presence of alkalies. See Watts's Dictionary, vol. v., p. 116.

Communications, Letters, etc. have been received from Messrs. Sawer, Goddard, Siebold, Johnson, Modlen, Fountain, Huskisson, Secretary of Society of Arts, Euryowie, Euonynim, Provincial Chemist, Calcis Phosphas, Acacia, Dartmoor, Cordial, Q., F. S. M., T. P. J., F. W. E. S.

NOTES ON PATCHOULI.[1]

BY J. CH. SAWER.

The identity of the plant furnishing this perfume has been the subject of articles in this Journal since the year 1844,[*] but the first mention of it in a pharmaceutical paper seems to be in the *Journal de Pharmacie*, 1826.[†] The first parcel of the leaf offered at public sale in London was in 1844, and it was bought in at 6*s.* per lb. Since that date the trade in these leaves and the oil has enormously increased, the number of bales imported into London during the last twelve months having been from 300 to 400 bales of 2 cwt. each. It is stated by Dr. Piesse that "its consumption in the perfumery trade of Europe is something beyond belief,"[‡] and in the last edition of his work on perfumery he says that "were the otto cheaper its consumption could be increased tenfold." This book is dated 1879; the average price, first-hand, during that year was 3*s.* per oz. in London; it is now only 1*s.* 7*d.*, and leaves have been sold at from 3½*d.* to 9*d.* per lb., according to quality.

The bulk of the enormous quantity of leaves harvested and of the oil goes direct from its place of production to Mecca, the Arabs believing in its health-giving properties and in its power of warding off fever and sickness. During the last five years China and Japan have adopted it for similar reasons. As a perfume it has much more popularity amongst Orientals than amongst Europeans; still, if the European consumption alone increases in the ratio predicted by Dr. Piesse, consumers will naturally inquire into the causes which influence so large a market, held in a few hands and based on the supply of a plant of which very little is known in Europe.

The generally accepted name, "*Pogostemon Patchouli*," originated by Pelletier-Sautelet,[§] and the minute botanical description of that plant given by him in vol. viii. of this Journal, may apply to a variety of the true plant or a plant yielding a somewhat similar perfume, but the plant as it grows wild in Province Wellesley does not flower; neither does the variety which is cultivated at Singapore. Still Bentham was of opinion that Pelletier's plant was identical, or not really specifically distinct from his *Pogostemon intermedius*[||] of Silhet, Penang and the opposite shore of the Malay peninsula, or from *P. parviflorus* of Silhet, Assam and Saharunpur, or even from *P. Heyneanus* of Ceylon, Java, etc., which Drury describes as "probably merely a variety with larger spikes and more drooping in habit," and says that it is found wild in the Concans, and that it is probably Rheede's synonym "cottam."[¶]

Apparently there are several varieties of this plant. It is found in many other places than those above-named; in Ceylon, China, Java, Mauritius, etc. Its native locality may not have so wide a range, but it has most likely been introduced for cultivation at many of those places. The plant does not grow to any extent on the island of Penang, but a plant said to have been obtained from thence was introduced into the Botanic Garden at Calcutta, and during ten years showed no disposition to blossom. Other specimens flowered in the stoves at Kew and at Orleans; others received from Louis Van Houtte of Ghent, and grown in the moist stove here, have not attempted to flower, although they otherwise throve exceedingly and agreed in the structure of leaf and stalk with the figure of the Kew plant. The only variety known to flower (if really it be a variety of the same plant) grows on one of the islands near Sourabaya, south-east of Sumatra; the leaf is odorous, though not so broadly ovate and with shorter pedicels, and it is grown simply for the flowers, which are sold in large quantities for a medicinal purpose in the various markets of Java, and fetch a high price.

The difficulty of obtaining accurate botanical details of these plants is great, but there are no doubt many varieties, and all labiate plants, especially the mints, are apt to take a character and habit not true to the original plant, when transplanted to a climate or soil other than is natural to them; and under such conditions the development of odorous properties is as much changed as is the development of medicinal properties in many drug-yielding plants. To instance the former I may mention the lavender and the peppermint, and regarding the latter, Dr. Hooker observes, in the introductory essay to his 'Flora Indica,' that the most conspicuous Indian examples are presented by the opium poppy, mudar (*Calotropis*) and the *Canabis sativa* or common hemp of England, which yields "bhang" and "chirris" in varying quantities and of different quality very much in proportion to the humidity of the soil and climate it grows in. The digitalis grown in the Himalaya is said to have proved almost inert, and so with other plants which have been cultivated for medicinal and economic purposes. The wood of the English-grown Lebanon cedars differs greatly in colour, hardness and odour, and the wood of the English oak grown at the Cape of Good Hope is worthless. The patchouli plant cultivated at Singapore is of course not propagated by seed, as it never flowers. It may be a hybrid, and if its difference of odour be not attributable to this cause it may be to the drying, fermenting and distilling processes being carried on in a different way to that adopted in Province Wellesley. These reasons may also account in some measure for the differences observed in the Chinese oil of peppermint.

Inquiring into the causes which influence the price of any volatile oil, we find that besides supply and demand, quality is considered, depending on freedom from adulteration and careful manufacture, whether derived from stale or recent plants, and particularly on the variety of the plant from which it is produced. Whether in the case of patchouli there are plants differing specifically or not, it is certain that there are varieties, arising perhaps from hybridization, cultivation, or climatic influence, and there are still greater differences in the aroma of the oil, arising either from method of production or adulteration. The bales which now arrive in London are mostly from Province Wellesley, and consist of leaves and woody stalks (too large a proportion of the latter) of the wild variety known locally as "*Doun Tilâm Utan*," *Doun* signifying leaf, *Tilâm* bed or mattress, also including the idea "health-giving," and *outan* "wild," meaning that the natives stuff their beds and pillows with the leaf and believe in its health-giving and life-prolonging virtues. Now, even assuming that these bales consist of this plant alone, unadulterated with leaves of any other plant, that they really have been properly cured and dried, and do not turn mouldy or rancid in transit and arrive sound and unseadamaged, and that during the time they are stored in warehouse in London they escape dampness (which the leaf is remarkably apt to absorb), the oil which is afterwards distilled from these leaves differs in aroma from that distilled from the leaves on the spot immediately after the final drying process. The majority of the bales imported are reshipped to a German port and the oil distilled from them is said to be often adulterated to the extent of even 60 per cent., with cheaper oils, mostly with those of cedar and cubebs. (It is remarkable that these have been selected as adulterants, as the camphor of patchouli is isomeric with that of cubebs and with the concrete oil of cedar.[*])

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[*] *Pharm. Journ.*, [1], vol. iv., p. 80; vol. vi., p. 482; vol. viii., p. 574; vol. ix., p. 282, and iv. (3rd series), p. 362.

[†] Vol. xii., p. 61.

[‡] *Garden*, Nov. 24, 1877.

[§] *Mém. de la Soc. Roy. des Sciences d'Orleans*, V. n. 6, 1845, and Benth. in De Cand. *Prodr.*, xii., p. 153; also Hooker's *Journ. of Bot. and Kew Mis.*, i., pp. 22 and 328.

[||] 'Wall. Cat.,' 2327.

[¶] 'Hort. Mal.,' x., t. 77.

The method of cultivation of the plant and preparation of the oil, as practised by Mr. Fisher of Singapore, is as follows:—The variety selected for cultivation is known locally as *Tilâm Wangi* (meaning "fragrant"), obtained from the island of Rhio, near Singapore, in the Straits Settlements. The soil most suitable is a rather stiff clay with only a small percentage of silica, and land of this description found near the coast (containing traces of marine deposits) is planted in rows about 4 or 5 feet apart. The plants are propagated by cuttings struck in the open air, which, until rooted, are sheltered from the sun by pieces of cocoa-nut shell. The harvest is made in dry weather and when the sun has drawn up the dew from the leaves; the tops and green parts of the plant are broken off by hand, rejecting all yellow or decayed leaves and all the woody stems. The selected parts are then dried in the shade under large sheds (as the sun would draw out the perfume), and to ensure evenness in drying, they are spread on bamboo racks, allowing the air to penetrate from beneath. During this process they are frequently turned over, and when so far dried as to leave just sufficient moisture to permit of a slight fermentation, they are piled in heaps and allowed to heat gently; after this they are again spread out and dried—but not to absolute dryness—and are immediately distilled. The addition of about 25 per cent. of the wild herb "*Tilâm outan*" is said to increase the fragrance of the distillate. The distillation is effected by passing steam generated in a boiler apart through the leaves in the stills. The pressure of steam is not allowed to rise above 30 lbs. The yield, under these conditions, being about ¼ oz. per lb. of leaves; by high pressure steam the yield would be greater but more rank in quality. The stills are sometimes jacketted, and by passing a separate current of steam into the jacket condensation in the body of the still is avoided. Operating on specimens of leaf recently imported into London, I have observed that at the commencement of the distillation a small portion of a pale coloured oil passes over, lighter than water, and of a more delicate aroma than the heavy oil; but the heavy oil was rank. The Singapore oil is sent to London in cases of twelve bottles containing 22 ounces in each bottle, labelled with the manufacturer's name and guaranteed by him to be pure. From London it is sent to merchants and manufacturing perfumers in all parts. Obviously such oil is more likely to be pure and of better quality than an oil distilled in England, France, or Germany from the baled leaves and without a reliable pedigree. The oil described as "French" oil has a different odour to the genuine leaf, and has not the peculiar olive-brown tint of the Singapore oil.

An examination of oil of patchouli was made in 1864, by Dr. Gladstone,[*] on a specimen obtained from Dr. Piesse, and believed to be quite genuine; also on a specimen obtained from India. Both specimens were brownish-yellow and slightly viscid. They began to boil at 257° C., at which temperature nearly all distilled over, and was found to be a hydrocarbon analogous to that from cubebs, but towards the end the thermometer rose much higher, and the distillate became of a deep blue colour, owing to the presence of an intensely blue matter termed "azulene" or "cœrulein," which is also found in the oils of *Calamus aromaticus*, *Matricaria chamomilla*, *Artemisia Absinthum*, *Achillea Millefolium*, and in small quantity in the oils of bergamot and Ceylon lemon-grass. The analysis of this remarkable fluid shows its formula to be $C_{16}H_{13}O$ (and not $C_{12}H_{13}O$, as stated by Piesse at page 58 of his last edition). Its boiling point is 576° F., and its sp. gr. ·910. There are but few liquids which give a coloured vapour when boiled, but azulene is one of them. Like itself its vapour is blue. It is soluble in and imparts its colour to fatty and volatile oils, alcohol, and many other liquids, but not water. It is very permanent, and bears a temperature of 700° to 800° F. in a sealed tube without alteration, and none but the strongest acids aided by heat will break up its constitution. It is most intensely blue, appearing almost black when in a concentrated state. It is not decolorized by sulphurous acid, sulphuretted hydrogen, or bromine water. It does not attach itself to animal charcoal, nor does it dye wool, cotton or silk. It has been found to exist to the extent of 6 per cent. in the pure oil.

When left at rest oil of patchouli deposits a crystalline body, known as camphor of patchouli, in regular hexagonal and pyramidal prisms. The composition of this camphor has been stated as $C_{30}H_{28}O_2$ by Gal,[†] but by Montgolfier[‡] as $C_{36}H_{26}O_2$, which would constitute it an isomer of camphor of cubebs and of concrete essence of cedar. The conditions most favourable to the formation of this body are little known, but it has been remarked that it forms more rapidly in samples of oil which have been desiccated by chloride of calcium. This camphor not having any commercial value its formation is undesirable, but as it results from a simple molecular change it may be difficult to prevent it; however, it is possible that the presence of a small quantity of water in the oil may at least retard it.

The difference of the boiling point of oil of patchouli from that of oil of cedar and of oil of cubebs may serve as a guide in testing a suspected sample; so also may the percentage of azulene.

Volatile oils exhibit great diversity in their action on polarized light, some being dextro-, others lævo-rotatory in various degrees. According to Gladstone[§]

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[*] *Comptes Rendus*, January 8, 1877.

[*] *Journ. Chem. Soc.*, series 2, vol. iii.

[†] *Bul. de la Soc. Chim.*, 1869, p. 304.

[‡] *Comptes Rendus*, January 8, 1877, p. 88.

[§] *Journ. Chem. Soc.*, xvii., p. 3.

the rotatory power (determined for a column of liquid 10 inches long) of the so-called "Penang" oil of patchouli is −120°, the same for cedar wood oil being +3°. The hydrocarbon of patchouli oil—patchoulene—deviates the polarized ray −90°; the rotatory power of cubebs is recorded as +55°.

The same authority gives the sp. gr. of the three sorts of commercial oil of patchouli as follows:—Indian, ·9554; Penang, ·9592; French, 1·0119; all taken at 60° F., and for their hydrocarbons:—

	Sp. gr. at 20° C.	Boiling Point.
Indian	·9211	254 C.
Penang	·9278	257 „
French	·9255	260 „

Of course, the addition of oil of turpentine would have the effect of lowering the sp. gr., and so counterbalance the adulteration of ol. copaibæ, but the application of Professor Dragendorff's test should detect this.*

NOTES ON THE ARISTOLOCHIACEÆ AS ANTIDOTES TO SNAKE POISONS.

BY R. MODLEN.

A remark in an article on the South American antidote for snake bites, guaco, in the *Pharmaceutical Journal* for November 6, leads me to offer one or two extracts on the above subject. The chief one is taken from Rev. J. G. Wood's 'Natural History,' the others from different works.

The natural order Aristolochiaceæ is rather a large one, and comprises plants found in nearly every part of the globe. Gray enumerates seventeen species, of which no fewer than six are supposed to have antidotal powers. Among them are *A. anguicida*, the root of which "chewed and introduced into the mouth of a serpent so stupefies it that it may for a long time be handled with impunity: if the reptile is compelled to swallow a few drops, it perishes in convulsions: the root is also reported to be an antidote to serpent bites;" *A. fragrantissima*, a native of the Andes; *A. indica*; *A. sempervirens*, which is supposed to be the plant the Egyptian jugglers use; *A. serpentaria*, which Pereira and Christison say, in spite of its name and old reputation, possesses no power at all as an antidote; and *A. trilobata*, a native of the West Indies. This genus is represented in England only by *A. clematitis*, and even that is so scarce and local that its claims are not very strong.

The species to which I particularly wish to attract attention is *A. indica*. An account of it is given in the *Pharmaceutical Journal*, vol. vii., [3], p. 311, by Dr. Dymock, in his valuable and interesting "Notes on Indian Drugs," but he does not mention the great use that seems to be made of it in some parts of India. The local name is sapsun, and it is in use chiefly as a stimulant tonic. It is a creeping plant, and is trained on a trellis-work, which it clothes with its narrow, abruptly pointed leaves.

Wood says, "This plant has long been considered as a valuable remedy for the bite of the cobra, but the accounts of its use and mode of operation have mostly been vague and scarcely trustworthy. I have, however, been fortunate enough to obtain much valuable information on this subject from R. Lowther, Esq., formerly Commissioner at Allahabad, who was accustomed to employ this plant very largely in cases of cobra bites." Mr. Lowther gives details of several interesting cases, too long to be quoted without unduly enlarging these notes. Suffice it is to say that in some cases the patient recovered from extreme weakness and exhaustion, and no ill effects of the poison remained. The leaves were bruised and applied to the wound, and were also reduced to a pulp, three medium sized leaves being mixed with an ounce of water.

"The fresh leaf is, when tasted, very bitter and aromatic, bearing some resemblance to quinine in the clear searching quality of the bitter. It is remarkable that when persons are suffering from the poison of the cobra they describe it as being sweet. There is certainly a kind of sweetness in the leaf, for on chewing a dried leaf of this plant, I found it to be rather, but not very, bitter, with a pungent aroma something like that of the common ivy, and a faint, though decided sweetness as an after flavour.

"It is not a universal specific, for when experiments were tried by getting some dogs bitten by the cobra, and treating them with this leaf, they died to all appearance sooner than if they had been entirely neglected. Mr. Lowther has made a rather curious series of experiments on the cobra's poison, and the mode of its action, and has found that while human beings become cold as marble under the influence of the venom, dogs are affected in precisely an opposite manner, being thrown into a high fever, from which they die. The body of a dog killed by a cobra's bite will remain quite hot for some ten hours. The Aristolochia, therefore, which is a powerful stimulant, rather aids than counteracts the operation of the poison.

"In the case of a human being, however, the effect of this remedy seems to be infallible, and Mr. Lowther informs me that he always keeps a pestle and mortar by the plant, so that no time should be lost in bruising the leaf, and mixing it thoroughly with water before pouring it down the throat of the sufferer. The admixture of water is necessary, because in most cases the patient is insensible and the jaws stiffened, so that the mouth needs to be opened forcibly, and the preparation poured down the throat."

Although we English pharmacists may never be in a position to test this remedy, still it seemed to be one of sufficient interest to be noted. Strangely enough the only place in this neighbourhood (Oxford) where I have seen an adder is the only locality for *A. clematitis*.

[Some previous remarks upon this subject, applying more specially to the reputation as antidotes attained by species of *Aristolochia* in ancient times, will be found in a paper by Dr. Hance, in the present series of this Journal, vol. iii., p. 725.—ED. PHARM. JOURN.]

NOTES ON CITRIC AND SALICYLIC ACIDS.

BY F. C. CLAYTON.

In the *Standard* of September 14, there appeared the following paragraph:—

"For the period during which the Autumn Manœuvres will last near Berlin large quantities of citric acid have been served out to the troops of the Guards and Third Army Corps who are taking part therein. The experience of previous years has shown that this material is not only an excellent preservative against sunstroke, but, dissolved in water, makes a refreshing drink. Another chemical preparation which has been distributed among the troops at the manœuvres this year is salicylic acid, in the form of a powder, an excellent remedy for such maladies of the feet as soldiers mostly suffer from."

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* *Pharmaceutical Journal*, [3rd series], vi., p. 541.

As a manufacturer of citric acid I was naturally interested in obtaining some furthur information as to this new use for it as a preservative against sunstroke, and more especially as my friend Mr. D. W. Greenhough, chemical broker, of Mincing Lane, had previously informed me that he had purchased 120 tons for the use of the Russian army during their campaign in Turkey three or four years since.

I therefore wrote to the Foreign Office authorities enclosing a copy of the above paragraph, and asking them to obtain further information on both acids at Berlin and St. Petersburg, which they have kindly done through our representatives there. That information is as follows and it will be seen that the statement as to the use of citric acid in the above campaign is contradicted, but Mr. Greenhough is confident that the purchase was intended for the Russian Army though it may never have been used:

"MEMORANDUM.

"*Germany.*

"No citric acid has been issued to the men in the Guard Corps and in the 3rd Army Corps, only to the 24th regiment.

"One junior surgeon in this regiment gave it to some of the hospital orderlies for them to give to such people as should require it when exhausted on the march. It is considered to be a refreshing drink in hot weather, of a better flavour than water with vinegar, which has been given for years to men who begin to be affected by the heat.

"The surgeon-general in the Guard Corps states that there is no decided proof of the benefit of this acid against sunstroke, but it seems to have answered in the 24th regiment.

"The salicylic acid is used. It is in the shape of a powder, and a great preventive against perspiring and sore feet.

"*Composition.*

"Acid Salicylic	3 parts.
"Amylum	10 "
"Powder of Talcum	87 "

"It is applied dry; on a march daily; in garrison every two or three days. It takes off the irritating influence of the perspiration of the feet, and prevents in consequence the soreness.

"In the Italian army anise-seed and 'Zambuco,' are similarly used in hot weather.

"*Russia.*

"Citric acid was not used by the Imperial troops during the Russo-Turkish war, but was first employed last year to make palatable and wholesome a quantity of spoilt cabbage. It helps considerably the progress of fermentation in making the soup known as 'stchi.'

"It has also been employed lately by the troops on service in Central Asia, to make drinkable the brackish water found in the desert.

"The amount served out is 1 lb. per hundred men, supplied in its crystallized state; but it is only under exceptional circumstances that the acid is employed in the Imperial army.

"Citric acid has never been used in Russia in case of scurvy; it is supposed to be too weak to act as a curative, or even as a preventive against that disease, and would require, at all events, vegetables and fresh meat to be of any use under such circumstances.

"The acid in question is made of Italian lemons in the military medicine establishment; there is no special factory for it in Russia, nor is it imported.

"Salicylic acid appears to be of no use whatever as a remedy for foot sores; it is used only as a disinfectant, but has no curative properties.

"Bandages are steeped in salicylic acid to prevent infection."

GLYCEROLE OF CINCHONA.*

BY FRED. LOOS, JR., PH.G.

Although there are numerous liquid preparations of the cinchona barks there appear to be none which, for any length of time, remain perfect and reliable; they become more or less turbid, and in most cases a precipitate forms.

As this deposit is generally that extractive portion of the bark which contains a large percentage of its alkaloids, and therefore the part which is most sought after in medicine, it is evident that a large proportion of its active qualities are lost, and what the physician supposes is doing his patient the most good is ornamenting the sides of the "shop bottle" in some modern "palace of pharmacy." It seems that the solvents used in making the officinal preparations of the cinchona barks have not the power to hold in solution the above-mentioned principle, and on that account in a short time the liquids lose their transparency, and become cloudy.

Glycerin is not only an excellent solvent and preservative, but its blandness and agreeable taste render it acceptable in many cases where an alcoholic or vinous preparation is objectionable. By using glycerin I find that a beautiful preparation of cinchona can be made, which effectually holds in solution the extractive portion of the bark, and its clearness or quality is not affected in the least by age. In this respect I think it surpasses the present extractum cinchonæ fluidum of the U. S. P., for in it there is invariably a very heavy deposit. Therefore, this fluid extract, which should and could be a very good one, has fallen almost entirely out of use.

The same complaint can be made of tinctura cinchonæ and tinctura cinchonæ comp., so much used at present and prescribed by physicians everywhere.

The glycerole of cinchona, of which I am now about to speak, is a dense but very clear liquid, each fluid ounce of which represents a troy ounce of the bark; and, as there is not the slightest deposit of any kind, it contains all the virtues of the bark, coupled with those of the glycerin. The glycerole of cinchona rubra is a very dense liquid, of a rich, deep garnet colour, while the glycerole of cinchona calisaya is considerably lighter in colour and not so dense; this is evidently on account of the much greater quantity of extractive matter in cinchona succirubra.

As the process for making the glycerole of either cinchona succirubra or cinchona calisaya is exactly the same, one formula will suffice.

℞ Cinchona Bark, in moderately fine powder	16 troy ounces.
Glycerin	12 "
Alcohol	3 fluid ounces.

Mix the liquids, and macerate the cinchona for five days, then pack in a conical glass percolator and displace with a menstruum composed of two parts of alcohol and one of water. Collect first twelve ounces and set aside, then continue percolation to exhaustion. Distil off the alcohol, or evaporate until reduced to 4½ ounces, and when cold mix with the first 12 fluid ounces; allow to stand a few days, and filter.

As stated above, each fluid ounce of this preparation represents one troy ounce of the bark, and therefore each teaspoonful represents 60 grains. Sixty grains of cinchona bark being rather a large dose, and one which is seldom prescribed, I have made a glycerole just half the strength, and find it equally as fine and much more convenient for prescribing. The process is the same as the one previously given, with the exception that in this case only one-half the quantity of cinchona bark is used, and therefore each teaspoonful represents but 30 grains of the bark, which is much nearer the average dose than the former.

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* From the *American Journal of Pharmacy*, October, 1880.

The glycerole of cinchona is so intensely bitter that I have endeavoured, by the use of licorice and several aromatics, to make a compound which, to some extent at least, would be pleasing to the taste; and, by compounding this with an equal bulk of the glycerole of cinchona, quite an agreeable mixture can be made.

Aromatic Glycerole of Licorice.

℞	Licorice root, in fine powder	2 troy ounces.
	Cinnamon, in fine powder	1 „
	Cloves, Anise and Caraway in fine powder, each	2 drachms.
	Glycerin	4 troy ounces.
	Dilute Alcohol	sufficient quantity.

Mix the drugs, and having moistened them with the glycerin and quantity sufficient of the diluted alcohol, pack in a conical percolator and displace with a menstrum of dilute alcohol; set aside the first three ounces, and continue percolation until exhausted. Evaporate until reduced to one fluid ounce, and when cold mix with first percolate, and filter.

Aromatic Glycerole of Cinchona.

Take equal bulks of glycerole of cinchona and aromatic glycerole of licorice; mix them, and filter if necessary.

Any of the above-mentioned glyceroles can be reduced to any desired strength by diluting with a menstruum composed of two parts of alcohol and one of water. Should the reduced preparation show any inclination to precipitate, it is advisable to add a small portion of glycerine to the menstruum used in making the dilution.

VIBURNUM PRUNIFOLIUM.*

BY HERMAN VAN ALLEN, PH.G.

Viburnum prunifolium, natural order of Caprifoliaceæ, indigenous to North America. The bark of the root is found in pieces about 2 inches long and 1 inch wide externally, reddish-brown, lighter internally, breaks with a short fracture, is without odour, and of a very bitter taste.

Of the bark collected in June, 4 ounces, in moderately fine powder, were percolated with stronger alcohol; the tincture evaporated to a syrupy consistence gave a dark green residue, of a very bitter taste; treatment with benzin removed a small portion of fatty matter, of a dark green colour, and ether afterwards dissolved a small portion of bitter principle. On evaporating the residue, it was found to be readily soluble in water, the solution giving no reaction with gelatin, but with salts of iron a dark green colour was produced. Only a small portion of the bitter principle was found to be soluble in chloroform.

The aqueous extract was treated with acetate of lead, but only a small portion of colouring matter was removed, the resulting liquid being of a light brown colour. To this sulphate of sodium was added, evaporated to dryness, and the bitter principle taken up with stronger alcohol, which on evaporating left a syrupy liquid of a very bitter taste.

Finding it impossible to obtain the bitter principle pure, the following course was tried :—2 pounds of bark on being exhausted with stronger alcohol gave a dark brown percolate, to which, on evaporating, acetate of lead was added, and by filtering a portion of the colouring matter was removed. To this filtrate sulphate of sodium was added and evaporated to dryness, and bitter principle taken up by alcohol fortior; percolation through animal charcoal failed to remove any of the colour. This alcoholic solution was then evaporated to dryness, dissolved in water, and again treated with animal charcoal, when a portion of the colouring matter was removed, but the percolate was still slightly coloured. A small portion was evaporated and treated with ether and chloroform, but nothing was taken up by these solvents. The aqueous percolate was then treated by dialysis, and the resulting liquid was found to be still slightly coloured, very bitter, and to give a copious precipitate with Trommer's test for sugar. Various solvents were used to obtain the bitter principle free from the sugar, such as a mixture of equal parts of alcohol and ether, stronger ether, benzin, chloroform, carbon bisulphide, or to precipitate it with mercury bichloride, but it was not affected by any of these reagents. It is probably a glucoside, or allied sugar. The alcoholic solution gave negative results with the general tests for alkaloids.

Examination of Colouring Matter.—That portion which was precipitated by acetate of lead was dissolved in boiling water; sulphuretted hydrogen gas was passed into this, giving it a dark red colour; this was continued as long as a precipitate was produced, then filtered and evaporated to dryness and dissolved in water, when it gave the following results:—With solution of gelatin, a light brown precipitate of tannin; with chloride of iron, a greenish black; with subacetate of lead, light grey; with sulphate of copper, light green; and when evaporated to dryness, left a brown residue of a slightly bitter and astringent taste. The precipitate containing sulphide of lead was then treated with hot alcohol; the resulting solution was of a dark brown colour, and gave the following results, alcohol having been previously added to the test solution :—Solution of mercury bichloride first becomes clear by oxidation, then, if more be added, a greyish-white precipitate is produced; chloride of iron, greenish-black; caustic potash, clear, then a brown precipitate; caustic soda, dark brown; subacetate of lead, brownish-grey.

Ethereal Percolate.—Three ounces of the bark were exhausted with ether, the resulting percolate being of a dark green colour, which gave a decided precipitate with solution of gelatin; was then detannated with oxide of lead, evaporated to dryness, and the bitter principle taken up with stronger alcohol, which leaves, on evaporating, a light yellowish-green mass, of a neutral reaction, and of a purely bitter taste, slightly soluble in water and freely so in alcohol; this corresponds in all respects to the viburnin obtained by Krämer from *Viburnum opulus*. The bark, after treating with ether, was then percolated with water; this percolate was found to have an acid reaction; it was then rendered alkaline by lime water, when a dark precipitate was obtained; this was filtered and tested for tartaric acid, but none was found. Then a portion of the precipitate was washed with dilute solution of hydrochloric acid, which, on being neutralized with ammonia, and acetic acid added, gave a precipitate of oxalic acid, also with solution of acetate of soda.

The filtrate obtained from lime water precipitation was boiled; when another precipitate was obtained this was filtered out, the precipitate washed with diluted acetic acid; this, when ammonia was added, remained clear, but on boiling a precipitate of citric acid was obtained. To the clear filtrate obtained, on boiling, an equal bulk of alcohol was added, when a precipitate of malate of calcium was obtained; this was washed on a filter with alcohol to remove colouring matter, then with boiling water to dissolve the malate. Acetate of lead added to this solution precipitated malate of lead, and when heated, first agglutinated, then fused.

Valerianic Acid.—A decoction of a half pound of bark was then percolated with hot water: this percolate has an acid reaction, and on being distilled with sulphuric acid the distillate is slightly coloured, has an odour of old apples and an acid reaction; this was neutralized with the officinal solution of caustic soda, sp. gr. 1·071, evaporated to dryness, dissolved in water and again distilled with sulphuric acid; the distillate was slightly coloured, and had the distinct odour of valerianic acid; this was neutralized with caustic soda and evaporated to dryness. A portion of the resulting valerianate of soda was dissolved in amylic alcohol, sulphuric acid added, and heated, when the characteristic apple odour was developed. An aqueous solution of valerianate of soda and of sulphate of zinc were heated separately and then mixed, when, on cooling, crystals of valerianate of zinc separated in white pearly crystalline masses; these are soluble in alcohol and in a large quantity of water, and have a styptic taste and an acid reaction, turbid when heated, clear on cooling, and are soluble in ammonia water.

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* From the *American Journal of Pharmacy*, September, 1880.

Analysis of Ash.—Twenty grams of the bark, in powder, were carefully dried and weighed; total weight, 18·6 grams; on incinerating, it was found to weigh 1·65 gram; on percolating with water and drying it weighed 1·579 gram. The aqueous percolate gave a dense white precipitate with solution of chloride of barium, insoluble in boiling nitric acid, and on addition of water the precipitate is not dissolved, showing the presence of sulphuric acid. With solution of nitrate of silver a curdy white precipitate of chloride of silver was obtained, soluble in ammonia, insoluble in boiling nitric acid; on addition of perchloride of platinum to the original solution a precipitate of potassium was obtained.

The ash was percolated with dilute solution of hydrochloric acid, which caused it to effervesce, showing the presence of carbonates; the ash was nearly all dissolved, only a slight portion remaining on the filter. The filtrate gave a copious precipitate with ferrocyanide of potassium, showing the presence of the ferric salts of iron. When ammonia was added to the filtrate it became cloudy, and clear again on addition of acetic acid. Ammonia was added to the filtrate to precipitate the iron, filtered, and to the filtrate solution of chloride and carbonate of ammonia, boiled and filtered, when a precipitate was formed. This was filtered, washed and dissolved in acetic acid; this gave no reaction with chromate of potassium, showing the absence of barium; but with oxalate of ammonia a white precipitate of calcium oxalate was formed. The filtrate gave a copious precipitate with phosphate of ammonia, showing the presence of magnesium. The small residue of ash remaining undissolved in hydrochloric acid solution under the blow-pipe only gave evidence of iron.

Chemical Constituents.—(1) A brown resinous body, of a very bitter taste, from which it was found impossible to separate the sugar; (2) a greenish-yellow resin or neutral body, of a bitter taste, slightly soluble in water, freely so in alcohol, called by Krämer viburnin; (3) a volatile acid, answering to all the tests of valerianic acid; (4) a tannic acid, giving greenish-black colour with ferric salts; (5) oxalic acid; (6) citric acid; (7) malic acid; (8) sulphates; and (9) chlorides of calcium, magnesium, potassium and iron.

THE APPLICATION OF CHEMISTRY TO AGRICULTURE.[*]

BY J. H. GILBERT, PH.D., F.R.S., V.P.C.S., F.L.S.

(*Concluded from page* 393.)

The animals being periodically weighed, we were thus able to calculate the amounts of the so-estimated nitrogenous substance, and of the total non-nitrogenous substance, including and excluding fat, consumed—*for a given live-weight within a given time*, and *to produce a given amount of increase in live weight*.

Experiments were made with a large number of sheep, and a large number of pigs. And, even without making allowance for the different condition of the nitrogenous or of the non-nitrogenous constituents, in comparable foods, the results so uniformly indicated that, both the amount consumed by a given live-weight of animal within a given time, and that required to produce a given amount of increase, were determined much more by the amount of the non-nitrogenous than by that of the nitrogenous constituents which the food supplied. And when allowance was made for the different condition of the nitrogenous constituents, and for the greater or less amount of the non-nitrogenous ones which would probably be indigestible and effete, the indications were still more remarkable and conclusive.

In very many cases the animals were slaughtered, and carefully examined as to whether the tendency of development had been more that of growth in frame and flesh or in fatness. Here, again, the evidence was clear, that the tendency to growth in frame and flesh was favoured by a high proportion of nitrogen in the food, and that to the production of fat by a high proportion of digestible non-nitrogenous constituents.

In a few cases the actual amount of fat in the animals in the lean, and in the fat condition, was determined; and the results admitted of no doubt whatever that a very large proportion of the stored-up fat could not have been derived from the fatty matter of the food, and must have been produced within the body.

So decisive and consistent were the very numerous and very varied results in regard to these points, that we had no hesitation in concluding—not only that much of the fat stored up was produced within the body, but that the source of much, at any rate, of the produced fat must have been the non-nitrogenous constituents of the food—in other words the *carbohydrates*.

As already stated, however, as the question whether the source of the produced fat was the proteine compounds or the carbohydrates was not then prominent, we had not so arranged the experiments as to obtain the largest possible increase in fat with the smallest possible supply of nitrogenous compounds in the food, nor did we then even calculate whether or not there was sufficient nitrogenous matter consumed to be the source of the whole of the fat produced.

This question, indeed, excited very little interest, until at a meeting of the Congress of Agricultural Chemists held at Munich in 1865 (at which I happened to be present), Professor Voit, from the results of experiments made in Pettenkofer's respiration apparatus with dogs fed on flesh, announced his conclusion that fat must have been produced from the nitrogenous substance, and that this was probably the chief, if not the only, source of the fat, even of herbivora—an opinion which he subsequently urged much more positively.

In the discussion which followed the reading of Professor Voit's paper, Baron Liebig forcibly called in question his conclusions; maintaining not only that it was inadmissible to form conclusions on such a point in regard to herbivora, from the results of experiments made with carnivora, but also that direct quantitative results obtained with herbivorous animals had afforded apparently conclusive evidence in favour of the opposite view.

Voit's paper excited considerable controversy, in which Mr. Lawes and myself joined. We maintained that experiments to determine such a question should be made not with carnivora or omnivora fed on flesh, but with herbivora fed on their appropriate fattening food, and on such herbivora as common experience showed to be pre-eminently fat-producers. We pointed out[*] that the pig comprised, for a given live-weight, a comparatively small proportion of alimentary organs and contents; that, compared with that of the ruminants, his food was of a high character, yielding, for a given weight of it, much more total increase, much more fat, and much less necessarily effete matter; that, in proportion to his weight, he consumes a larger amount of food, and yields a larger amount both of total increase and of fat, within a given time; and, lastly, that he contains a larger proportion of fat, both in a given live weight and in his increase whilst fattening.

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[*] Presidential Address delivered before the Chemical Section of the British Association, Swansea, 1880.

[*] "On the Sources of the Fat of the Animal Body," *Phil. Mag.*, December, 1866.

It is obvious that, with these characteristics, there is much less probable range of error in calculating the amount and the composition of the increase in live-weight in relation to the amount and composition of the food consumed, than in the case of the ruminants; and that, therefore, the pig is very much more appropriate for the purpose of experiments to determine the sources in its food of the fat it produces.

Accordingly, we calculated a number of our early experiments made with pigs, to determine whether or not the nitrogenous substance they consumed was sufficient for the formation of the fat they produced. For simplicity of illustration, and to give every possible advantage to the view that nitrogenous substance might have been the source of the produced fat, we assumed the whole of the crude fat of the food to have been stored up in the animal—thus estimating a minimum amount to be produced. Then, again, we supposed the whole of the nitrogenous substance of the food to be perfectly digested and to become available for the purposes of the system. Lastly, after deducting the amount of nitrogenous substance estimated to be stored up as such, the whole of the remainder was reckoned to be so broken up that no other carbon-compounds than fat and urea would be produced.

The result was that, even adopting these inadmissible assumptions, in all the cases in which, according to common experience, the food was admittedly the most appropriate for the fattening of the animal, the calculation showed that a large amount of fat had been produced which could not have been derived from the nitrogenous substance of the food, and must therefore have had its source in the carbohydrates. Such a result is, moreover, entirely accordant with experience in practical feeding.

Reviewing the whole subject in great detail in 1869, Professor Voit refers to these results and calculations. He confesses that he has not been able to get a general view of the experiments from the mass of figures recorded, and from his comments he shows that he has on some points misunderstood them. He admits, however, that, as the figures stand, it would appear that fat had in some instances been derived from the carbohydrates. Still, he says, he cannot allow himself to consider that a transformation of carbohydrates into fat has thus been proved.

Professor Emil von Wolff, again, in his *Landwirthschaftliche Fütterungslehre*, referring to the same experiments, admits that they are almost incomprehensible unless we assume the direct concurrence of the carbohydrates in the formation of fat. He nevertheless seems to consider that evidence of the kind in question is inconclusive, and he suggests that experiments with pigs should be made in a respiration apparatus to determine the point.

Mr. Lawes and myself entertained, however, the utmost confidence that the question was of easy settlement without any such apparatus, provided only suitable animals and suitable foods were selected. I accordingly gave a paper on the subject in the *Section für Landwirthschaft-und Agricultur-Chemie*, at the *Naturforscher Versammlung* held at Hamburg in 1876.* The points which I particularly insisted on were: that the pig should be the subject of experiment; that he should be allowed to take as much as he would eat of his most appropriate fattening food, so that his increase and the fat he produced should bear as large a proportion as possible to his weight, to the total food, and to the total nitrogenous substance consumed. Finally, it was maintained that, if these conditions were observed, and the constituents of the food determined, and those of the increase of the animal estimated according to recognized methods, the results could not fail to be perfectly conclusive, without the intervention either of a respiration apparatus or of the analysis of the solid and liquid matters voided.

Results so obtained were adduced in proof of the correctness of the conclusions arrived at. We at the same time admitted that although, for reasons indicated, we had always assumed that fat was formed from the carbohydrates in the case of ruminants as well as of pigs, yet, as in our experiments with those animals we had supplied too large amounts of ready formed fat, or of nitrogenous matter, or of both, it could not be shown so conclusively by the same mode of calculation in their case as in that of pigs.

In the discussion which followed, Professor Henneberg agreed that it seemed probable that fat could be formed from the carbohydrates in the case of pigs. In the case of experiments with other animals, however, the amount of fat produced was too nearly balanced by the amount of fat and albuminous matters available, to afford conclusive evidence on the point.

Quite recently, Professor Emil von Wolff (*Landwirthschaftliche Jahrbücher*, Band viii., 1879, Supplement) has applied the same mode of calculation to results obtained by himself with pigs some years ago. He concluded that the whole of the body fat could not have been formed without the direct co-operation of the carbohydrates of the food. But what is of greater interest still is that he also calculated in the same way the results of some then quite recent experiments of Henneberg, Kern and Wattenberg, with sheep. He thus found that, even including the whole of the estimated amides with the albumin, there must have been a considerable production of fat from the carbohydrates, and, excluding the amides, the amount reckoned to be derived from the carbohydrates was of course much greater.

I will only add on this point that, on re-calculating, some of our early results with sheep, which did not afford sufficiently conclusive evidence when the whole of the nitrogen of the food was reckoned as albumin, show a very considerable formation of fat from the carbohydrates, if deduction be made for the probable amount of non-albuminoid nitrogenous matter of the food.

We have now, then, the two agricultural chemists of perhaps the highest authority, both as experimenters and writers on this subject on the continent, giving in their adhesion to the view that the fat of the herbivora, which we feed for human food, may be, and probably is, largely produced from the carbohydrates. I dare say, however, that some physiologists will not change their view until Voit gives them sanction by changing his, which, so far as I know, he has not yet done.

The question which has been currently entitled that of '*The Origin of Muscular Power*,' or '*The Sources of Muscular Power*,' has also been the subject of much investigation and of much conflict of opinion since the first publication of Liebig's views respecting it in 1842.

As I have already pointed out, he then maintained that the amount of muscular tissue transformed, the amount of nitrogenous substance oxidated, was the measure of the force generated in the body. He accordingly concluded that the requirement for the nitrogenous constituents of food would be increased in proportion to the increase of the force expended. In his more recent writings on the subject, he freely criticizes those who take an opposite view. He nevertheless grants that the secretion of urea is not a measure of the force exerted; but, on the other hand, he does not commit himself to the admission that the oxidation of the carbohydrates is a source of muscular power.

The results of our own early and very numerous feeding experiments were, as has been said, extremely accordant in showing that, provided the nitrogenous constituents in the food were not below a certain rather limited amount, it was the quantity of the digestible and available non-nitrogenous constituents, and not that of the nitrogenous substance, that determined—both *the amount consumed by a given live-weight within a given time*, and *the amount of increase in live-weight produced.* They also showed that one animal, or one set of animals, might consume two or three times as much nitrogenous substance in proportion to a given live-weight within a given time as others in precisely comparable conditions as to rest or exercise. It was further proved that they did not store up nitrogenous substance at all in proportion to the greater or less amount of it supplied in the food, but that the excess reappeared in the liquid and solid matters voided.

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* The substance of that communication is given in the *Journal of Anatomy and Physiology*, vol. xi., part iv.

So striking were these results, that we were led to turn our attention to human dietaries, and also to a consideration of the management of the animal body undergoing somewhat excessive labour, as, for instance, the hunter, the racer, the cab-horse, and the foxhound, and also pugilists and runners. Stated in a very few words, the conclusion at which we arrived from these inquiries (which were summarized in our paper given at Belfast in 1852) was—that, unless the system were overtaxed, the demand induced by an increased exercise of force was more characterized by an increased requirement for the more specially respiratory, than for the nitrogenous, constituents of food.

Soon afterwards, in 1854, we found by direct experiments with two animals in exactly equal conditions as to exercise, both being in fact at rest, that the amount of urea passed by one feeding on highly nitrogenous food was more than twice as great as that fed on a food comparatively poor in nitrogen.

It was clear, therefore, that the rule which had been laid down by Liebig, and which has been assumed to be correct by so many writers, even up to the present time, did not hold good—namely, that "The sum of the mechanical effects produced in two individuals, in the same temperature, is proportional to the amount of nitrogen in their urine; whether the mechanical force has been employed in voluntary or involuntary motions, whether it has been consumed by the limbs or by the heart and other viscera"—unless, indeed, as has been assumed by some experimenters, there is, with increased nitrogen in the food, an increased amount of mechanical force employed in the "involuntary motions" sufficient to account for the increased amount of urea voided.

The question remained in this condition until 1860, when Bischoff and Voit published the results of a long series of experiments made with a dog. They found that, even when the animal was kept at rest, the amount of urea voided varied closely in proportion to the variation in the amount of nitrogenous substance given in the food—a fact which they explained on the assumption that there must have been a corresponding influence in the force exercised in the conduct of the actions proceeding within the body itself in connection with the disposal of the increased amount of nitrogenous substance consumed. Subsequently, however, they found that the amount of urea passed by the animal was, with equal conditions as to food, etc., no greater when he was subjected to labour than when at rest; whilst, on the other hand, the carbonic acid evolved was much increased by such exercise. They accordingly somewhat modified their views.

In 1866 appeared a paper by Professors Fick and Wislicenus, giving the results obtained in a mountain ascent. They found that practically the amount of urea voided was scarcely increased by the labour thus undertaken. Professor Frankland gave an account of these experiments in a lecture at the Royal Institution in the same year; and he subsequently followed up the subject by an investigation of the heat developed in the combustion of various articles of food, applying the results in illustration of the phenomena of the exercise of force.

Lastly, Kellner has made some very interesting experiments with a horse at Hohenheim, the results of which were published last year. In one series, the experiment was divided into five periods, the same food being given throughout; but the animal accomplished different distances, and drew different weights, the drought being measured by a horse-dynamometer The changes in live-weight, the amount of water drunk, the temperature, the amount of matters voided, and their contents in nitrogen, were also determined.

The result was, that with only moderate labour there was no marked increase in the nitrogen eliminated in the urine; but that with excessive labour the animal lost weight and eliminated more nitrogen. Kellner concluded, accordingly, that, under certain circumstances, muscular action can increase the transformation of albumin in the organism in a direct way; but that, nevertheless, in the first line is the oxidation of the non-nitrogenous matters—carbohydrates and fat, next comes in requisition the circulation-albumin, and finally the organ-albumin is attacked.

In reference to these conclusions from the most recent experiments relating to the subject, we may wind up this brief historical sketch of the changes of view respecting it, with the following quotation from our own paper published in 1866:*—" . . . all the evidence at command tended to show that by an increased exercise of muscular power there was, with increased requirement for respirable material, probably no increased production and voidance of urea, unless, owing to excess of nitrogenous matter in the food, or a deficiency of available non nitrogenous substance, or diseased action, the nitrogenous constituents of the fluids or solids of the body were drawn upon in an abnormal degree for the supply of respirable material."

In conclusion, although I fully agree with Voit, Zuntz, Wolff, and others, that there still remains much for both chemistry and physiology to settle in connection with these two questions of "*The Sources of the Fat of the Animal Body*" and "*The Origin of Muscular Power,*" yet I think we may congratulate ourselves on the re-establishment of the true faith in regard to them, so far at least as the most important practical points are concerned.

ANALYSES OF BLACK AND WHITE MUSTARD.†

BY CHARLES H. PIESSE AND LIONEL STANSELL.

The seeds of black and white mustard, *Sinapis nigra* and *S. alba*, when crushed and sifted constitute the mustard farina of commerce; both species are cultivated in this country, a considerable quantity, however, being imported from abroad. In the manufacture, the seeds of both variety in suitable proportions are crushed between rollers, then pounded and sifted. The residue in the sieve is called dressings; what passes through is farina or flour of mustard. This is re-sifted, yielding three qualities: (*a*) superfine; (*b*) fine; and (*c*) seconds. The seeds are tough and difficult to powder; the best method on a small scale is to pulverize them in an ordinary mortar with a large cast iron pestle.

The farina of black and white mustard differs but little in appearance, the brown being, however, slightly darker. In the unground state the seeds of white mustard are of a yellowish straw colour, those of brown a dark brownish-purple.

A. 1 gram white seeds, Yorkshire, contain 170 seeds.
B. 1 „ „ „ Cambridge, „ 172 „
C. 1 „ brown „ Cambridge, „ 944 „

100 seeds of A weigh ·5882 gram, B ·5814 gram, C 0·1059 gram.

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* "Food in its Relations to Various Exigences of the Animal Body."—*Phil. Mag.*, July, 1866.

† From *The Analyst*, September, 1880.

Methods of Analysis employed.—The sulphur was estimated by oxidation with concentrated nitric acid, and subsequent precipitation with barium chloride.

For the determination of nitrogen the soda-lime method was employed, the evolved ammonia being passed into standard acid. Mustard contains so large a proportion of fat, that during the combustion the amount of tar produced considerably interferes with the subsequent titration. It was therefore found necessary to exhaust a weighed quantity of the crushed mustard seeds (previously dried) with petroleum ether, to collect the exhausted mustard on a weighed filter and to dry it, then after re-weighing to calculate the ratio between the original mustard and that free from fat and moisture. A weighed quantity of this exhausted mustard was then used for the estimation of the nitrogen. By this expedient the production of tar during the combustion was almost entirely prevented. The amount of nitrogen, after subtracting that contained in the potassium myronate,* in the case of black mustard, is multiplied by 6·25 to obtain the albuminoid substances.

Substances Soluble in Water (Myrosin and Albumin).—The amount of myrosin and soluble albumin appears not to differ in either variety. About 2 grams of substance were well digested for twelve hours with cold water, the fluid then filtered into a quarter litre flask, and the seeds washed thoroughly with cold, warm, and finally boiling water. Of the filtrate, 50 c.c. were evaporated to obtain the total soluble matter; 100 c.c. were boiled, and the coagulated albumin collected on a weighed filter.

Fat and Cellulose.—(*a*) About 2 grams of finely pulverized seed well dried; (*b*) extracted with petroleum ether, the insoluble matters collected on a weighed filter, dried and weighed; (*c*) boiled successively with very dilute hydrochloric acid, caustic soda, and hydrochloric acid, being washed with boiling water each time, finally with alcohol, dried, and weighed as cellulose.

Estimation of the Volatile Oil.—The distinguishing characteristic of brown mustard is the occurrence in it of potassium myronate, which, in presence of water, is acted upon by a peculiar ferment—myrosin, contained in the seed—whereby it is decomposed, yielding potassium, hydrogen sulphate, glucose, and allyl isothiocyanate, the pungent oil of mustard:—

$$K,C_{10}H_{18}NS_2O_{10} = KHSO_4 + C_6H_{12}O_6 + C_3H_5,CS,N.$$

100 parts potassium myronate yield 23·355 volatile oil.

It is remarkable that the yield of volatile oil is greater when the brown mustard is mixed with some of the white. The results of many experiments have led to the following process:—

About 25 grams of the crushed brown seeds are mixed with about a quarter of their weight of white seeds (also crushed, in a 500 c.c. flask, 300 c.c. cold water added and allowed to stand for five or six hours. The highest yield of oil is obtained by standing for this length of time, and sensibly diminishes after six hours, gradually decomposing in contact with the myrosin; the yield after the lapse of forty-eight hours will reach only about two-thirds of that originally present, while after a week not one-third of the whole will be obtained. We have found after numerous trials that not less than three hours nor more than six should be allowed to elapse between the addition of the water to the mustard and its distillation, the rule finally adopted being to allow the mixture to stand for five hours. The flask is then to be connected with a small Liebig's condenser, and the liquid distilled until no more oily drops are seen to come over. The distillate is received in a small flask (150 c.c.), containing 30 c.c. ammonia sp. gr. 0·88. When the distillation is judged complete, the flask is disconnected and, after removing from the flame, shaken. If the steam possesses the sharp pungent odour of mustard oil, the contents are further distilled. This test is very sensitive. When the boiling proceeds rapidly, after 50 c.c. have come over, it will almost invariably be found that the mustard is entirely deprived of volatile oil. The distillation finished, the condenser is well rinsed out with cold distilled water into the receiver (this is necessary), the flask corked and put aside until the oily drops have quite disappeared, being occasionally shaken for this purpose; at least twenty-four hours are usually requisite. When the change is complete the flask is covered with a porcelain crucible lid, and boiled for a few minutes to expel the ammonia, transferred to a weighed platinum basin, and evaporated to dryness on the water-bath, subsequently dried in the water oven, and weighed. The amount of thiosinamine thus obtained is multiplied by ·85344; the product is the quantity of allyl isothiocyanate contained in the mustard operated upon. If the factor 3·5775 be used, the amount of potassium myronate is ascertained.

Thiosinamine is formed by the union of one molecule of ammonia with one molecule of mustard oil.

$$CS,N,C_3H_5 + NH_3 = CS, \left\{ \begin{matrix} NH,C_3H_5. \\ NH_2. \end{matrix} \right.$$

ANALYSIS OF WHITE MUSTARD.

	Mustard Whole Seeds.		Mustard Farina.		
	Yorkshire.	Cambridge	Superfine.	Fine.	Seconds.
Moisture	9·32	8·00	·30	5·78	6·06
Fat	25·56	27·51	37·18	35·74	32·55
Cellulose	10·52	8·87	3·90	4·15	9·34
Sulphur	0·99	0·93	1·33	1·22	1·26
Nitrogen	4·54	4·49	5·05	4·89	4·25
Albuminoids	28·37	28·06	31·56	30·56	26·56
Myrosin and albumen .	5·24	4·58	7·32	6·67	6·11
Soluble matter . . .	27·38	26·29	36·31	36·60	33 90
Volatile oil	0·06	0·08	0·03	0·04	0·03
Ash	4·57	4·70	4·22	4·31	4·30
„ soluble	0·55	0·75	0·44	0·55	0·33

ANALYSIS OF BROWN MUSTARD.

	Mustard Whole Seeds.	Mustard Farina.		
	Cambridge.	Superfine.	Fine.	Seconds.
Moisture	8·52	4·35	4·52	5·63
Fat	25·54	36·96	38·02	36·19
Cellulose	9·01	3·09	2·06	3·26
Sulphur	1·28	1·50	1·48	1·30
Nitrogen	4·38	4·94	5·01	4·31
Albuminoids . .	26·50	29·81	30·25	26·06
Myrosin and albumin	5·24	6·46	6·78	6·14
Soluble matter . .	24·22	31·64	32·78	31·41
Volatile oil . . .	0·473	1·437	1·500	1·381
Potassium myronate	1·692	5·141	5·366	4·940
Ash	4·98	5·04	4·84	4·91
„ soluble . . .	1·11	1·01	0·98	0·77

In the process of manufacture, the sifting chiefly removes the husk, and dries the farina, the other constituents being, as it were, concentrated. This is well seen in the amount of volatile oil in brown mustard. Again, the fat, which averages about 25 per cent. in the seeds, reaches 37 per cent. in the farina; the sulphur is increased nearly one-half of 1 per cent., and so on with the other constituents; while the cellulose falls about two-thirds and the moisture about one-half.

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* Potassium myronate contains 3·37 per cent. of nitrogen.

The white seeds differ in composition from the brown, chiefly in not yielding volatile mustard oil, in the fact that the sulphur is lower, and the soluble matters higher in the former than in the latter.

The results of over forty experiments upon the amount of volatile oil present in brown mustard are here shown, a few of the separate determinations being given:—

					Volatile Oil per cent.
Whole mustard seeds	0·486	0·465	0·468	Average	0·473
Brown farina, superfine . . .		1·439	1·436	„	1·437
Brown farina, fine	1·51	1·49	1·50	„	1·500
Brown farina, seconds . . .	1·358	1·418	1·367	„	1·381

Characteristic Tests.—I. The aqueous extract of white mustard yields with solution of ferric chloride a deep blood-red coloration; this reaction is so slight as to be scarcely apparent with a similar extract of black mustard.

II. The aqueous extract of white mustard acquires in a few hours a powerful odour of sulphuretted hydrogen; that of the black mustard smells only of the pungent mustard oil.

ANALYSIS OF ASH OF MUSTARD SEED.

	White Seeds.		Brown Seeds
	Yorkshire.	Cambridge.	Cambridge.
Potash	21·29	18·88	21·41
Soda	0·18	0·21	0·35
Lime	13·46	9·34	13·57
Magnesia . . .	3·17	10·49	10·04
Iron oxide . . .	1·18	1·03	1·06
Sulphuric acid .	7·06	7·16	5·56
Chlorine . . .	0·11	0·12	0·15
Phosphoric acid .	32·74	35·00	37·20
Silica	1·00	1·12	1·41
Sand	1·82	1·95	1·38
Charcoal . . .	12·82	15·14	7·57
	99·85	100·48	99·70

When the charcoal and sand are deducted, the following is the percentage composition of the ash. An analysis made in 1850 by Way and Ogston of white mustard is appended:—

	White Seeds. Yorkshire.	White Seeds. Cambridge.	White. Way and Ogston. 1850.	Brown Seeds. Cambridge.
Potash	24·98	22·64	25·78	23·59
Soda	0·21	0·25	0·33	0·38
Lime	15·79	11·19	19·10	14·95
Magnesia . . .	9·58	12·58	5·90	11·06
Iron oxide . . .	1·38	1·23	0·39	1·16
Sulphuric acid . .	8·28	8·58	2·19	6·12
Chlorine	0·12	0·14	trace.	0·16
Phosphoric acid .	38·48	41·97	44·97	40·99
Silica	1·17	1·34	1·31	1·55
	99·93	99·92	99·97	99·96

The ash for analysis was obtained by careful incineration at a heat below visible redness.

It will be noticed that the ash consists mainly of potassium, calcium and magnesium phosphate, with a very minute proportion of chlorine; and that no carbonates are present. Practically no difference exists between the ashes of the two varieties, so that no analytical indications can be obtained from the mere examination of that constituent.

We append a few reactions of thiosinamine likely to prove of interest:—

I. Thiosinamine dried at 100° is an oily substance, which solidifies when cold after some time. It dissolves readily in hot water, and crystallizes therefrom in beautiful tufts of crystals (monoclinic).

II. Treated with nitric acid, it is partially oxidized, though even boiling with the concentrated acid for half-an hour failed to effect complete decomposition, as evidenced by the percentage of sulphuric acid obtained by precipitating the liquid with barium chloride.

III. Silver nitrate added to an aqueous solution of thiosinamine gives a white curdy precipitate, which redissolves less and less perfectly until the silver salt is in excess, when the precipitate remains permanent.

IV. Mercuric chloride gives a reaction precisely similar to silver nitrate.

V. Platinic chloride gives an abundant curdy orange-yellow coloured precipitate, which does not redissolve in the excess of thiosinamine, nor in cold water In hot water it dissolves after first melting and floating to the surface, and on cooling separates as an opaque mass of the consistence of balsam tolu, in which condition it remains. This salt, as well as the two before mentioned, is readily soluble in alcohol.

VI. Mayer's reagent (HgI_2+KI) yields a dirty white coloured precipitate, which coheres in a few hours to form a number of oily drops. This change occurs at once on heating. The precipitate is only slightly soluble in either hot or cold water.

VII. Nessler's solution gives an insoluble yellow precipitate.

VIII. Picric acid only affords a precipitate in strong solutions.

CHROME ORES OF CALIFORNIA.*

Among the varied mineral riches of California, that of chrome ore, for the manufacture of bichromate of potash, so largely used in making colours and pigments, and in charging batteries for telegraph purposes, is assuming a remarkable importance. The chrome ore is found associated with serpentine, and the mines are situate near San Luis Obispo, from the shipping harbour of which—Port Harford—15,000 tons have been sent away within the last three years. The average production yielded from 2000 lb. of chrome iron, containing 50 per cent. of chromium, is about 1600 lb. of bichromate of potash. During the year 1870, the following were the statistics of the trade:—Import of bichromate, 2,624,000 lb.; domestic manufacture, 4,258,000 lb.; total, 6,882,000 lb.; and, as the requirements of chemical science are annually increasing, it is likely that a considerable mining industry will be added to those already existing in California.

SOULAN'S PROCESS FOR CAPPING BOTTLES.

Make the following solution:—

Purified resin	7 drachms.
Ether	10 „
Collodion	15 „
Aniline red, sufficient.	

Dissolve the resin in the ether, mix it with the collodion, and colour to taste. All that is necessary to apply the mixture is to dip the cork and the top of the bottle in it, turning it for an instant in the hand while the composition dries. The result is a semi-transparent varnish of pleasing appearance, especially if the cork of the bottle is previously sealed on top with sealing-wax.—*Druggists' Circular and Chemical Gazette.*

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* From the *Journal of the Society of Arts*, October 8.

The Pharmaceutical Journal.

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SATURDAY, NOVEMBER 20, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal MESSRS. CHURCHILL, *New Burlington Street, London, W Envelopes indorsed "Pharm. Journ."*

THE RELATION BETWEEN MEDICINE AND PHARMACY.

AN attempt has recently been made in Philadelphia to improve the relations between those engaged respectively in the practice of pharmacy and of medicine by organizing meetings for the discussion of various subjects affecting the interests of both classes, with a view to devising means for the remedy of mutual grievances. . The idea appears to have originated with the Medico-Legal Society of Philadelphia, and in response to the invitation of that body a number of physicians and pharmacists met in the hall of the Philadelphia College of Pharmacy. On that occasion Dr. SWAYZE opened the proceedings by calling attention to patent medicines, and recommending pharmacists to abandon and discourage their sale, much upon the same grounds as those urged by Dr. LANGDON DOWN in his inaugural address last month. This proposal appears to have been so far approved by the meeting that a resolution was passed to take steps for ascertaining how far the pharmacists of Philadelphia would be willing to unite in such a course. The editor of the *American Journal of Pharmacy* refers favourably to this proposal, and suggests it might very properly go further by including also, on the part of pharmacists, the discarding of all signs and circulars relating to and recommending patent medicines, and, on the part of the physicians, the discarding of the specialties which are sometimes prescribed by medical men. Between these preparations, often protected by trade marks and made by unknown formulæ, and the common nostrums known as patent medicines, our contemporary thinks there is no distinction to be drawn.

Another subject discussed was the compact sometimes formed between certain physicians and pharmacists for mutual advantages in dispensing prescriptions, but no action was taken upon it, as it was considered that the evil was one difficult to reach. Prescribing over the counter and the repetition of prescriptions were the subjects which excited most interest, and they were both discussed at adjourned meetings held last month. As regards the former subject the discussion did not bring forth any new points beyond the difficulty of defining exactly what is to be understood by "prescribing over the counter" and of deciding how far the pharmacist is justified in expressing an opinion as to the choice of simple remedies. On the part of the physicians charges were made to which the pharmacists present replied by denying that they applied to them, and on the motion of Professor REMMINGTON a resolution was passed to the effect that as the diagnosis and treatment of disease belong to the province of a distinct profession, and as a pharmaceutical education does not qualify the pharmacist for these responsible offices, he should, where it is practicable, refer applicants for medical aid to a regular physician. However, if we may judge from the comments on this discussion in the *American Journal of Pharmacy*, it does not appear to have been conducted with sufficient regard to the propriety of not burdening one class or the other with the misdoings of some of its individual members, or to have been free from the bitterness of feeling which has been experienced amongst ourselves.

In regard to the unauthorized repetition of prescriptions, it was contended, on the one hand, that this practice was undesirable, because serious results and even death had taken place in consequence of it. It was maintained that the physician does not sell a prescription, but merely charges a professional fee for his advice, and that he suffers pecuniary loss by the use of his prescription being repeated without his direction. On the other hand, it was held that pharmacists cannot interfere with the right which the public claims of having prescriptions dispensed as often as may be desired, and that it is for the physician to determine with his patients what is to be done in that respect. As embodying to some extent both views, a resolution was passed at the meeting stating that physicians when writing a prescription which they do not wish renewed should write on the bottom of such prescription, "Do not renew," and also inform the patient of the fact in every case, while, on the other hand, the druggist dispensing it should write or print on the label, "Not to be renewed unless by a written order of the doctor."

Whether such a proceeding will have the desired effect is at least doubtful. The popular idea is that a patient has a right to the prescription he receives from a physician and that he may do as he pleases with it. Long usage has confirmed that belief, and there does not appear to be any way in which it can be interfered with, except as the result of an understanding to the contrary between the physician and his patient. The pharmacist really has no option, but the utmost he can do is to caution patients against the injury likely to arise from the continued use of dangerous drugs, and even by that course he may prejudice himself in some instances.

This subject has been recently under consideration by the Austrian Government, and a proposal to regulate the use of physicians' prescriptions has been discussed by the Bohemian Pharmaceutical Association. Upon the principle that a physician's prescription is only an order for one supply of medicine, it is suggested that it shall be made unlawful for the pharmacist to dispense a prescription more than once or to dispense medicines according to copies of prescriptions. With that object physicians are to write their prescriptions upon stamped paper, stating their address and qualification as well as the date upon which the prescriptions are given and the name and address of the patient. Pharmacists are to be prohibited from dispensing any prescriptions that are not thus authenticated, and they are also to be required to mark all prescriptions dispensed with the date, their own name and address and the word "dispensed." Disregard of these regulations by either physicians or dispensers is to render them liable to penalty. The Bohemian pharmacists have pointed out the difficulties attending the adoption of the plan proposed, even if it were restricted to powerful medicines, and they suggest that it is for medical men to adopt such precautions as they may deem necessary for preventing misuse of medicine ordered by them.

We have referred to these discussions less on account of any novelty they present, than for the purpose of pointing out the desirability of conferences between medical practitioners and pharmacists upon such topics as those above mentioned. Even if most questions cannot be settled at once to the satisfaction of all concerned, we agree with the editor of the *American Journal of Pharmacy* in thinking there is reason to believe that much good might result from more frequent intercourse of physicians and pharmacists. There are so many scientific and practical points on which the members of one body might enlighten those of the other, that such meetings might be made interesting as well as beneficial, and more calculated to promote on both sides that differentiation of function to which we must look for improvement in their relations rather than to one-sided incriminations and declamations as to grievances. One of the greatest deficiences of the present time is the absence of adequate comprehension by medical men or pharmacists of the circumstances by which each class is governed. We are constantly meeting with indications of such mutual misunderstanding, and may illustrate the fact by reference to the last number of the *British Medical Journal*, where it is stated that the Pharmacy Act renders the practice of pharmacy penal for any person that is not duly registered under the Act. If this statement were a representation of fact there might probably be less reason for medical men to complain of pharmacists, but it certainly is not creditable to a leading medical journal to give currency to such an absurd blunder.

INFRINGEMENTS OF THE PHARMACY ACT.

In the reports of proceedings under the Pharmacy Act, 1868, it will be seen that in an action brought by the Pharmaceutical Society against G. J. E. Copping, in the Manchester County Court, the defendant has paid into court the amount of penalty and costs. This is the second time within the present year that Mr. Copping has been proceeded against for infringement of the Pharmacy Act by keeping open shop for the sale of poisons,* and this circumstance is not without significance in connection with the complaint in the report of the Local Government Board as to the sale of adulterated drugs, to which we called attention last week. It is under such circumstances of infringement of the Pharmacy Act by unqualified persons that the sale of adulterated drugs is carried on, and for this reason alone the efforts of the Pharmaceutical Society to enforce the law in the interest of the public ought to receive every possible support from those departments of the Government that are concerned with the punishment of offenders. That the influence of such official countenance of the Society's action in this respect is requisite may be sufficiently inferred from the fact that the defendant in the case above referred to had been proceeded against twice within six months, and on both occasions paid the penalty of his offence.

DEATH OF AN ANNUITANT.

We regret to have to report the death, on Tuesday last, of Mr. John Seagrave Higgs, at the age of 69 years. Mr. Higgs was elected an annuitant on the Benevolent Fund in 1878.

MUNICIPAL HONOURS TO CHEMISTS.

In addition to the gentlemen referred to last week as having been chosen to municipal offices, we have to mention Mr. Edward Clark, Chemist and Druggist, who has been elected Mayor of Lancaster, and Mr. Arthur Deck, Pharmaceutical Chemist and Local Secretary of the Pharmaceutical Society, who has been re-elected an Alderman of the borough of Cambridge.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association will be held on Thursday, November 25, at 8.30 p.m., Professor Attfield, F.R.S., President, in the chair. A paper will be read by Dr. Senier, on "The Object of Study, including that of Pharmaceutical Study."

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association will be held at the rooms, 32a, George Street, Hanover Square, on Wednesday next, November 24, at 9 p.m., precisely. A paper will be read by Mr. C. Parkinson, subject, "Sir Humphrey Davy," and one by Mr. F. W. Collinson, subject, "Michael Faraday."

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* See *Pharm. Journ.*, xi., p. 39.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The first meeting of the twenty-seventh session was held in the Society's Rooms, 119A, George Street, Edinburgh, on Wednesday, November 10. Mr. J. B. Stephenson, President of the Branch, in the chair.

The minutes of the former meeting were read and confirmed.

The Honorary Secretary intimated the following donations:—

Donations to the Museum.

30 Mounted Specimens of the Official Indigenous Medicinal Plants.
3 Series of Diagrams illustrating Flower Arrangements. From a Friend.

Contributions to the Library.

The Spirit of Nature. By H. B. Baildon. Presented by the Author.
Note Book of Materia Medica. By Dr. Scoresby Jackson, 4th edition. Edited by Dr. Moinet. From the Publishers.
Historical Sketch of the Progress of Pharmacy in Great Britain. By Jacob Bell and Dr. Redwood. From the Society in London.
The *Pharmacist and Chemist*, from May till October. From the Chicago College of Pharmacy.
The *Canadian Pharmaceutical Journal*, from May till October. From the Ontario College of Pharmacy.
Journal of the Chemical Society, from May till October. Official Awards of the Sydney International Exhibition, 1879. Report of H.M. Commissioners for the Paris Universal Exhibition, 1878, 2 vols, and list of awards to British Exhibitors. An Inquiry into the Theory and Practice of Antiseptic Surgery. By Dr. James Cumming. From Mr. Mackay.

The President then opened the session with the following—

INTRODUCTORY REMARKS.

Gentlemen,—When a man has to open the session for the fourth time from this chair, as is the case with me this evening, I think you will agree with me that it is neither to be expected nor desired that he should have much to say. One duty, however, is rendered the more incumbent by the frequency of my appearance here, viz., the acknowledgment of the great and, as I think, the unprecedented honour you have conferred on me by again electing me to fill this chair. And this duty, as it becomes more incumbent year by year, becomes also, let me assure you, less a matter of course and more a matter of heartfelt sentiment. Let me add my assurance that I will do my best to fulfil the duties of the chair, and my hope that our meetings this session will prove as interesting and be as well attended as in former years.

I have said that it was not to be expected or desired that I should have much to say to you this evening. It might indeed be expected that in the present position and future prospects of our business, which are confessedly of a somewhat gloomy character, I might have attempted to lay before you any considerations which might tend either towards enlightenment and guidance, or at least comfort under the circumstances, but I fear I am little competent to do so. There can be no doubt that the present depression of trade has affected us all more or less. Then there are these wholesale organizations in the form of co-operative stores and supply associations, so greatly in vogue with the professional classes, and which have done so much, and may do so much more, in the way of damaging retail business. And lastly,—unkindest cut of all,—there is the decision of the Supreme Court of Judicature, wounding us in a part which we had believed to be invulnerable, and the full effect of which if carried to its logical conclusion it is difficult to foresee. In view of all these difficulties, I have really nothing to say, except the merest commonplaces and truisms; but perhaps the mere repetition of them may serve some purpose. As to the depression of trade which has been not only so universal, but so protracted, it is bound in the natural course of things to pass over. They say it is doing so already, although I confess no signs of this have come within my personal knowledge. Then, as a trade we must just accept all legitimate competition that may arise, be it on the part of stores, or in any other form, and we should consider that all other retail traders are affected by these causes as well as ourselves, most of them indeed to a greater extent. With regard to stores I am persuaded that they cannot compete in the long run with the retailer in meeting all the requirements of the public, so that when the present mania for amateur shopkeeping shall have died away, these concerns will do so likewise. Besides, I think it is within the range of possibility that retailers may devise some plan to get their professional assistance at wholesale rates, which would throw a new light on the relation of the different classes to one another. The legal decision which I have referred to presents difficulties more serious, because it trenches on the professional part of our business, which we had hitherto considered our stronghold. It seems to deprive us of the protection which we had come to regard as belonging to us in virtue of our professional qualification. Seems to deprive us, I say, because I believe that in point of fact, protection—at least the substantial benefits of a protected condition—will always be found associated with the qualification. It is true that the judges based their decision on the fact of the qualification being present, but then the new principle they introduced was that of the qualification of one man constituting the basis of the protection of another—a doctrine which admits of many awkward applications. Our aim, both as a Society and as individuals, should ever be to magnify this qualification. We need fear no outside competition in this, and I think it is in this direction we should ever turn our eyes in view of difficulties. On the theme of the future of pharmacy as conditioned by the qualification of the pharmacist, there has been a good deal said and written lately. Notably, there were leading articles in our own Journal, and also in the *Chemist and Druggist*, quite recently, and a speech by Dr. Langdon Down to the students in Bloomsbury Square on the opening of the winter session, which all express and illustrate my own ideas on this subject in a manner I cannot hope to emulate, and as you must all be familiar with these articles, I need not do more than refer to them. I thought of now asking your attention for a few moments while I showed how the idea was part and parcel, as it were, of our Society, being expressed in the very words of our charter of incorporation. You have to imagine our venerated founders laying their heads together, as we say, to found our Society, and selecting words to express the very *raison d'être* of it. Well, they begin by saying that the first purpose of the association is "to advance chemistry and pharmacy, and to promote the education of those who should practise the same." There are other purposes, but this is the one first mentioned and its position assigned, primary and paramount. Look for a moment at it, we see it unfolds in two directions. The first aspect is outward—to the world of science "for advancing chemistry and pharmacy." The second is inward—to her own members "for promoting education," the animating principle in both cases being qualification—the qualification of the chemist and pharmacist. It is worth noting, too, that the words "promoting education" are used. You all know the agitation which has been and is taking place about the proper place of our Society as to education. She already provides it in Bloomsbury Square, but the difficulty of providing an education at all commensurate with the entire requirements of our profession, is one that has met every one who has for an instant considered the subject, and it met, I firmly believe, these founders of ours and led them to use this word "promoting," for promote is a very wide word and includes every agency that tends either directly or indirectly to educate our members. Our examining boards promote education, because candidates must be educated up to the standard of our examinations. So do our library, and museum and lectures. Yes, gentlemen, we are this evening, by our presence here, fulfilling the first purpose of our existence as a corporate body. Well then, after laying down this first purpose of our Society, and assigning it its place, our founders go on to the second "and for the protection of chemists and druggists." You see the order and connection of the two; first, the qualification, then the protection. And it were well for us to give them always the same order and precedence, the one of the other, in our minds. I have only in a word to mention the third purpose of the Society—the Benevolent Fund. It was like these good men to make a regard for the sacred principles of charity and mercy, the third strand of the cord that was to bind our Society together. For, as you all know, our Fund is of a purely eleemosynary character, and in this respect unlike the funds of many other corporate bodies which partake more of the nature of insurance funds. Is it necessary to point the moral of this last purpose by formally urging the claims of the Fund on the support of every one of us?

Dr. J. A. Russell, Edinburgh, afterwards read a paper, of which the following is an abstract, on 'Disinfectants,' illustrated by diagrams and specimens.

DISINFECTANTS.

BY J. A. RUSSELL, M.B., F.R.S.E.

A large amount of the quackery and confusion which prevails in the prescription and use of disinfectants is due to ignorance of the precise nature of the contagia of diseases which disinfectants are intended to destroy or render inert. Disinfectants, deodorants and antiseptics have been confounded because so long as the nature of the noxious material was unknown the chemical agents were selected to satisfy the most various and differing theories as to its nature and properties. Recently a flood of light has been thrown upon the nature of the contagia of many diseases, and being acquainted with their life history we can select appropriate disinfectants. These propagating agents consist of minute solid particles, probably of a vegetable nature, and appear as a corkscrew-like spirilla in relapsing fever and as a large motionless rod (the *Bacillus anthracis*) in wool-sorters' disease; while in fowl cholera the blood is purpled with a micrococcus one fifty-thousandth of an inch in diameter. When these organisms exist in clothing they can be destroyed by dry heat (220° F. for two hours) or by thorough boiling and washing. Some kinds of them, at all events, multiply in media external to the animal body, and this multiplication appears in many cases to be favoured by diet. Being non-gaseous they are not withdrawn from air in which they may be floating in clouds by liquid or solid disinfectants exposed in vessels, and in these circumstances should be expelled by ventilation or cleansing or attacked by gaseous disinfectants.

Experiments upon vaccine matter, which may be taken as the type of a virulent material, show that disinfectants to be effectual must be used in much larger quantity than is usually considered necessary, and that when the disinfectant is of an acid nature the virus must be rendered permanently and strongly acid. These experiments show that sulphurous acid is much more potent than chlorine as a gaseous disinfectant, and that though carbolic acid in quantity equal to 2 per cent. of the virus completely deprives it of its infective power for the time being, yet it is not permanently abolished but returns when the carbolic acid has escaped through exposure to the air.

Permanganate of potash, though deficient in antiseptic properties, is truly disinfectant when used in such quantity that the colour is retained, but the expense becomes enormous, except for a few purposes. Though we have no trustworthy light from direct experiment, there is reason to believe that many metallic salts in very strong solution are disinfectant, and at all events many of them are antiseptic (fatal to microzymes). The waste chlorides from the manufacture of chlorine might be used for drains. It should be remembered that agents such as carbolic acid and metallic salts, which in small quantity have a preservative power, may actually prolong the life of contagium which would otherwise succumb to natural processes if the agents are used in limited quantity.

Experiments upon vaccine matter prove that several lauded and patented "antiseptics and disinfectants" are perfectly worthless, so far as any useful influence upon this virus is concerned. It is necessary clearly to understand what is required when selecting an agent for practical use. There are good deodorants, which arrest putrefaction and fermentation, and yet completely fail to destroy contagious particles imbedded in an epithelial or albuminous envelope, as they usually are.

The usual vote of thanks to the President and Dr. Russell brought the meeting to a close.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual meeting was held at Burlington Chambers, New Street, Birmingham, on November 10, at half-past eight in the evening. There was a good attendance.

In moving the adoption of the report, copies of which were on the table,

Mr. Barclay said that although there had not been this year a course of lectures similar to three previous years, there had been a good deal of quiet work done by the Association. The library had been much enlarged, and book case provided. The works recently bought were of a kind most useful to the chemist for reference. A committee had been formed and had commenced the work of revising and republishing the price list. A sum of £5 had been disbursed by the Treasurer in giving temporary assistance to a distressed chemist; the sum was a small one but the relief reached cases which the Benevolent Fund of the Pharmaceutical Society did not deal with so well, as assistance was given at once without delay. The report was adopted.

Mr. Churchill moved that a sum of £10 be granted for the temporary relief of chemists in distress. This was agreed to. A further sum of £5 was voted on a motion of Mr. Thomas Barclay for the purchase of additions to the library.

Mr. Thomas Holdsworth was elected President; Messrs. Gibson and Wilcox, Vice-Presidents; Mr. Joseph Lucas was unanimously re-appointed Treasurer; Messrs. Arblaster and Haydon were appointed Auditors. The Honorary Secretaries, Messrs. Dewson and Austen were also re-appointed. The Committee was then elected, consisting of the following gentlemen:—Messrs. Arblaster, Barclay, Bellamy, Brown, Grieves, Jones, Haydon, Morris, Partridge, W. Southall, A. Southall, J. Green.

The following books were reported by the Librarian new additions to the Library:—"Roscoe's and Schorlemmer's 'Chemistry,' vol. ii, part 1 and part 2; Cooley's

'Encyclopædia of Practical Receipts; and 'The National Dispensatory,' Stillé and Maisch.

The report of the Local Government Board, an abstract from which appeared in the *Birmingham Post*, was then referred to by Mr. Barclay, who pointed out that the report was calculated to produce an impression on the minds of the public injurious to the chemist. The chemist was not likely, as stated in the report, to sell paregoric without opium, having no inducement to do so, since he has the legal right to vend poisons. The real culprits were hucksters and unqualified sellers of drugs, who sold a so-called paregoric without opium in order to evade the Pharmacy Act, a practice which was likely to be productive of much mischief to the public as well as injury to the chemist; the weakness of sweet nitre was well known to be due to the difficulty of the official process on a large scale, and the rapid deterioration of the product by keeping. With regard to cream of tartar, the impurity (sulphate of lime) complained of in the report, when present, was due to the practice of the wine producer, and not to fraud on the part of the chemist; again, the lead in tartaric acid, which the commissioners had reported, was not an adulterant at all, but an impurity present in minute quantity and difficult to altogether avoid, when made by the method adopted by many manufacturers.

Considerable discussion ensued, in which most present took part.

At the termination of the proceedings, the committee elected a *soirée* committee to conduct the *soirée* business, which should meet at an early date and settle the preliminaries. The Secretary reported that the Town Hall was bespoken for the 21st of January next, and as there was a strong desire felt for a good exhibition of processes apparatus, etc., an unusually interesting *soirée* is looked forward to.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

The first meeting of the session was held on Thursday, November 11, Professor Attfield, F.R.S., President, in the chair.

The election of officers for the ensuing session was proceeded with, Mr. Caley and Mr. Evans being appointed scrutineers.

The result of the election was as follows:—Vice-Presidents, Mr. Robert H. Parker, Mr. David Hooper; Secretary and Treasurer, Mr. Wyndham R. Dunstan; Committee, Mr. William Elborne, Mr. John O. Braithwaite, Mr. Richard H. Groves, Mr. Charles Thompson.

A vote of thanks to the retiring officers, proposed by Mr. Hooper, and seconded by Mr. Job, was carried unanimously.

The President then explained the objects of the Association, and welcomed new members, urging them to work for the Association by reading papers, thus indirectly obtaining benefit themselves. The subject of "Chemical Constitution from the point of view of the Student of Pharmacy" was introduced by the President, who after defining and describing the subject generally, alluded to and explained some of the principal difficulties which a pupil commencing the investigation of the subject would experience.

A discussion followed, in which Messrs. Mitchell, Davies, Lewis, Bird, Braithwaite and Parker took part.

A vote of thanks to the President for his communication, and for the continued interest which he takes in the Association, was proposed by Mr. Groves, and seconded by Mr. Braithwaite, and carried unanimously.

Parliamentary and Law Proceedings.

PROCEEDINGS UNDER THE PHARMACY ACT.

PHARMACEUTICAL SOCIETY *v.* D. B. JOHNSTONE AND CO.

In the Bloomsbury County Court, on Wednesday, November 17, Messrs. D. B. Johnstone and Co., of Edgware Road, were sued for a penalty of £5, incurred by them in selling or keeping open shop for retailing, dispensing, or compounding poison, to wit, "chloral hydrate," contrary to the provisions of the Pharmacy Act, 1868 (31 and 32 Vict. cap. 121).

Mr. Flux appeared for the Society, and Mr. Ryland appeared for the defendants.

Upon the defendants' solicitor applying for an adjournment of the case, Mr. Flux stipulated for an undertaking on the part of the defendants not to sell poisons in the meantime, and this being agreed to, an order was made accordingly.

Adjourned to December 2, at 12 o'clock.

A second action, brought by the Pharmaceutical Society against G. J. E. Copping, of 18, Stockport Road, Manchester, in the Manchester County Court, in which the plaintiffs sued the defendant for a £5 penalty, incurred by his having kept open shop for the sale of poisons, has terminated by the defendant paying into court the amount of the penalty and costs.

PROSECUTION FOR SELLING PATENT MEDICINES WITHOUT A LICENCE.

On Tuesday, November 9, at the Petty Sessions held at Market Harborough, John Simon Rochard, of Kibworth, described as a chemist,[*] was charged by John Hearne, supervisor, with having sold or exposed for sale certain patent medicines without having a licence.

Defendant pleaded guilty, but in extenuation stated that he went to Leicester for the purpose of taking out a licence, but was referred to Stamford in Lincolnshire, and in the hurry omitted to look further after it. Defendant alleged that Mr. Brown (a chemist in the same village), who had been the means of proceedings being instituted against him, was not actuated by any affection for the revenue, but from a very different motive obtained a licence on September 1.

It was stated that the Bench under the Summary Jurisdiction Act had the power to reduce the fine *ad libitum*, and defendant was fined in the nominal penalty of 5*s.*, and 16*s.* 6*d.* costs.—*Leicester Chronicle.*

STRANGE CASE OF ALLEGED POISONING.

On Friday the 12th inst., Mr. J. Humphreys resumed an investigation, at the Leigh Hoy Tavern, Hanbury Street, Whitechapel, into the circumstances attending the death of Cornelius Sullivan, aged 26, which took place on the 16th ult. The deceased was in the service of Mr. Stevens, a herbalist, of Osborne Street, Whitechapel. He complained, on returning home, of feeling faint and being sick, and stated that his employer had given him a powder which he had taken. Medical aid was sought, but death was almost instantaneous. An inquiry was subsequently made as to the nature of the powder given to the deceased, and it was ascertained that Stevens also died suddenly the same day.

Dr. Sterling made a *post-mortem* examination of the body of Sullivan. Believing poison to be the cause of death, he preserved the stomach and its contents for analysis, and the inquiry was adjourned for this purpose.

The supplementary evidence taken yesterday was that of Frederick Webb, a coachman, living in Gloucester Road, Regent's Park, who said he had an attack of liver complaint on the 9th of October last, and was recommended to Stevens for advice. Witness received a powder, for which he paid 2*s*. He was ordered to put it into a pint of water, and take three teaspoonfuls four times a day. On Sunday morning he took the first dose, and immediately afterwards he was unable to grasp anything, felt giddy, and his features became contracted—so much so that his wife screamed when she observed them. Witness went to a qualified medical practitioner, who at once informed him he had taken poison, and administered an emetic, which afforded him relief. Witness wrote to Stevens demanding the return of 2*s*., and enclosing his medical man's bill. Stevens took no notice of the letter, and witness called upon him, and saw him in his shop. Stevens still refused to refund the money, and witness said he had a portion of the powder with him, and he would have it analysed. Stevens said he had no poisons in his shop, and in order to convince him took three teaspoonfuls of witness's powder. Stevens also called in Sullivan, who, he said, would take a similar dose. Witness said that was unnecessary. Sullivan, however, took a dose. This was all witness knew of the matter until he read the deaths of Stevens and Sullivan in *The Standard*.

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[*] There is no such name on the Register of Chemists and Druggists.—Ed. Ph. J.

Dr. Tidy, of the London Hospital, said he received a jar on October 19 from Dr. Sterling, containing the stomach and parts of the intestines. In the stomach were 8oz. of a thick yellowish fluid. The stomach was considerably congested, and inflammation was running through all the coats. On further examination he found mineral and organic poisons, a considerable quantity of lobelia, and definite traces of aconite, and a hot material, which he thought was pepper. It was difficult to tell whether lobelia or aconite was the cause of death, but either or both would destroy life, as both were active poisons. Aconite being the more powerful of the two, would, perhaps, have been the more likely cause of death, which was beyond doubt due to poisoning.

The Jury returned a verdict to the effect that the cause of death was due to poisoning, but under what circumstances it was taken there was not sufficient evidence to prove.—*Standard.*

The Use of the Word "Pyretic."

LAMPLOUGH *v*. BEEDZLER.

In the Court of Appeal of the Supreme Court of Judicature, at the Sittings at Lincoln's Inn, on Friday the 12th inst., before Lords Justices James, Cotton and Lush, this case came on for hearing.

It was an appeal by the plaintiff from the refusal of the Master of the Rolls to grant an injunction to restrain the defendant from infringing the plaintiff's registered trade marks, from selling any chemical preparation in wrappers having printed on them any imitation of the plaintiff's trade marks, and from using in connection with the manufacture and sale of any chemical or other preparation any wrappers or labels containing the words "pyretic saline," either alone or associated with other words, or any wrappers or labels so contrived as to lead to the belief that the article manufactured by the defendant was the manufacture of the plaintiff. The plaintiff is a chemist carrying on business in Holborn, and is the manufacturer of a compound which has been well known for many years as "Lamplough's Pyretic Saline." He has always used the words "pyretic saline" in connection with his own name, but he alleged that his article had always been known in the market by the name of "pyretic saline." The plaintiff had registered the words "pyretic saline" as a trade mark, and he has also registered a label of a more elaborate character. The defendant is a wholesale and retail chemist trading as John Beedzler and Co., in Norton Folgate. He sells an article of his own manufacture which he describes on his labels as "John Beedzler and Co.'s Salubrious Saline or Health Giver," and the label also described it as "an excellent pyretic antibilious and headache effervescing saline." The Master of the Rolls in June last, held that the plaintiff's trade mark had not been infringed, that the defendant had not been guilty of any fraud, and that what he had done was not calculated to deceive. His Lordship, therefore, refused the injunction. The plaintiff appealed.

Mr. Aston, Q.C., and Mr. E. Brodie Cooper (with whom was Mr. Ince, Q.C.), for the appellant, contended that the words "pyretic saline," which had been registered by the plaintiff as his trade mark in addition to the whole label, were distinctive, and formed a good trade mark, and that if these words were not a good trade mark the labels used by the defendant were deceptive.

Mr. Chitty, Q.C., and Mr. Jason Smith, for the defendant, contended that the word "pyretic" was purely descriptive, and appeared in dictionaries as long ago as 1775, as equivalent to "febrifuge." As a merely descriptive word it could not form a valid trade mark, and no monopoly could be claimed in it by the plaintiff, who, in order to obtain relief, must prove that the defendant had himself committed fraud or had enabled others to do so.

Mr. Aston, Q.C., replied.

Lord Justice James said there was no pretence for saying that the plaintiff's trade mark had been taken by the defendant. Was there any ground for saying that the defendant had attempted to pass off his goods, not as goods of the same kind or as rival goods, but as the goods of the plaintiff? In his Lordship's opinion there was not, and it was impossible for any one by means of the defendant's labels to pass off his goods as the plaintiff's goods. No part of the one label could be said to bear any resemblance to the other. The appeal must be dismissed.

Lord Justice Cotton was of opinion that, assuming the plaintiff's trade mark to be a good one, there had been no infringement of it by the defendant. As to the other point, his Lordship thought there was more room for reasonable doubt. The question was whether, from the use of the word "pyretic," the defendant had done that which was calculated to induce people to believe that his manufacture was that of the plaintiff. It was not necessary that there should be a fraudulent intent, for every one must be held responsible for that which, upon the facts known to him, was the reasonable and probable result of what he did; he could not be heard to say that he did not intend to deceive. The case turned upon the question what the use of the word "pyretic" by the defendant was calculated to do. It was not a mere fancy name, but a word descriptive of that which was useful in curing or preventing fever, and it was used by the defendant in that part of his label which was essentially descriptive of the qualification of the article which he manufactured, not as a name of the article itself. In his Lordship's opinion, if a man took a really descriptive name and annexed it to an article which he manufactured, and it became known to the general public only from his use of it, as a word descriptive of the article, still he was not entitled to complain if another person used the word as descriptive of his manufacture, provided that he did not attempt to palm off his goods as those of the first maker.

Lord Justice Lush said that if the term "pyretic saline" was a trade mark, a proposition to which he did not wish to say that he assented, yet in his opinion there had been no infringement of it by the defendant. The only question was whether the defendant's label was a fraudulent imitation of the plaintiff's. Was it so clear an imitation that a person of ordinary intelligence, buying the defendant's goods, would suppose that he was buying the plaintiff's? That was the test. But there was not a single paragraph or sentence in the defendant's label resembling the plaintiff's. If the plaintiff had given to his article a fancy name, a word which had no meaning, the case might have been very different. But the word "pyretic" was to be found in our vocabularies a century ago as descriptive of the qualities of an article, and a man could not, by using such a descriptive word in this way, obtain a monopoly of it. There was no other resemblance between the two wrappers, and a person of ordinary capacity and intelligence would not be deceived into buying the one for the other.

The appeal was accordingly dismissed, with costs.

POISONING BY "BABY'S MIXTURE."

On Monday last, Mr. C. Maynard, coroner, held an inquest at New Seaham, touching the death of Caroline Heppell, daughter of George Heppell, miner. From the evidence it appears the deceased was one month old, and had been ailing for a few days. Dr. Beatty saw the child, and under his treatment the symptoms got better. On Thursday night the deceased becoming restless, the mother gave it half a teaspoonful of a "baby's mixture," made by a man named James Paisley, a workman at the colliery, and who keeps a small shop. A neighbour named Kirkbride made up the "mixture" with an addition of aniseed, loaf sugar, and boiling water, giving it to Elizabeth Heppell, sister of the first witness, who in turn gave it to a little girl, seven years, old, sister to the deceased, with instructions not to administer more than half a teaspoonful. The baby's mixture was sold by a a girl thirteen years old, daughter of James Paisley, to a son of the witness Kirkbride, a mere boy. After the child had taken the mixture it became worse, and died a few hours afterwards. Dr. T. C. Beatty, who had seen the child since its death, was of opinion that death had resulted from opium poisoning.

James Paisley said he made the laudanum up with 24oz. proof spirit, 4 oz. distilled water, and ¾oz. opium. He bruised the opium. He had a patent medicine licence, but no licence for making up this mixture.

The jury returned the following verdict:—That the deceased died from the injudicious administration of laudanum; and Paisley be censured by the Coroner, and warned as to any future sale. Paisley was then called into the room and admonished by the Coroner. On Paisley promising to cease the making up and sale of the noxious drug, the proceedings terminated.—*Newcastle Daily Chronicle.*

Reviews.

EIN BEITRAG ZUR KENTNISS DES LEVULINS, TRITICINS UND SINISTRINS. Von ADOLF WEYHER v. REIDEMEISTER. Dorpat. 1880.

This pamphlet contains the "Inaugural Dissertation" written by the author for the obtaining of the title of "Magister der Pharmacie" from the Faculty of the University of Dorpat. It has for its subject three substances that apparently perform similar functions in different plants, namely, levulin, an indifferent body occurring in the *Helianthus tuberosus*, and occupying a place between inulin and fruit sugar analogous to that of dextrin between starch and grape sugar; triticin, occurring in the couch grass; and sinistrin, occurring in the squill. These three bodies, notwithstanding that they correspond in appearance and in most of their properties,—showing only a difference in their behaviour towards polarized light and some reagents,—have been attributed to different groups of carbohydrates, and there has been a difference of opinion expressed as to their behaviour towards polarized light. The author's experiments, which are very numerous, lead him to the opinion that triticin is an isomer of saccharose, whilst levulin and sinistrin belong to the dextrin group. He failed to prepare triticin or sinistrin optically inactive, his products rotating polarized light to the left, though to a less degree than stated by previous experimenters, and this rotatory power he believes to be due, not to impurity, but an inherent property of these bodies. When boiled with water triticin is readily decomposed, being partly converted into fruit sugar, but levulin and sinistrin are only broken up by water when heated to 100° C. in closed tubes. By the action of yeast, however, levulin is more rapidly decomposed than triticin or sinistrin.

THE WORKSHOP COMPANION: A Collection of Useful and Reliable Recipes, Rules, Processes, Methods, Wrinkles and Practical Hints for the Household and the Shop. New York: The Industrial Publication Company. 164 pp.

This volume, although a small one and low priced, has an advantage over many of its more pretentious competitors in the evidence it presents of the truth of a statement in the preface that it has been prepared with very great care, the chief aim being to give none but recipes which will not disappoint those who attempt to use them. It has no doubt fallen to the lot of many of our readers after running down a recipe to be deterred from attempting to use it through some absurdity or distortion which has accrued to it during its passage through the hands of successive compilers. Without committing ourselves to endorsing all that is stated in the book, and notwithstanding a little looseness of expression that is met with here and there, we may say that it appears to be a very handy little volume, and shows considerable originality. The way in which some of the subjects are grouped together and preceded by a practically written introduction may be seen from two sections that have been quoted in full in this Journal: "How to use Glue" and "Cements" (vol. x. pp. 712 and 834).

Although published in New York we presume the work could be obtained through some of the London agents for the American publishers.

LONDON SMOKE AND FOG: With Some Observations on the Country Parson's Grate and other Modern Fireplaces. By FREDERICK EDWARDS, jun. London: Longmans, Green and Co. 1880. 8vo. 20 pp.

The pretext for the publication of this pamphlet is the attention which has recently been directed to the subject of fog and smoke in London; but the author must be an exceptionally sanguine man if he thinks that the hundred lines in which he discusses this subject throw much light upon it. Assuming, as is the fashion, that smoke and fog stand in the relation of cause and effect, he, in this short space, passes in review various methods proposed for the diminution of the production of smoke,—such as the burning of gas, coke, or anthracite coal, the taxation of open fire places, heating by hot water or air, etc.,—and dismisses them all as impracticable in favour of a smokeless stove burning from above, upon the Arnott principle, but modified by the author. In presence of the fact that the fogs which have visited London during the last two or three years have been very different from the sooty irritating fogs of ten or twenty years ago, and have not been much unlike fogs that occur in localities where little or no coal is burnt, it would be just as well to have some of the evidence upon which the assumption that the occurrence of fogs could be controlled in such a manner is based. The greater part of the pamphlet deals with the relation between ventilation and modern fire-places, and points to a similar conclusion in respect to the author's invention. On the whole we do not think much loss to the public would have been incurred by the postponement of the publication of the pamphlet until it could have been included in a forthcoming volume, of which it is intended to form a chapter.

PROFESSIONAL BOOK-KEEPING. A Treatise for Non-Traders. By WILLIAM JOHN GORDON. London: Wyman and Sons. 1880.

Although from the statement rather ostentatiously set out on the title page that this little work is intended for non-traders, it might be supposed not to present much interest to pharmacists, such a conclusion would be incorrect. It is true that the scheme of accounts it contains has been designed to "meet the special requirements of legal, medical and similar businesses in which gross profits are represented by receipts for services rendered." But the author is not one who dogmatizes in favour of a particular scheme; for he starts with the admission that there is no reason why a man should not design his own system of book-keeping. A system of account-keeping that would suit one trade, would be cumbersome or ill-adapted to another; whilst even in the same trade the detail that would satisfy one man would be utterly insufficient in the eyes of another. The merit of this treatise lies in the fact that in a section on "Principles," and another on "Details," the reader is helped to understand first the objects that should be sought in book-keeping and then the best methods of attaining those objects, and is thus enabled to select those best adapted to his special case.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[451]. I fail to see that Mr. Brown has proved satisfactorily that a chemist should either in this or any other instance dispense corrosive sublimate when hyd. chlor. is prescribed. As I take, it a chemist's duty is to follow the nomenclature of the British Pharmacopœia. We find there "hydrargyri chloridum" as a synonym for "hydrargyri subchloridum," and I should myself consider a dispenser (especially one who is aware that calomel is applied in the dry state to the eye) much in error, who made use of corrosive sublimate in the prescription quoted. The present edition of the Pharmacopœia has been in use for many years, and, presumptuous as it may appear to say so, I think the prescribers should, equally with the dispensers, adhere to the nomenclature (including synonyms) adopted by the representatives of their own profession as the most suitable for use in this work, which, as stated in the preface "is intended to afford to the medical profession and those engaged in the preparation of medicines throughout the British Empire one uniform standard and guide, whereby the nature and composition of substances to be used in medicines may be ascertained and determined."

EDWARD H. STORRY.

[451]. I consider that the dispute as to the chlorides should be set at rest by a full discussion carried on in a friendly spirit through the medium of this Journal.

Mr. Brown still persists in his statement that hydrarg. chlor. is hydrarg. bichlor. He quotes as his authority Sir Robert Kane. Does he mean to infer that the B.P. is to be cast on one side and that the dispenser is to consult, instead, Sir Robert Kane's work?

Mr. Brown goes on to say that the argument in the "Month" is not altogether to the point in asserting that calomel if used as a powder might also be used in solution. He bases his objection on the ground that if calomel were used in this manner, the quantity would be so small that it would be of very little value as an eye lotion

Is it not just as probable that the prescriber may have intended that a weak lotion should be made, and wrote to that effect? Besides, this lotion contains also ext. opii, which adds to its strength.

The U. S. Pharmacopœia seems to be Mr. Brown's "guiding star," for he says that this pharmacopœia is far superior in many respects to the B.P. I do not wish to dispute with Mr. Brown on this point, for I think that some alterations are required in our Pharmacopœia. But the point at issue is reduced to these few words:—Is the U. S. Pharmacopœia or the B.P. to be taken for our standard? Mr. Brown seems to infer the former. I would suggest to J. G. P. S. that if possible he should endeavour to ascertain from the writer whether calomel or corrosive sublimate was intended.

T. G. M.

[451]. I dispensed the prescription with calomel, but my assistant, like Mr. Brown, said hyd. perchlor. (or chloral hyd.) was meant, and it was for his satisfaction that I put the question to the Journal. I have dispensed the same prescription many times and know that calomel is meant.

Preston. J. G. P. S.

[465]. If "John" refers to his Latin dictionary, he will find that aq. bull. means *boiling* water, not *cold* water as dispensed by him, hence the sediment he complains of.

H. A. T.

[465]. "John" should have implicitly followed the direction of the prescription by using "boiling water," he would then have obtained a clear mixture without sediment.

Pot. chlor. is only sparingly soluble in cold water (1 in 16), whilst in boiling water its solubility is 1 in 2.

Oundle. F. DAVIS.

[465]. I cannot possibly see what object "John" could have in view in using cold water when aqua bulliens is so distinctly ordered. "John" is surely aware that potass. chlorat. is not soluble to the extent of 80 grains in ℥iss. aqua. Squire says that potass. chlorat. is soluble in cold water 1 in 12, in boiling water 1 in 2. No wonder the customer brought it back and complained of the sediment of undissolved potass. chlorat.

T. G. MORRIS.

[468]. In dispensing the following prescription should the liq. Fowleri be neutralized, or the hydrate of iron allowed to be precipitated with a "shake" on the bottle?—

℞ Ferri. Dialysati (Wyeth and Co.) . ʒiv.
Liq. Fowleri . . . . ♏ 40.
Aquæ . . . . ad ℥vj.
M. Sig. One measured tablespoonful thrice daily.

Q.

[469]. Could you give me in your next issue a formula for hypodermic solution of ergotine?

PROVINCIAL CHEMIST.

[470]. The following recipe was given me as a specific for toothache. I was told also that it made a clear preparation. I have tried it several ways, and after each it separates into three distinct layers. Can it be prepared to present a decent appearance?—

Gum. Camph. . . . . ʒj.
Chloroform. . . . . ℥ij.
Liq. Opii Sed. . . . . ʒiv.
Alum. Ust. . . . . ʒij.
Spt. Vini Rect. . . . . ℥iv.
M.

T. P. J.

[471]. I should be glad to know whether a chemist would be justified in refusing to dispense the following prescription, which was presented a few days since. It was thought possible that teriodide of nitrogen might be

formed. If so, need any care be exercised in dispensing it so as to prevent an explosion?—

℞ Lin. Iodi Co. . . . . ℥j.
Lin. Camph. Co. . . . . ℥j.
M. To be rubbed in three times a day.

DARTMOOR.

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[472]. What should I use for aq. caryophyllæ? My dispensing unfortunately had not the appearance of that previously sent out.

F. S. M.

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[473]. What is the usual custom in England when a physician orders sulphate of iron in pills; is the granulated or dried sulphate used?

Dublin. EUONYMIN.

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[474]. Will some one kindly inform me of the best method of preparing the enclosed prescription and oblige?

2 drachms of powdered Alum.
7 „ „ Nitrous Spirits of Ether.

Mix well together and apply to the tooth affected.

Wrotham. W. H. WATKINS.

Notes and Queries.

[687]. DECOLORATION OF LAVENDER WATER.—Would any of the readers of the Journal tell me how to get the colour out of some very high coloured lavender water? Animal charcoal has not the effect.

S.

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[688]. SALICYLIC ACID.—I wish to draw the attention of pharmacists to the quality of the salicylic acid used for dispensing purposes (it having been stated that considerable disappointment and vexation are at times experienced by the medical profession, owing to impurities when the commercial kind has been used), and I also wish to ask whether it would not be well to use only the pure natural salicylic acid obtained from the oil of wintergreen (*Gaultheria procumbens*), salicylate of methyl. No doubt the pure natural acid is more expensive, costing at the present time 42*s.* per lb. against 9*s.* 6*d.* for the commercial kind, which is used with so much advantage as a preservative and antiseptic. Still, I think that for medicinal purposes the pure natural acid should be adopted, and I am assured that it can be produced in quantity almost on the same terms as the commercial variety.

35, *Baker Street, W.* A. W. POSTANS.

[⁂ There can hardly be any doubt that an adequate supply of the natural acid would be forthcoming were there any considerable demand for it. In 1871 Mr. Broughton (*Pharm. Journ.*, [3], ii., 281) reported to the Indian Government that the essential oil obtained from the *Andromeda Leschenaultii*, a plant growing commonly in the Neilgherries, consists of methyl-salicylic acid, with even less of accompanying hydrocarbon oil than is present in Canadian oil of wintergreen. So abundant did he consider the supply of this oil obtainable that he proposed to use it in the manufacture of carbolic acid (*Pharm. Journ.*, [3], ii., 503). Dr. De Vrij also has stated that an essential oil closely resembling oil of wintergreen is yielded by species of *Gaultheria* growing plentifully on the mountains of Java.—ED. PHARM. JOURN.]

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[689]. GINGER ALE.—Can any of the readers of the Journal give me a good form for the essence used in the manufacture of ginger ale?

J. B.

Correspondence.

⁂ ***No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.***

THE LOCAL GOVERNMENT BOARD ON THE ADULTERATION OF DRUGS.

Sir,—I crave space in your columns for a few remarks on the subject of the recent report issued by the Local Government Board on the Adulteration of Drugs.

I will first simply state my own experience. In the early part of this year I was honoured by a call from an inspector, who purchased from me samples of tartaric acid and cream of tartar for analysis. They were supplied to him in the proper way. He at the same time stated to me that he had procured similar samples from two tradesmen in the place who sold drugs, one a saddler and the other a general dealer. Some weeks after I was informed by the same authority that the drugs supplied by me had been pronounced pure, and those supplied by the other two tradesmen, adulterated; that there had been a long discussion between the magistrates as to whether they (the tradesmen) should be prosecuted, and that it was finally decided to warn them.

I do not wish by this statement to pretend that I supply better drugs than my brethren in the trade do; nothing of the sort. Twenty-five years' experience convinces me that the vast majority of druggists are careful and conscientious in the conduct of their business. What I wish to convey is, my impression, nay, my belief, that upon investigation it would be discovered that the great majority of the adulterated samples of drugs alluded to in the Local Government Report had been procured from persons who had no special qualification for dealing in them.

To conduct the drug trade properly, even in the simple sale of a drug over the counter, requires a special education, and the Legislature has recognized this fact, though it does not follow out the logical consequences of its own act, inasmuch as it does not sufficiently support those who legally qualify themselves.

The drug trade cannot be taken up and carried on by persons who know nothing about it without damage to the public, and the sooner this fact is recognized the better.

"*Ne sutor ultra crepidam*," and true as the old saying may be with regard to the shoemaker, it is far more pointedly true with regard to medicine and the man who deals in it, inasmuch as the results of error in one case ar far more serious than in the other.

K. K.

THE FUTURE OF PHARMACY.

Sir,—There can be but little doubt that the volume recently issued by the Council of the Pharmaceutical Society to its members and associates in business, entitled 'Progress of Pharmacy,' and bearing upon its cover the all-respected names of Bell and Redwood, has received more than a usual share of attention.

Borne to us, as it were, upon the flowing tide of troublous times, it has been eagerly grasped in the hope of finding within its pages some talisman wherewith to effect release or relief from a desperate situation.

Although it may not bear the imprint of the magic characters, it may be asked can the thoughtful reader lay it aside believing that its issue will have been in vain? Is it a book, and nothing more than a book, a merely interesting story of old times pleasantly retold in which he has but a passive interest? Or is it, rather, a history of battles fought and won—of tough encounter and glorious victory—of lives —even the lives of many noble men spent in unselfish contest for the welfare of a future generation? If such a tale is true shall it be said that these things were done to no purpose, and the brilliant examples of those who have gone before have borne no good fruit? Let him who continues this history of progress tell as impartially as they to whom we stand indebted for these first lines have done, and the world will judge. Let us, on our part, recognize the absolute and immediate necessity of united and unflinching conflict, and the world will not have to judge harshly.

Coming so soon after the issue of the 'Progress of Pharmacy,' Dr. Langdon Down's stirring address follows in natural sequence fitting in exactly with it, so that it may almost be said to be the first chapter in a new volume. That there should be considerable argument upon this point may very reasonably be expected; already Mr. Elliman, in your issue on the 16th ult., takes exception to that portion of Dr. Down's address which, to others, appears the most defensible, and in supporting his position gives a list of proprietary articles, to some three or four of which probably, Dr. Down himself could find no objection.

From the multitudinous columns devoted to the cataloguing of patent and proprietary remedies, it is easy enough to select a few and hold them forth to the community at large saying, are not these evidences of progress? and there would be none to dispute the fact. Whilst taking the self-same columns as they stand, the Patent Medicine Act as it is framed, and the trade as it is generally worked, it will not be easy to prove any other than that these are the fatal weights which have clogged the progress of pharmacy ever since the 16th clause of the Pharmacy Act became the law of the land.

It is far better to recognize the truth, and it stares us in the face. The Patent Medicine Act is a mockery to our boasted civilization, and it is suicidal for us to defend it. The present situation has been largely contributed to by our own sympathetic natures in allowing others to do that which we can equally as well do for ourselves; this too without the protection of a complacent Government, which for the sake of an impost of about 10 per cent., would allow a shoe-black to dispense his paste blacking, in the form of pills, to cure all the diseases which ancient and modern pathology, combined, had ever attempted to diagnose. Nothing but humiliation can be the outcome of our fostering a system of charlatanism which we in our respective positions should have been the first to expose. It seems highly probable now that trade competition will bring about that which moral instinct has failed to do, and, providing we are united in telling the truth we need not fear the effects of our enforced veracity. In that portion of our business which is undisputably a trade, we should seek to place before the public the results of our own labour and energy, and in cases where medicine is sold, to claim for it no mysterious virtues, nor hesitate to state exactly what it contained. The most unenlightened amongst our customers could scarcely fail to appreciate this line of action although, at first, they may not understand it. Such a course of procedure does not take long to break down the prejudices of the British public, and even in these turbulent times will insure the success of the individual who pursues it. The question as to the future of pharmacy admits of no such solution and, regarding the recent legal decision, is perfectly chaotic, the only thing certain is that if the present state of affairs undergo a much further development there will be no future to pharmacy, and consequently no progress to report.

In reading carefully Messrs. Bell and Redwood's book it is noticeable that whenever trade interests were threatened in the slightest degree a public meeting of energetic and able men was the immediate result, generally followed by a circular addressed to the whole of their country brethren. It is now more than three months since a decision was given which, for aught we know to the contrary, will improve one-half of our number from the face of the earth, and yet so far as I am aware there has not arisen from our midst the indignant expressions of even one public meeting. How much more shall we suffer before we seek a remedy? Mr. Long urges the necessity of agitation as being the only true solution; let those of us who agree with him unite to form a public gathering which, I venture to predict, will not be wanting in number. At such a meeting it might be possible to come to some conclusion as to what should be the most desirable course to pursue in order to arrest what we still believe to be an entire setting aside of the Pharmacy Act of 1868. At the same time, it would be desirable to do nothing which might render the difficult position of the Pharmaceutical Council still more difficult. It must be remembered that it is through their action alone that we can hope for success, and whilst there are murmurings of an apparent inactivity at headquarters it should also be borne in mind that the gentlemen who are our chosen representatives are, most of them, in the same position as ourselves, and, like ourselves, subject to and sufferers from every phase that the question has undergone from its commencement to the present crisis.

Kilburn, N.W. CHARLES B. ALLEN.

A QUERY.

Sir,—An occasional customer of mine, whom I will call A. states the following case:—Several years ago A.'s mother (since deceased) had a physician's prescription for diarrhœa dispensed by the local chemist, whom I will call Z., and the medicine proving effectual was regularly used by the whole family.

Recently A. requested Z. to make up a fresh bottle of the medicine, and also to let him have a copy of the prescription, the original having been mislaid or lost.

Z. replied that he would supply the medicine, but would require one guinea for a copy of the prescription.

A., who has all his life dealt regularly with Z, asks me if this demand is customary or justifiable.

Before replying to him, I should like an expression of opinion from some of your readers.

ACACIA.

THE TEACHING OF DISPENSING.

Sir,—With regard to the argument concerning the teaching of dispensing in the School at Bloomsbury Square, I was much pleased to see a "Member's" letter so ably responded to. I should have scarcely believed that anyone at all interested in the advancement of our profession would have offered the slightest objection to so excellent a proposition as that which Professor Redwood subjected to the Council of the Pharmaceutical Society recently. I am afraid that many candidates who present themselves for the Minor have a very rough and unskilful manner of dispensing, owing to their having received a very insufficient training from their late masters, not in all cases from his want of interest in them, but from his utter incapability to instruct them. I and others know this to our cost. Some chemists (as I know from sad experience) know a great deal more respecting cabinet making and the veneering process than they do about chemical reactions, practical pharmacy, or helping us to construe our Latin author. The result is that many are obliged to have recourse to cramming just a short time before their examination, and may manage to pass, when they are as little fitted to be chemists as to be solicitors, owing to the small interest their late employer took in instructing (?) them. The only way to obviate this is to enforce a fixed curriculum on everyone entering the business, either in the Society's School or in some other recognized school of chemistry and pharmacy, and also to make it compulsory for them to pass both Minor and Major examinations, and thus admitting only the thoroughly competent.

CUPIDUS RERUM NOVARUM.

Pill.—A tincture of the strength of 1 grain of podophyllin to 1 drachm of alcohol has been suggested by Messrs. Young and Postans. See vol. x., p. 300.

T. W. Collett.—Moore's Ointment is generally sold in market places and hucksters' shops. We cannot give you any information as to its composition. See vol. x., p. 40.

M. P. S.—The subject of citrate of iron has already been discussed in the "Dispensing Memoranda." See vol. viii., pp. 359 and 407.

J. G. P. S.—The change of colour which takes place in a mixture of fat and liq. plumbi acet. has been referred to on several occasions. See vol. ix., pp. 65 and 693.

K. Bohm.—Your recipe, as it is written, is not intelligible.

"*Assistant*" is referred to the rule respecting anonymous communications.

H. C. A. is recommended to read the botanical note that appear in this Journal in "The Month."

A. B. R.—The examination has no reference to particular books, but is designed as a test whether the candidate has received sufficient and suitable education. The questions for each Preliminary examination are published at the same time as the list of successful candidates. See, for instance, before, p. 353.

W. D.—In the way directed in all books on analysis. Dissolve it in water and keep the solution in a bottle well-corked.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Troughton, Marchant, Miller, Rowcroft, Stoakes, Trick, Dymott, Brady, Parry, Edwards, Feltness, One who is heartily sick of the Drug Trade, Pil. et Haust., Hydra fusca, Norsk, Resurgam, Retort, Filius, T. E. G., H. C. H.,

"THE MONTH."

When frost and snow commence at the end of October, there is but little chance of botanizing in November. The heavy snow storm on October 20 seems to have done great damage in various parts of the country, especially to oak trees, which seem to have suffered more than elms, their branches being strewed on the ground in abundance in many places. This may probably be accounted for, partly by the weight of snow supported by the numerous leaves still remaining on the trees, and partly by the greater leverage sustained by the spreading branches of the oak as compared with those of the elm, and by the heavy crop of acorns, which this year are unusually abundant. It is a singular fact, as noted in the *Gardeners' Chronicle*, p. 598, that domestic cattle will eat nothing else where they can get acorns, and they are being poisoned by eating them, as in 1874, death resulting from inflammation of the small intestines; while the deer, which also eat them, are not poisoned. The adaptability of the pine tribe to cold climates and snowy regions is very remarkable, as is manifest in the linear character of the leaves, which are not so likely to retain snow, while the arrangement of the branches seems also calculated, especially in the northern species, to cause the snow to glide off.

At the last meeting of the Linnean Society, Professor Henslow exhibited a curious monstrosity of the inflorescence of *Verbascum nigrum*, sent by Mr. Marshall, of Ely, in which the upper branches were developed in the form of leafy axes, forming an interesting illustration of the fact that flowers are only spirals of leaves condensed to the same level by the non-development of internodes and modified so as to be fitted for the purpose of sexual reproduction. In the lower part of the inflorescence the ovaries were very large and were adherent to arrested proliferous branches. This monstrosity was attributed to the tendency of the sap to rise to the extremities. Some years ago a somewhat allied case came under the writer's notice, in which a pear developed leafy growth and no seed; in this case the tree after being for some time badly nourished, had during the formation of the pears been furnished with an abundant supply of moisture. A similar proliferous growth to that exhibited by Mr. Henslow is mentioned by Baillon as occurring in *Lysimachia ephemerum* ('Adansonia,' vol. iii., p. 310).

Most plants may be said to have two methods of propagating themselves, the one by means of sexual organs, and the other by buds or gemmæ, either attached or deciduous. Ferns are known in some cases to produce buds on the surface of the frond; but Dr. Farlow has shown that these may occur also on the prothallia of ferns. In the *Gardeners' Chronicle* for November 6, p. 598, the editor mentions a case of this kind, in which buds occurred on the upper surface of the prothallium of a crested variety of *Athyrium Filix-fœmina*, the prothallium having archegonia, but no antheridia visible on the under side. This mode of growth would be classed by De Bary under "Apogamy." A correspondent in the same journal makes the interesting observation with regard to *Amanita muscaria*, the fungus from which muscarine is obtained, that the larger specimens increase very regularly about an inch in diameter every twenty-four hours, and grow at the same rate during the night as during the day.

In a recent number of the *Annales Agronomiques* (*Gardeners' Chronicle*, October 30, p. 566), M. Van Tieghem shows that the presence of too much moisture in the soil causes the formation of alcohol in the tissues of roots by depriving them of oxygen; in fact, that alcoholic fermentation depends on the suffocation of a living cell containing sugar. On examining the tissues of the root of an apple tree, diseased from this cause, he found that the medullary rays contained brown oily globules instead of starch sugar, the cells being tinged of a brown colour and giving off an easily detected alcoholic odour. It would have been interesting to know whether acetous fermentation follows the alcoholic, and precedes the formation of fungous growth.

Those who cannot read German and who are willing to learn something of the sieve tubes in plants, about which very little is said in most botanical works, will do well to read the review of Dr. Karl Wilhelm's recent book on the subject, in *Nature* for October 28.

In the *Practitioner* for November, Professor Tommasi-Crudelli, of Rome, gives an interesting account of the most recent investigations on the subject of malaria. From these it appears that in all the malarious districts of the Roman Campagna the *Bacillus malariæ* has been found in a fully developed state and could easily be obtained by artificial cultivation, but could not be obtained by any means either artificial or otherwise in some perfectly healthy districts. During the heat of summer this bacillus rises in such quantities in the atmosphere of malarious districts as to be found in large quantities in the sweat of the face and hands. The bacillus is always found in the blood in the cold stage of the fever. In the acme of the fever, on the contrary, the bacilli disappear and only the spores are found. The cause of this phenomenon is undergoing further investigation. The principal nidus of the parasite is in the marrow and spleen, the organs which produce the white corpuscles.

M. Duclaux, who has been entrusted by the French Minister of Agriculture with an investigation of the phenomena attending the industrial production of cheese, has presented a suggestive report to the Academy of Sciences, which shadows forth the possibility of controlling and multiplying the flavours and aromas of cheeses to an extent not less than that declared possible by M. Pasteur in the case of beers (*Comptes Rendus*, xci., 731). M. Duclaux states that the modifications of properties and flavour which lead up to the maturation of cheese are not spontaneous phenomena, but are due to the action of a number of ferments, which have the character of attacking nearly exclusively albuminoid substances. Of these ferments he has met with at least a hundred, but only about a score of them have yet been studied by isolation and cultivation after Pasteur's method. Some of these are aërobies,* others anaërobies, and others behave differently in this respect at different times. Cultivated in milk they transform the casein into soluble albumens, very nearly if not identical in constitution, and scarcely distinguishable in this respect. But what the aërobies effect by a slow and regular action the anaërobies accomplish by a disengagement of carbonic acid and hydrogen, a portion of the latter becoming sulphuretted hydrogen or even a phosphide of hydrogen, and causing the mass to acquire a putrid odour and taste. This would account for the practice, long followed and based upon empirical observation, of adopting such conditions in the manufacture of cheeses which are wished to mature slowly, as would by presenting to the air a surface large relatively to the volume favour the development of aërobies. The organized ferments, moreover, were found to secrete at least two soluble ferments, one coagulating casein, like rennet, the other resembling pepsine and converting casein into a kind of peptone soluble in water. The products of the soluble ferments are not savoury, odour and taste being the result of the action of the organized ferments, and according to M. Duclaux the quality of a cheese is dependent upon the relative proportions in which these ferments are present. The value of cheese as an article of diet would appear, therefore, to lie partly in its presenting to the stomach a semi-digested or peptonized aliment, together with an excess of soluble and organized ferments capable of existing and acting upon albuminous matters in the stomach.

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* The designation given by Pasteur to ferments which flourish in contact with atmospheric air.

In a paper on the cultivation and preparation of vanilla, by M. Jaillet, in the *Répertoire de Pharmacie*, he mentions that in the Island of Réunion the vanilla is supported by trees in the plantation, preference being given to the *Jatropha Curcas*, the tree producing the physic nut, owing to its easy and rapid growth and its abundant milky juice, well adapted to the nutrition of the vanilla plant. If there be any truth in this statement, then the poisonous effects of vanilla in some cases and not in others may be explained by supposing that the acrid matter contained in the *Jatropha* and most Euphorbiaceæ had been absorbed by the vanilla plant and acted on persons having an idiosyncratic sensibility to it. In Mexico, fig trees, which have a milky juice, are used as supports for the vanilla plant.

In the *American Journal of Pharmacy* for November, there is an instructive paper by Mr. J. C. Reeve, on the cinchona barks of American commerce, containing engravings of microscopical sections of the different barks. The author arrives at the conclusion that only 50 per cent. of the retail and 51 per cent. of the wholesale barks he examined were of the official kinds. Of twenty-two barks sold as true red cinchona only thirteen were *C. succirubra*. Of fifteen sold as true Calisaya, ten only belonged to that species, and of five barks sold as pale or grey bark only one belonged to *C. officinalis*. A similar investigation in this country would probably reveal that even a less proportion of the bark sold as yellow cinchona (*C. Calisaya*) belonged to the official species, and certainly that the proportion of quinine in the barks supplied to the retail trade is too often below the Pharmacopœia standard.

At the October Pharmaceutical Meeting at Philadelphia, Dr. F. B. Power exhibited specimens of the oil of *Asarum canadense*, or wild ginger, which he stated is being largely used by perfumers in flavouring tooth washes, and in soap making. By fractional distillation it becomes separated into several distinct portions, that coming over at the lowest temperature being isomeric with oil of turpentine, and the next having the composition of Borneo camphor. The portion which comes over at the highest temperature has an intensely blue colour, and is probably of complex composition. Professor Sadtler mentioned a case in which essential oil of mustard, imported from Russia, contained so much bisulphide of carbon as an adulterant that an explosion resulted in pouring it from one vessel into another. The oil always contains a small portion, whether made naturally or artificially; but this was in large excess, and was attributed by the maker to the employment of seeds of *Sinapis juncea*.

At a recent meeting of the Eure Pharmaceutical Society, in France, M. Lepage called attention to the adulteration of digitalis leaves with those of ploughman's spikenard. He points out that in the month of May the leaves of the two plants have such a close general resemblance as to be easily mistaken for one another by ignorant or careless herb gatherers. The leaves of digitalis are crenate and those of *Inula Conyza* serrate. He also states that while a weak infusion of digitalis (1 in 100) assumes a yellow colour on the addition of a few drops of ammonia, that of *Inula Conyza* assumes a green colour, which becomes deeper and deeper on standing, and can still be noticed in an infusion of digitalis containing less than one-third of the adulterant. The same reactions can be obtained with the tincture when sufficiently diluted with water. There is, however, another feature in the leaves which does not appear to have been noticed in the above paper, and that is that the nerves or prominent veins at the base of the blade in digitalis are distinctly decurrent into the petiole, while in *Inula Conyza* they proceed only to the midrib.

A case of poisoning by star anise is reported to have occurred in Leeuwarden, Holland, which presents considerable interest in consequence of a suggestion having been made that it was due to the substitution of the fruit of the Japanese *Illicium religiosum* for the aromatic fruit of the Cochin Chinese *Illicium anisatum*. Although a careful investigation as to the probable correctness of this suggestion only, gave negative results, the occurrence has given emphasis to statements on the subject which it would be as well to bear in mind at a time when a praiseworthy effort is being made to introduce Japanese drugs into the European markets.

It appears that, so far back as 1834, Professor J. Hoffmann published in Leyden a little-known work on the differences between these two plants, in which he says, "The fruit of this tree (*Illicium religiosum*), which occurs in China and Japan, and in the natural histories of both nations is classed among the poisonous plants, is not the true star anise, but probably through ignorance of the deceptive resemblance, is mixed with it, and by the dealers of those countries is used for its adulteration. The true star anise grows neither in China nor Japan, but is an article of import into both countries." This statement is said to be based upon a study of some fifty Japanese and Chinese works on natural history and medicine, in which several cases of poisoning by the fruit of *Illicium religiosum* are expressly mentioned.

A recent communication from Yokohama, by Herr Geerts (*Pharm. Zeit.*, September 1), also confirms this position. Herr Geerts reports that he has experimented physiologically both with the fruit and a thick yellowish oil obtained from it, which contained a large proportion of free fatty acids, and he found that when administered to dogs 2 grams of the powdered seeds acted as an emetic and 10 grams of the oil caused intense irritation of the stomach and intestines.

The plants which have been named respectively *Illicium anisatum* and *I. religiosum* are considered generally by botanists in the present day to be at most varieties, if not identical, and Bentley and Trimen ('Med. Plants') speak of the difference consisting in the fruit of the Japanese tree being somewhat less rough and having a sharper and more recurved beak. But a writer in the *Pharmaceutische Zeitung* (Sept. 1), using the initials T. H. (probably Professor Theodor Husemann), asserts that the Japanese *Illicium* bears poisonous fruit when introduced into China, whilst the Cochin China *Illicium* undergoes no change in the properties of its fruit when grown in that country. Altogether the subject appears to be worthy of further investigation, and meanwhile it will be well to put on record the following differences, besides the want of aroma, found in the Japanese fruit by Herr Geerts. The ends of the carpels of the Japanese fruit are pointed and curved upwards, whilst the apex of the star anise is mostly pressed in, and extended horizontally. The former, too, are much more woody, are rougher on the surface, and enclose much brighter and yellowish seeds; they are also compressed and more boat-like than the rosette-formed star anise. The smell and taste of the Japanese drug recall camphor or laurel berries, but not anise.

Dr. Vitali reports (*L'Orosi*, vol. iii., p. 259), a characteristic and delicate reaction of atropine and daturine, when either of these alkaloids is oxidized by means of nitric acid and caustic alkali. If the alkaloid to be tested be in the solid form, it is boiled for a few minutes with ten times its volume of strong nitric acid, and then the heat is continued at a lower temperature until all free nitric acid is driven off. Upon treating the cooled residue with a few drops of freshly prepared alcoholic solution of potash, a magnificent violet colour is developed, which passes in a short time to wine red and then muddy red. When the suspected alkaloid occurs in solution, the liquid is evaporated and the residue treated as the solid alkaloid. The test is said to be very delicate, and Dr. Vitali thinks it points to the identity of atropine and daturine. According to Ladenburg, however, they are only isomeric; but it would be interesting to know how hyoscyamine and duboisine, which he says are identical with daturine, and which Dr. Vitali does not appear to have examined, behave towards the test.

Chemical discovery appears to be jeopardizing the future of another important agricultural industry, and the synthetic production of indigo threatens to play the same part towards the indigo cultivators as that of alizarin did towards the growers of madder. It is only a short time since that the accomplishment of this synthesis in the laboratory was announced, and already a considerable advance has been made towards the carrying out of the operation on the commercial scale. The starting point is cinnamic acid obtained from storax, benzoin, or other sources, or itself synthetically produced according to known methods, and the successive steps of the process were demonstrated by Mr. W. H. Perkin, before the Chemical Society at its last meeting, and are described on a subsequent page.

The amount of metallic iron in a specimen of ferrum redactum can, according to O. Wilner (*Farmaceutisk Tidskrift*, August), be satisfactorily ascertained by treating it with an excess of concentrated solution of mercuric chloride at a gentle heat, when a separation of metallic mercury and mercurous chloride takes place, and the metallic iron passes into solution as chloride, and can be titrated with permanganate solution, leaving ferric and ferrous oxides undissolved. Three specimens that were examined in the laboratory of the Pharmaceutical Institute at Stockholm showed proportions of iron varying from 74·88 to 21·35 per cent.; ferrous oxide from 60·38 to 11·58 per cent.; and ferric oxide from 65·41 to 2·16 per cent.

Professor Warden, of Calcutta Medical College, reports (*Ind. Med. Gazette*, October 1), the results of a partial chemical examination of the root of the *Gloriosa superba*, an Indian liliaceous plant popularly reputed to possess poisonous properties. After the removal of two resins and a tannic acid precipitate from an alcoholic tincture of the root, there was obtained upon evaporation of the filtrate a bitter residue that Professor Warden looks upon as the active principle contaminated with resin. It was very toxic, ·047 gram injected into the stomach being sufficient to kill a full grown cat. This hypothetical active principle has been provisionally named "superbine." Considering that the plant belongs to the same natural order as the squill, and after comparing the physiological action of the two drugs, Professor Warden thinks it may be assumed that this active principle of the *Gloriosa superba* is closely allied to, if not identical with, that of the *Scilla maritima*.

From the *Calycium chrysocephalum*, a yellow lichen that grows on the oak, birch and pine, Dr. Hesse has separated a new neutral substance which he has named calycin (*Berichte*, xiii., 1816). The lichen is treated with boiling ligroin, and the resulting golden yellow solution yields upon cooling small prisms of calycin, which when purified by recrystallization are golden yellow. Calycin is nearly insoluble in cold ligroin, light petroleum spirit, ether, alcohol, glacial acetic acid, and acetic anhydride, somewhat more soluble in chloroform, and still more so in these solvents when hot. It melts at 240° C. (uncor.), sublimes unaltered and is represented by the formula $C_{18}H_{12}O_6$. Heated with solution of potassium or sodium carbonate or barium carbonate suspended in water calycin takes up a molecule of water and is converted into calycic acid, which is nearly allied to vulpic acid.

Liquid storax has been the subject of investigation by Dr. J. Biel, of St. Petersburg, who finds that coal tar benzin dissolves it with ease, and forms the best menstruum for freeing it from impurity, of which there is usually present about 10 per cent. As liquid storax is not at all soluble in petroleum benzin, it is suggested by the editor of *New Remedies* that purified liquid storax may form a useful means of distinguishing between the two benzins, or even detecting their admixture. At the Paris Exhibition there was exhibited in the Nicaragua and Guatemala courts a remarkably clear form of liquid storax, presumably obtained from *Liquidambar styraciflua*, resembling virgin honey fresh from the comb in appearance, which, at least, deserves examination.

Dr. J. G. Hess has found that cochineal contains a hard crystallizable stearopten or fat in various proportions; in that from Guatemala in the proportion of 17 per cent.; from Java cochineal, 7 per cent., and from Canary cochineal, 18 per cent. If this be removed from cochineal by alcohol previous to the extraction of carmine, he finds that the carmine obtained possesses a purer and more brilliant tint.

In the *British Medical Journal*, there is being published a series of articles on "Recent Studies in Therapeutics," which are worth reading by those pharmacists who have a demand for new drugs; the doses, uses, and formulæ, of the various preparations being given. In the issue of November 6, hydrastis and hydrastine are thus described.

Two new anæsthetics, methyl chloroform, CH_3CCl_3, and monochlorethylenchloride, $CH_2Cl,CHCl_2$, have been proposed by Dr. E. Tauber, of the Jena University. Methyl-chloroform is described as having a sp. gr. of 1·372, an odour like chloroform, and a boiling point of 167° F. Monochlorethylenchloride (for which it may be hoped some shorter name will be invented for daily use) has also an odour like chloroform, but a sp. gr. of 1·422, and a boiling point of 239° F. As yet experiments have been made only on animals, but these promise excellent results. Hopes are entertained that the latter of the two will present advantages over those hitherto in use. An account of the experiments that have been made is given in the *British Medical Journal* for November 13, p. 785.

Mr. Foulds, in a letter to the same journal (p. 797), recommends as an anæsthetic giving excellent results a mixture of 1 ounce of alcohol added to 2 ounces of chloroform, the two shaken together and mixed with 3 ounces of ether. Two to 4 drachms of this mixture are used for an inhalation. He claims that the mixture is much safer than chloroform alone.

Messrs. Gehe and Co., of Dresden, in their September Report, give a few notes of pharmaceutical interest. Aspidospermine, the alkaloid of white quebracho bark, of which the sulphate and hydrochlorate are not crystallizable, has been crystallized in the form of citrate. The yield of the alkaloid is stated to be only 0·3 per cent. of the bark.

Hyoscyamine is now being prepared in the form of sulphate, which is more soluble in water, and therefore more suitable for subcutaneous injection.

Belladonnine has for some time past been regarded in the light of a waste product, but the recent demand for homatropine and the discovery that it could be prepared from belladonnine has brought the latter into use for that purpose. The want of a cheaper mode of obtaining amygdalic acid prevents at present much reduction in the price of homatropine.

Benzoic acid is being prepared in Germany from benzoyl chloride, and hence it is said to be likely to fall in price. It becomes very necessary, however, in these days of artificially produced chemicals, that the physiological properties of the substances so made should be compared with those of the natural products. That there are differences of some kind is shown by the fact that the manufacturers of aniline blue prefer the benzoic acid made from urine to that made from toluol. How far the unsatisfactory results obtained in the treatment of diphtheria by benzoate of sodium may have depended on the source of the benzoic acid used in the preparation of that salt is also open to question. Attention has already been called by Messrs. Schering to the physical differences in the different benzoic acids of commerce (*New Remedies*, June, p. 173). The potassium salt of the acid prepared from oil of bitter almonds is easily soluble in alcohol, while that prepared from the benzoic acid of benzoin is insoluble.* In the benzoate of sodium, prepared from urine, the solubility is not constant, but varies between 1 in 1·7 to 2·6 of water. In that prepared from toluol 1·9 to 5 parts of water are required. Messrs. Schering attribute these differences to the acids being probably isomeric, and to impurities, such as chlorobenzoate of sodium. The salt prepared from benzoin, on the other hand, is stated to be uniformly soluble, whether the benzoic acid is prepared by the wet process or by sublimation. At 15° C. 1·7 parts of water were found by Messrs. Schering to invariably dissolve 1 part of the salt. It behoves pharmacists, therefore, upon whom physicians must trust for uniformity of result as regards the quality of drugs, to use only the benzoate of sodium and benzoic acid prepared from benzoin for medicinal purposes. In like manner the natural salicylic acid and salicylate of sodium, prepared from oil of wintergreen, should alone be used in dispensing and ordered in prescriptions if uniformity of result and reliability of operation be required.

A curious instance of the difference between natural and artificial chemicals is presented by valerianate of quinine, which according to Messrs. Gehe can only be prepared as a handsome salt if the natural acid be used. They state that new stock cannot be made at present owing to want of natural acid. There are, however, so many natural sources of valerianic acid that there should be no difficulty in obtaining it, provided that the acid from different natural sources possesses the same properties. The berries of the wild guelder rose, *Viburnum Opulus*, are powerfully odorous of valerianic acid, and the "kesso," or Japanese valerian, smells stronger of valerian than the English drug.

Another remedy for tapeworm, which is much relied upon by the natives in India, and is often sent over or brought over to this country in small samples, is the fruit of *Embelia Ribes*, a myrsinaceous plant. The small brownish striated fruit, rather less in size than peppercorns, are given in the form of powder and in doses of a teaspoonful for a child and a dessertspoonful for an adult. This remedy has already been described in this Journal by Dr. Dymock ([3], vii., p. 3), and deserves further investition, as the taste is pleasant and slightly astringent, resembling tea, an advantage that does not belong to all anthelmintics.

Balsam of copaiba is still high in price owing to a deficiency of supply, and gurjun oil has been eagerly bought up in consequence. It is said that balsam of peru has lately been much adulterated with gurjun oil and resins. Surely pharmacists in this country have plenty of subjects that need investigation in matters relating to the drugs in daily use. The absence of interest in these matters by members of the trade, as shown by the dearth of papers on pharmacy, pure and simple, during the last year or two, indicates an apathy by no means calculated to win the confidence of the physician, or to raise the business of a chemist and druggist to that high position in the estimation of the public it should hold.

Chinese rhubarb also, owing to scarcity of the Shansi drug, and to the fact that the province of Szechuen has been invaded by the rebels, is likely to rise in price. Of otto of roses there is said to be a better supply than last year, the yield at Kijanlik being estimated at 300,000 meticals (a metical equals 4·8 grams, or 3 dwt. troy) as against 210,000 in 1879, the average product in this district being estimated at 400,000 meticals, while in a good year, as in 1873 it sometimes rises to 600,000.

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* Gregory, *Ann. de Chemie*, 87, p. 125.

Among various novelties referred to in Messrs. Gehe's report is "tonga,"* for which a botanical source was sought to be defined by Mr. Holmes last May.† According to information lately furnished by Mr. Christy concerning the source of this article, and as having been received from Dr. Bancroft of Brisbane, it appears that it is not to be regarded as the product of any particular plant, but rather as a kind of herbalist's composition powder, for which a formula was obtained by a German resident in one of the Fiji Islands, who suffered from neuralgia and sought relief by trying the effect of the leaves, bark, fruit, and roots of every plant growing wild upon the island. By this enterprising and eclectic method it is reported that he eventually arrived at a combination from which he wishes to make what profit he can; and we learn from the September report of Messrs. Gehe and Co., that this remedy appears in commerce as a fluid extract. It would appear from this that "tonga" is less a subject for pharmacological study than an addition to the repertory of secret preparations.

The announcement that the Corporation of the City of London has entered into contracts with three companies for the lighting of the principal streets and bridges of the city by the electric light, marks the considerable advance which this method of illumination has made in public estimation. Indeed, it would really appear from the demonstration which took place at the last meeting of the Newcastle Literary and Philosophical Society (see before, p. 360), and repeated on Wednesday evening before the Society of Telegraph Engineers, that the lamp problem and that of the subdivision of the light have been at last satisfactorily solved by a pharmacist, Mr. Swan, of Newcastle, and that the greatest need at the present time is a convenient means of storing electricity. It is not surprising that just at this crisis a letter which has appeared in the *Times* from Mr. Preece, alleging that already the deaths of two persons are known to have been caused by shock through contact with wires in connection with an apparatus supplying current to a Jablochkoff's candle, and also that the use of the electric light in mines would sometimes involve conditions favourable to the production of explosions, has attracted considerable attention. Mr. Swan alluded to this letter in his presidential address to the Newcastle-upon-Tyne Chemical Society, and said that even admitting that the deaths had resulted from shock, which he considered by no means proved, he did not think that the extreme views put forward by Mr. Preece as to dangers consequent on electric lighting in general could be sustained. The machine which supplies a Jablochkoff's candle gives alternating currents, the physiological effect of which is undoubtedly severe, but the machines more generally used give a direct current, which only causes a slight shock upon breaking contact. Mr. Swan demonstrated practically the harmlessness of the direct current by holding the wires from a dynamo-electric machine for some minutes. With respect to the risk of accident in mines through disarrangement of the wires, Mr. Swan admits that in the case of a lamp breaking, or wires coming accidentally into contact in a gas-laden atmosphere, there would be a danger of explosion, but he thinks Mr. Preece has exaggerated the danger, and that a preferable course would be to examine the difficulties with a view of seeing whether they could not be overcome.

As bearing upon the influence of electric light upon plants it may not be without interest to some of our botanical readers to recall a curious experiment performed by M. Schott, Director of the Botanical Gardens at Vienna, who to suit the whim of the Emperor Francis Joseph made the night-blooming cereus flower by day instead of at night. This was done by causing the plant to be shaded, and finally excluded from light during the day, and subjecting it to the action of electric light at night, so that the habit of the plant became reversed, in consequence of which it flowered between nine and ten o'clock in the morning, in July. This was so long ago as 1850. This plant (*Cereus Bonplandii*) is now being used in the United States in functional diseases of the heart.

Mr. Henry Faulds, of Tsikiji Hospital, Tokio, contributes an interesting letter to *Nature* (October 28, 1880, p. 605) concerning the skin furrows of the fingers. He finds that not only are these different in the Japanese and English, but even in different families and individuals, and suggests that this fact might be turned to account in medico-legal investigations for the identification of criminals. The author states that on one occasion he discovered by the means of greasy fingermarks the person who had been drinking some rectified spirit. But there is nothing new under the sun, for after many patient and original experiments, he learned that the Chinese criminals in early times had been made to give the impressions of their fingers, just as we make ours yield their photographs.

Probably many who have been unwise enough to put vulcanized indiarubber articles and instruments into the shop windows have found to their cost that such articles crack and become brittle, and lose their elasticity. This, according to a Russian journal, may be prevented by immersing the articles for a few minutes to half or one hour, according to the requirements of the case, in a mixture of 1 part liquor ammoniæ with 2 of water until they resume their former elasticity, softness and smoothness.

A new form of gutta percha for instruments, etc., has been devised by Mr. G. Fleury. In warm countries, such as Algeria, surgical appliances made with gutta percha become in a few months so brittle as to be useless. He found that by mixing 9 parts of gutta percha with 1 of camphor, a soft product is obtained, which can be welded at about 136° F., and which when cold is cohesive and elastic.

From the discussion which has followed the publication by J. G. P. S. of the prescription containing "hyd. chlor.," it is evident that there existed considerable difference of opinion as to what was intended by the prescriber, and there would have been consequently great diversity of practice on the part of those chemists into whose hands the prescription may in due course have fallen, and it is satisfactory now to find from a subsequent communication of J. G. P. S. that he knows the prescriber's intention was that calomel should be used.

The free discussion of such a subject should be conducted without anything of a personal nature. The presumed object of the writers of those queries which appear every week in this department of the Journal is to obtain from others whose experience may be larger the requisite information for their guidance, and the sole object of the summary in "The Month" is to afford that information and to review generally the views of different dispensers on the questions at issue. It is not, therefore, too much to ask that in any remarks on the views of correspondents the subject matter alone should occupy the more prominent, if not the only place. Further than these observations there is nothing to add to and nothing to alter in the conclusions expressed last month with regard to the prescription in question, and it may be considered another instance of the desirableness, if not the necessity, of a more careful study of the British Pharmacopœia, and more especially of the synonyms given in that work. Changes do occur in the nomenclature of successive Pharmacopœias, but as they have no stated periods of issue they are not abreast of advanced chemical science.

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* See *Pharm. Journ.*, [3], x., 770, 849.

† *Ibid.*, 889.

Mr. J. B. Kent, No. 461, requires the best solvent for quinæ salicylas. He has been answered by three correspondents, and whether those answers be satisfactory or not, he should be reminded that he has not accompanied his question with full particulars. He has not stated whether he requires the best solvent for quinæ salicylas, or the most suitable, if not the best, for quinæ salicylas in a mixture; the one requirement would necessitate a reply in the abstract, the other might have evoked one more to the purpose had the circumstances under which the difficulty occurred been mentioned. It is soluble in hot water and also in spirit.

The recipe No. 462 is typical of some which are occasionally placed in the hands of the chemist to prepare. Hydrochloric acid has little or no action on iodide of mercury. They should be mixed together, the antimonial wine added, and a "shake the bottle" label attached to the bottle. The white calx of mercury ointment is an ointment of hydrarg. ammoniatum of the B.P. This subject has on a former occasion been discussed.

In prescription No. 463 the acetate of lead throws down the colouring matter, with some extractive, from the decoction of poppies. The acetate of lead should be dissolved in water previously to its being added to the decoction of poppies. The flocculent precipitate cannot be avoided; it will form in that combination. Although there would appear to be a chemical incompatibility, it still possesses medicinal activity. The combination is not unusual as an injection, but the mixture is not so elegant as could be desired.

Prescription No. 465 contains more chlorate of potash than the fluid will retain in solution. It is true that the prescriber has added boiling water, but the dispenser, aware that if a larger quantity of a salt be dissolved by heat the excess will crystallize out, and that the crystallization will not necessarily stop at the point of saturation, but continue until there is little salt left in solution, will not use hot water, but will rub down the salt to as fine a powder as possible, and direct the bottle to be shaken before the dose is poured out. Dispensers, to whom the pharmacy of the different medicinal agents should be familiar, are not expected blindly to follow the directions of the writer of the prescription, as was hinted at by Dr. Langdon Down, when he stated that the time is not far distant when the medical man will have to leave all that relates to pharmacy to those whose education has specially qualified them to undertake it.

The liniment of No. 466, although it forms a good temporary emulsion, will, on standing, separate more or less, and as the attar of rose is only faintly perceived in it when freshly prepared, it is scarcely to be wondered at that it finally disappears entirely.

In making liniments, such as that of No. 467, the order of mixing very much influences the result, and it would have rendered the inquiry more interesting if Mr. Walton had stated more precisely how he mixed the ingredients in the first instance, when the result was a transparent liniment, and what was the particular change which he afterwards made. Much will depend on the strength of the acetic acid used. Further information on a liniment containing the same ingredients, will be found in a paper contributed to this Journal two years since (vol. ix., p. 505) by Mr. Symons, which may be read by Mr. Walton with advantage.

In dispensing prescription No. 468, the liq. Fowleri should not be neutralized, and if the hydrate of iron be thrown down from Wyeth and Co.'s ferri dialysat., a "shake the bottle" label must accompany the mixture.

In reply to an inquiry by a "Provincial Chemist," No. 469, for a hypodermic solution of ergotine," that preparation known as "Bonjean's Ergotine, is usually employed. A preparation for the same purpose by M. Yvon will be found in the 'Year-Book' for 1878.

The recipe No. 470 will not make a clear solution and is likely to differ in appearance when made up in different establishments, dependent to some extent upon the make of the liq. opii sedat. used.

A chemist would not be justified in refusing to dispense the prescription No. 471, unless he had satisfied himself by previous experiment that an explosion resulted from mixing lin. iodi comp. and lin. camph. comp. "Dartmoor" should have determined this point for himself and then his communication would have been more interesting. At present it lacks the important element of experiment. Were teriodide of nitrogen formed it would not explode in a moist state and no such accident would be likely to follow the preparation of the prescription. "Dartmoor's" attention may be directed to the German formula for tinct. iodi decolorat.

Aq. caryophyll., in No. 472, is the water drawn over from cloves just in the same manner as dill or cinnamon; it is more elegant than inf. caryoph. and devoid of its colour. It is very probable that at no distant date the aq. caryoph. will find a place in the B.P. to the exclusion of the infusion. The water is slightly opaque from the presence of the oil and is very pungent.

It is at all times difficult to say what is the custom in England as regards many points in dispensing, these columns testify that opinions are much divided. In reply to "Euonymin" the granular sulphate of iron should be used when sulphate of iron is ordered, and it may be made into pills with glycerine of tragacanth. Sometimes the ingredients will admit of the dried sulphate only being used, in which case it should be used in the proportion of 3 grs. for every 5 of the crystallized salt.

The ingredients of recipe in No. 474 should be put together in a bottle, and the powdered alum shaken up every time it is used. It was once considered a specific for toothache, but whether toothache has changed its characters or later remedies have superseded this recipe, it is now rarely used; perhaps it has lost the reputation it once possessed.

RESORCIN AND ITS THERAPEUTIC USES.*

Some eighteen years ago a new chemical compound was obtained by Hlasiwetz and Barth,† of Vienna, from certain resins by the action of fusing alkalies. The discoverers gave it the name resorcin, partly from the fact that it is derived from a resin, and partly because it has some similarity to orcin, a peculiar substance derived from archil. Some time afterwards, Körner‡ prepared resorcin synthetically by treating paraiodophenol (obtained from dinitrobenzol) with fusing potassium hydrate; but since then many other and cheaper methods of preparing it artificially have been discovered. Regarding the chemical constitution of resorcin, it is meta-dihydroxyl-benzol $C_6H_4(HO)_2$. Pyrocatechin is the ortho- and hydroquinone is the para-compound.§ Resorcin, like all phenols forms neither acids nor ketones by oxidation. The hydrogen of the hydroxyl in resorcin can be replaced by metals, but carbonic acid gas again separates the resorcin from the salts. Alcohol and acid radicals can also take the place of the hydrogen of the hydroxyl.

The tabular prismatic (orthorhombic) crystals of resorcin, when rubbed or struck in the dark, appear phosphorescent, a phenomenon which has not been mentioned by any chemist. Its melting point is variously placed at 99° C. (Hlasiwetz and Barth); 104° C. (Oppenheim and Vogt); 118° C. (Calderon); and its boiling point is given as 276·5° C. by Calderon and 271° C. by Naumann. At 300° C. it is decomposed, leaving a carbonaceous residue. Its spec. grav. at 0° C. is 1·2727.

Solubility.—100 parts of water dissolve about 86·4 parts of resorcin at 0° C. (Calderon). It is easily soluble in all liquids, excepting carbon disulphide and chloroform. It has a peculiar odour, resembling phenol, and a peculiar sweetish-bitter taste. Ferric chloride colours its aqueous solution dark violet; chloride of lime produces the same tint. Acetate of lead added to pyrocatechin produces a white precipitate; none, however, with resorcin, which is isomeric with pyrocatechin. Ammonio-nitrate of silver is easily reduced by resorcin. On boiling a solution of resorcin with manganese dioxide and sulphuric acid, no odour of quinone is produced: difference from hydroquinone with which it is likewise isomeric. To prove the identity of resorcin it is only necessary to heat a small quantity of the latter with some phthalic anhydride for half an hour to 200° C. On adding now ammonia, there will be developed a beautiful fluorescence, owing to the formation of fluoresceine. Another reliable test is Liebermann's reaction with nitrous acid, which leads to magnificent

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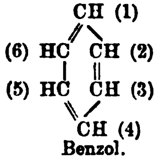
[*] Abstract of a pamphlet by Dr. Justus Andeer, of Würzburg. Reprinted from *New Remedies*, September, 1880.

[†] *Annal. Chem. and Pharm.*, 130, 354. See also Malin in the same journal, 138, 76.

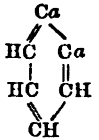
[‡] *Comptes Rend.*, 63, 564.

[§] NOTE BY THE EDITOR OF N. R.—For the benefit of those of our readers who have not followed the advances of modern chemistry, the relationships between resorcin, hydroquinone, and pyrocatechin may be thus explained: Benzol is a compound containing C_6H_6, each molecule of which has the atoms of carbon and hydrogen so arranged that the group CH follows each other six separate times, being bound to the preceding group by two and to the succeeding group by one bond. Now a molecule is a compound existing in space, and has therefore three dimensions; yet, as it is not known what particular stereometrical shape the molecule has, nor if known, possible to draw it accurately, it is customary to project the constituent parts of a molecule upon a plane surface (paper, blackboard), in form of a diagram or drawing, and to indicate by lines the number and directions of the bonds. It should be distinctly understood, however, that this mode of projection is only a makeshift, and leaves out of consideration the fact that the molecule is stereometric. The benzol-molecule, then, may be thus represented:

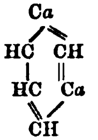


Benzol.

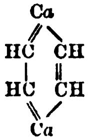
In this scheme, the figures in brackets are added only to the purpose that the particular atom of hydrogen which we may wish to designate may be pointed out by the number placed opposite. Each atom of hydrogen in this nucleus may be replaced by a monatomic atom or compound radical; and not only one atom may be thus replaced at a time, but several or even all together. Let us now assume that two hydrogen atoms are replaced by a monatomic radical *a*, and let us begin the substitution at 1, passing round on the right: we obtain three possible modifications, which are the only ones possible, as it would have made no difference if we had begun the substitution at any other H but that marked 1. We therefore obtain the following three compounds, which are distinguished by the prefixes ortho-, meta-, and para-, placed before the special name of the compound:



Ortho-Series.

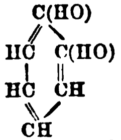


Meta-Series.

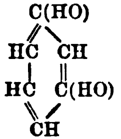


Para-Series.

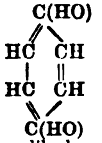
The ortho-series, then, is that in which two successive hydrogens are replaced, the meta-series that in which one hydrogen is left intact between two replaced hydrogens, and the para-series that in which two hydrogens are left intact between two replaced hydrogens. We will here refrain from inquiring into the possible forms of these three series, if three atoms of hydrogen are replaced at the same time. Now pyrocatechin, resorcin, and hydroquinone are three isomeric substances, having the composition $C_6H_4(HO)_2$; yet they are chemically quite different. Pyrocatechin is benzol in which hydrogens Nos. 1 and 2 are replaced by HO; resorcin is benzol in which hydrogens Nos. 1 and 3 are replaced by HO; and hydroquinone is benzol in which hydrogens Nos. 1 and 4 are replaced by HO, thus:



Ortho-dihydroxyl-Benzol or Pyrocatechin.



Meta-dihydroxyl-Benzol or Resorcin.



Para-dihydroxyl-Benzol or Hydroquinone.

In order to produce resorcin, however, it is advantageous to start, not from benzol, but from phenol or carbolic acid, which is nothing else but benzol in which hydrogen No. 1 is replaced by HO. The particular compound of phenol which yields resorcin most easily is paraiodo-phenol, which, when melted with potassium hydrate is oxidized to resorcin:

$$C_6H_4I.HO + KOH = C_6H_4(HO)_2 + KI$$

Paraiodo-phenol + potass. hydr. = Resorcin + potass. iodide.

Yet this method is rather expensive on account of the requisite iodine, part of which is apt to be wasted or lost. It is preferable to first convert the phenol, by means of sulphuric acid, into a compound which may be termed meta-phenol-sulphuric acid (the proper name is metaphenolsulphonic acid), and the salts of which, when melted with caustic alkalies, yield resorcin. Or, according to Jos. Bersch, vapours of pure benzol may be conducted into sulphuric acid heated to at least 240° C. (= 464° F.). At this temperature the benzol as well as the sulphuric acid are decomposed and a new compound is formed, namely the benzol-disulphonic acid, which has the composition $C_6H_4(SO_2.HO)_2$. This acid is transformed into a sodium salt and melted with caustic soda, thus:

$$C_6H_4(SO_2.NaO)_2 + 2NaHO =$$

Sodium benzoldisulphonate + Soda =

$$C_6H_4(HO)_2 + 2\ Na_2SO_3$$

Resorcin + Sodium sulphate.

blue and red colours. It strongly coagulates both egg and blood albumen. The coagulum emits vapours of ammonia when heated to 122° C. On raising the temperature to 170° C., a sky-blue colouring matter is produced, which covers the inner walls of the flask with a resinous coat. The same blue substance, which may be called resorcin blue, and which is soluble both in water and alcohol, is also formed when resorcin is treated with urea. Heating over 170° C. destroys this blue colour.

Dr. Justus Andeer, of Würzburg (from whose pamphlet* we have abstracted the contents of the present article), concluded from the relationship of resorcin to phenol that the former body might possibly possess antiseptic properties similar to the latter. His preliminary experiments showed that it requires rather strong solutions of resorcin to arrest fermentation; yet a $1^\circ/_0$ solution will prevent the decomposition of urine, even if exposed to the air for months. On the other hand, even a dilute ($1^\circ/_0$) solution of resorcin is an energetic destroyer of the organic germs of putrefaction. Its efficiency was proved not only by applying the solution to putrescent matters directly, but also in this way, that some putrescent substance was injected into or otherwise caused to be absorbed by living animals, and the morbid symptoms afterwards arrested and removed by the application of resorcin.

Resorcin is not absorbed by the healthy, unwounded skin, nor does it, even when violently rubbed into it, either discolour it or produce symptoms of irritation or relaxation. Hypodermic injections, containing $2^\circ/_0$ of resorcin, produce, in fat and well nourished persons, no reflex symptoms, but in lean and nervous persons, painful cramps and nervous twitchings are observed. Abscesses have never been noticed. Concentrated solutions, when injected into the muscles, produce sometimes more or less decided symptoms of poisoning, at other times none at all. The effect is particularly severe when a larger vessel or lymphatic gland has been injected. Applied to the lips it produces no effect as long as they are dry; if they are wet, a white blister is raised. It does not affect the substance of the teeth.

Pharmacological Effects of Resorcin.—1. In abnormal fermentative processes, which are usually termed "putrefactive," it has proved to be a good antiseptic.

2. A 1 per cent. solution of resorcin prevents the decomposition of pancreas, blood, urine and other easily putrescible substances. They retain their natural odour.

3. A 1 per cent. solution of resorcin soon arrests already existing decomposition; whether this is accomplished by a direct destruction of the cause of decomposition or by coagulating the fluid which nourishes it has not yet been determined.

4. In septic processes artificially produced in animals, resorcin (in 1 per cent. solution) acts, without local or constitutional effect, just as well as carbolic acid, without sharing the disadvantage of the latter, or of pyrogallic acid, to be absorbed by the circulation, and thereby causing an injury of its own.

5. Stab or cut wounds, purposely made in animals, if treated with a 1 per cent. solution of resorcin, always heal by first intention.

6. Wounds of the cornea, conjunctiva, gums, and other mucous membranes which are artificially irritated and infected by micro-organisms, after being cauterized with resorcin, heal quickly without permitting the development of vital pathogenous germs or bacteria below the scab.

7. Artificial, subepidermoidal, or cutaneous abscesses or erysipelas yield to a proper treatment with resorcin often in two or three days.

8. Resorcin, in 1 to 2 per cent. solution, has as little effect upon the healthy skin or mucous membrane as pure water, and never causes an eruption.

9. Resorcin is borne as well or better than any other antiseptic, particularly by the organs of respiration, which it does not in the least irritate.

Indications.—Resorcin is valuable in surgical technic in general, and in dental practice especially. It is an excellent remedy by way of inhalation. Administered by spray it neither irritates the eyes of the operator (as carbolic acid does) nor the patient, and is almost odourless in this form. In abnormal fermentative processes of mucous membranes, a 1 to 2 per cent. solution speedily arrests the phenomena. It is also valuable as a caustic for catarrhal, tubercular and syphilitic sores, in which cases it is best used in form of crystals applied to excrescences, particularly on mucous membranes; it removes them painlessly, and restores the membrane in three to four days to its normal condition. In form of powder or crystal it is a most efficient remedy in diphtheritic affections. A close observation and control of all cases treated for two years past with resorcin has furnished only positive results. The most difficult cases of this disease were cured in at most one week, completely and without injurious consequences.* In purulent discharges of the sexual organs and of the ears, resorcin acts differently according to the nature of the discharge. If the latter is purely septic or is a hypersecretion, a 1 to 3 per cent. solution of resorcin acts as an efficient antiseptic; in purely fermentative discharges it is almost inert, and in mixed forms only moderately effective.

Dose and Mode of Application.—The usual dose for an adult, in mild cases and at the beginning of severe cases, is 1 to 2 grams (15 to 30 grains), in more severe cases, 3 to 5 grams (45 to 75 grains) dissolved in 100 gm. (about 3½ fl. oz.) of water. These doses may be divided and be taken at intervals during the day, as a preventive against toxic influences.

The average maximum dose of resorcin, which is about 5 gm. (75 grains), either dissolved in 100 gm. of water or in powder, should only be given in exceptional cases, that is, such where smaller doses have already been given previously with gradual increase, or where the quantity of septic material is comparatively large.

For exhibition in fluid form the best vehicles are alcohol, glycerin and syrup of orange. But it is preferable to exhibit it in powder enclosed in wafer or gelatin capsules, whereby its peculiar taste is completely masked. The following formulæ can be recommended:—

1. *Mixture* (*Mistura Resorcini*).

℞	Resorcini puri	0·5 gm.	8 grains.
	Aquæ destillatæ . . .	100·0 „	3 fl. oz.
	Syrupi aurantii . . .	30·0 „	1 „

M. *Dose.*—A tablespoonful every two hours.

2. *Emulsion* (*Emulsio Resorcini*).

℞	Resorcini puri	0·5 gm.	8 grains.
	Amygdalæ dulcis . . .	20·0 „	5 ʒ.
	Syrupi aurantii . . .	30·0 „	1 fl. oz.

Fiat emulsio. *Dose.*—A tablespoonful every two hours.

3. *Powder.*

℞	Resorcini puri . . .	0·3—0·5 gm.	5—8 grains.

To be given in wafer or gelatin capsules.
Dose.—One powder every two hours.

4. *Resorcin Gauze*, 1½ per cent.

For 1 kilo (2⅕ lb.) of gauze use:—

Resorcin	15·0 gm.	½ oz. avoir.
Glycerin	150·0 „	5 „
Alcohol	450·0 „	1 lb.

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* 'Einleitende Studien über das Resorcin, zur Einführung in die Praktische Medicin.' Von Dr. Justus Andeer, in Würzburg. 8vo. Würzburg, 1880.

* The medical profession is to be warned to be careful in trusting to the reports on the effectiveness of such new remedies in diseases like diphtheria, since a case might possibly have been saved by trusting to old and well-tried remedies. Yet if, by careful trials, the profession should come to the same conclusion as the author of the above paper, there can be no doubt but that resorcin would have a great future as a remedial agent.—Ed. N. R.

5. *Resorcin Cotton*, 3 per cent.

For 1 kilo (2⅕ lb.) of cotton batting use:—

Resorcin	30·0 gm.	1 oz. avoir.
Glycerin	70·0 „	1⅓ „
Alcohol	100·0 „	3½ „

6. *Resorcin Spray.*

℞ Resorcini puri . . .	5·0 gm.	75 grains.
Aquæ destillatæ . .	1000·0 „	32 fl. oz.

FOOL'S PARSLEY (ÆTHUSA CYNAPIUM).*

BY JOHN HARLEY, M.D.

It is often said that medicine can never become an exact science. It would be much nearer the truth to say, that such an education as the ordinary medical man receives, or such knowledge as he commonly acquires, can never lead him to be scientifically exact. His ordinary acquirements are too often but a cloak to his ignorance, and it follows that when he is called upon for scientific information he is apt to impart the crudest errors; the common practice ensures impunity, assertion takes the place of facts, and a didactic assurance carries more enforcement than knowledge.

These reflections seem harsh, but who can deny their truth? They are suggested on the present occasion by referring to my previous paper, in which I have given an analysis of all the published cases of reputed poisoning by fool's parsley. Here we witness, on the one hand, the animus of an ancient prejudice, and, on the other, a deplorable ignorance of the first object of these observations—the *Æthusa Cynapium* itself. From this review, and from my own study of the plant, I was led to the unavoidable conclusion that it was perfectly harmless. Shall we say that the three hundred years of horror, loathing and hate cast upon this now innocent little plant have at last purged it of its vices; or must we dejectedly confess that so much emotion has been so long and so ignorantly wasted? I think we are bound to make the confession. What a lesson to those who, with as much reason, erect their prejudices into altars whereat to sacrifice the best feelings of their nature!

The observations in my previous paper had reference to the juice prepared from Essex-grown plants of the year 1867, and to tinctures derived from fruits, both green and dry, grown in different localities, in Sussex and Kent, and in three different seasons.

A notion prevails, I believe, to some extent, that locality and season have a great influence in developing or repressing the qualities of the poisonous umbelliferous plants, but I know of no fact which bears out that idea. It is said, for example, that hemlock is eaten as a salad in Russia. Well, even in England, where the poisonous properties of hemlock are fully developed, the horse or the ox may browse upon the juicy plant to the extent of at least a pound of young leaves without showing any of its physiological effects, and even man may eat an ounce of the herb without experiencing any appreciable degree of coneism. But we have yet to learn that hemlock is used in any part of the world as a salad, for there are the "greater" and the "lesser" hemlocks, and a reference to medical literature will show how easy it is to confuse them and how often this has been done.†

The lesser hemlock (*Æthusa Cynapium*) might well be eaten as a salad in Russia or any other part of the world. That it has been so used seems to me very probable. Fool's parsley is a domestic plant. Like the house sparrow, it everywhere invades our homesteads, and it is rarely or never found in the wild uninhabited parts of the country. Nay more, it seems to have the same association with the Roman stations in this country as the *Smyrnium olusatrum* has with the Norman castles of a later age. Verulam, Richborough, and Thanet are notable instances, St. Albans especially, for there is no weed more common there than fool's parsley. I will leave the philologist to determine whether the prefix "fool's" is to be taken as indicative of a thing to be avoided, or a thing to be loved, as "my pretty fool," and will pass on to give further evidence of the harmlessness of the *Æthusa Cynapium* for the benefit of those who may be still in doubt, or who are likely to be misled by those who have written more recently on the subject than myself. My previous paper seems very little known. One eminent medical jurist, the late Dr. Taylor, indeed, has expressed himself as satisfied with the evidence which I have adduced; but when I turn to other writers on toxicology I find them transcribing the old story, and promulgating errors which I thought I had fully exposed seven years ago.

It is thus with von Boek in Ziemssen's 'Cyclopædia of Medicine,' who, unwittingly perhaps, adds to rather than diminishes from the error in quoting the following:—"In 1869 five members of one family became ill from eating a veal pie which had been flavoured with fool's parsley instead of ordinary parsley (Chevallier)."*

"Flavoured," merely flavoured! Oh, pernicious plant, worse than the worst, even aconite itself!

A foreigner may be excused for his ignorance of a few facts in English literature, but the same indulgence can scarcely be accorded to his English translator.† For the sake of contrast, the reader will perhaps allow me to transcribe the summary, almost entire, of the properties of fool's parsley as given in this most recent work on toxicology. The authors say "the leaves of fool's parsley have been eaten by mistake for common parsley, and the roots for parsnips. The plant may be known from true parsley by its producing, when rubbed, a nauseous odour. It is a narcotico-irritant poison. It is a poison to animals. Six ounces of the juice introduced into the stomach of a dog and secured by a ligature killed it in one hour. In the human subject it has caused death in one hour. Nausea, vomiting, stupor and insensibility, dysphagia, muscular tremblings, dilated pupils, and lockjaw have been observed." Then follow six illustrative cases, the evidence in which, amongst others, I have criticised and shown to be fallacious in my previous paper.

Botanists trouble themselves as little with the facts as do the toxicologists, and so we find the latest writers on medicinal plants‡ reiterating the stereotyped errors—amongst others this—"The leaves of fool's parsley when bruised emit a peculiar, disagreeable odour, which is altogether different from that of parsley." The authors previously quoted, in strict obedience to precedent, make the same statement, and I dare to assume that neither of these four men ever bruised fool's parsley themselves in order to appreciate its qualities. If they had done so they would have found that the odour of the bruised leaves is not unpleasant, inasmuch as it is faint, and resembles that of parsley itself. Again, in reference to Orfila's stupid experiments, can a man in his senses infer anything of the action of a medicine by forcing it into the stomach and then tying a string tightly round the gullet and its nerves? The only way to bring people who make such inferences to a sense of the realities of the situation would be to put them in it. In such a case, and apart altogether from the reputed poison, how many would survive the hour? It is surely time to expunge such glaring absurdities from scientific literature. Here my criticisms end, and I will now adduce my facts.

1. *Juice of the plant obtained before flowering.*—June 4, 1874, between 5 and 6 p.m., I collected a few plants of *Æthusa Cynapium* growing in an old-established walled garden, shaded by trees, within a stone's throw of St. Alban's Abbey, and sloping to the south. The day had been dry and hot. The plants varied from four inches to

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* From 'St. Thomas's Hospital Reports,' vol. x.

† See my previous paper, p. 69, vol. iv, 'St. Thomas's Hosp. Rep.'

* Ziemssen, vol. xvii, p. 829.

† Woodman and Tidy, 'Forensic Medicine and Toxicology,' London, 1877.

‡ Bentley and Trimen, vol. ii, p. 124, 1880.

a foot high, were bushy and robust, and most of them just about throwing up a flowering stem. At night the roots were washed, and the plants placed in a deep vessel containing quarter of an inch of water. They were quite fresh in the morning, and between 9 and 10 a.m., that is, fifteen hours after they were gathered, they were crushed and pressed. To insure success the roots were crushed separately; they evolved more of the pleasant carroty flavour than the herb. The herb proved to be very succulent, as Mr. Walter Hemingway's statement will show:—

	lbs.	ozs.
Gross weight of herb	1	15½
Weight of expressed juice . . .	1	7¼
„ „ marc	0	7
	1	14¼
Loss	0	1¼
	1	15½

The expressed juice measured 23 ounces, and it was mixed with 7 ounces 6 drachms of rectified spirit. The turbid mixture was not filtered. After subsidence of the solid matter the juice was brightly clear, of the colour of pale sherry, and a pleasant taste. Five hundred grain measures evaporated to dryness on a water-bath yielded 20·3 gr. of varnish-like, orange-brown extract.

2. *Juice obtained from the plants in green fruit.*—The remainder of the plants in my friend's (Mr. Edward Beal's) garden were allowed to grow undisturbed and they finally attained a great size. On July 25 I pulled one of the finest of these plants (about three feet high) out of the ground, and during the afternoon chewed the washed root. It had a sweet taste, with a pleasant flavour resembling both carrot and parsley; it was tough and woody, and harder than pine wood to chew. I experienced no effects.

In the evening of August 7 the rest of the plants were dug up and sent to me entire. I received and examined them the same night. They were very finely grown, and heavy with fully formed, green, sweet fruit. Most of the plants were over 2½ feet high. Many had a dozen umbels. One plant was 4½ feet high, had eleven primary branches, and 173 umbels, and the stem at the base was half an inch in diameter.

The plants were crushed and subjected to strong pressure early next morning. The following is Mr. Walter Hemingway's statement:—

	lbs.	ozs.	
Weight of Æthusa Cynapium	12	10	
Weight of juice expressed . .	5	1	= 78 fluid ounces.
	7	9	
Weight of marc	6	15	
Loss	0	10	
	7	9	

The 78 fluid ounces of expressed juice were mixed with one third of its bulk (19 fluid ounces) of rectified spirit, making a total of 97 fluid ounces. The turbid mixture was not filtered. It was a very dark brownish-green, and after the subsidence of the solid matter the bright supernatant fluid was of a rich reddish-brown colour, darker than taraxacum juice, which, though free from bitterness it resembled in taste. Five hundred grain measures, evaporated to dryness on a water-bath, yielded 53 grains of dark, rather charred extract, for my water-bath had become dry.

3. *Observations on the juices of the immature and mature plants.* Being thus provided with carefully prepared juices of the young plant in its most succulent condition, and of the same generation of plants in their fully matured condition, I exhausted my supply upon four patients, one a little girl six years old, who took them in quantities ranging from 2 drachms to 2 ounces; myself, who took them in quantities ranging from 2 to 4 fluid ounces; and two other adults, who were the subjects of spasmodic torticollis. These two took one or other of the juices in doses ranging from 1 to 8 fluid ounces. Effects were carefully looked for, but there were absolutely none in either case after any one of the doses.

Further detail is superfluous, and I may say in conclusion that the *Æthusa Cynapium* of Sussex, Kent, Surrey, Essex, and Hertfordshire is not only absolutely free from the noxious properties attributed to it, but that it is pleasant all, to sight, smell, and taste, and, in the absence of the more fragrant and succulent plants, might well be used as a potherb or a salad. If any one should think differently of the plant of his locality, I will be ready to indulge his scruples, to test the matter with him, and satisfy him, as I have no doubt I shall be able to do, that my conclusions are independent both of locality and season, and that the only influence which these conditions have on fool's parsley, as on hemlock, is to increase or diminish its succulency.

THE STABILITY OF CALOMEL.*

BY PHIL. HOGLAN, PH.G.

In the *Druggists' Circular* for August, 1880, is a statement from M. Verne, a French pharmaceutist, on the stability of calomel, which statement is copied from the *Bulletin de Thérapeutique*. M. Verne finds that calomel mixed with chloride of sodium, sugar, or citric acid undergoes no change, and that therefore the asserted danger of prescribing them at the same time is fictitious. The conversion of calomel into corrosive sublimate by the chlorides of the alkaline metals, and also by the organic acids, has for a long time been a much vexed question; and the purpose of the following experiments was to discover the cause of the great discrepancies on this subject, and also to ascertain the correctness of M. Verne's assertion that "the danger of acid drinks when using calomel is pure prejudice."

Experiments.

A. Calomel was mixed with a solution of chloride of sodium, and after standing ten days, at the temperature of 78° F., the filtered liquid gave no evidence of the presence of corrosive sublimate by the stannous chloride test.

B. Calomel and citric acid were treated in the same manner, and after fifteen days the filtered liquid gave a slight greyish tinge with stannous chloride, indicative of the presence of corrosive sublimate.

C. Calomel and sugar were treated in the same manner, and after fifteen days no evidence of corrosive sublimate could be found in the filtered liquid.

D. Calomel and solution of chloride of sodium were maintained at a temperature of 98° F. (temperature of the body) for one hour, when the filtered liquid gave evidence of the presence of corrosive sublimate.

E. Calomel and sugar and calomel and citric acid treated in the same manner at the same temperature, also gave a reaction indicating the presence of corrosive sublimate.

F. Calomel and water, treated in like manner for three hours at 98° F., gave a very slight reaction with stannous chloride. Not so marked as previous ones.

These experiments show, first, that calomel is slowly converted into corrosive sublimate by water at the temperature of the body. Secondly, that chloride of sodium, citric acid, and sugar greatly promote the conversion of calomel into corrosive sublimate, and hence are more or less dangerous when present in the system with calomel. Thirdly, that the discrepancies in regard to the stability of calomel are, in part, accounted for by taking into consideration the temperature at which the experiments have been conducted. Fourthly, that at the temperature of the human body calomel is an unstable compound.

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* From the *Chemical News*, October 8, 1880.

The Pharmaceutical Journal.

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SATURDAY, NOVEMBER 27. 1880.

BOARD OF TRADE REPORT ON WEIGHTS AND MEASURES.

In this report of the proceedings and business carried out under the Act of 1878, it is again pointed out that it is the duty mainly of the justices and town councils to carry out the Act with regard to the inspection of weights and measures used in trade. Where practical difficulties arise and applications for assistance are made to the Board of Trade, the department continues to place before local inspectors its own practice or that of the principal districts of inspection, with the view of securing greater uniformity in the carrying out of the Act.

The suggestion of the Board that a uniform design of stamp should be used by inspectors in different districts has met with general approval, and it has been acted upon in a large number of places.

In regard to the stamping of weights and measures, it is also pointed out that the Act requires every weight and measure to have its denomination or an abbreviation of that stamped upon it in legible figures and letters, and in an appendix to the report the abbreviations allowed by the Board are given. In the case of apothecaries' graduated glass measures, they consist of a number indicating the capacity in fluid ounces, drachms or minims and the letters, fl. oz., fl. dr., or Min.

There is we think one point in connection with the stamping of graduated glass measures to which we may call attention as being likely, as things now stand, to cause unnecessary trouble. This is the character of the abbreviated denomination to be stamped on such measures. According to the Act every weight or measure is required to have its denomination stamped upon it in legible figures and letters. In the case of weights the compliance with this requirement has an obvious practical limitation according to the size of the weights, and this circumstance is recognized in the Act by the exception made where the small size of the weight renders the stamping with its denomination impracticable. In the case of measures, however, there does not appear to be any such exception made, and for the measures used in the sale of drugs the denominations of standards mentioned in the second schedule of the Act are fluid ounces, fluid drachms and minims, their multiples and aliquot parts being also recognized by the Order in Council of August, 1879.

In addition to the impracticability of stamping the denomination at all upon certain weights, it appears, as we learn from the late report of the Board of Trade, to have been found impracticable to stamp the full denomination on certain other weights, and that hence abbreviations are used. Neither the Act itself nor the schedules attached to it or to the Order in Council make any mention of such abbrieviated denominations as being proper to stamp on weights or measures for the purpose of making them conform with the law, and as usage appears to be the only authority for thus stamping weights it is not to be wondered at that inspectors sometimes differ as to the proper abbreviation to be allowed. Consequently in the report just referred to, a list of the abbreviations allowed by the Board of Trade for all new standard weights is appended, for the information of makers of weights and measures. In that list the recognized abbreviations for apothecaries' weights comprise the symbols ℥ and ℈, but in the case of the corresponding measures the abbreviations indicated are fl. oz., fl. dr., and Min.

So far, then, it would appear that in order to be lawful an apothecaries' graduated glass measure must be stamped with the above-mentioned letters. It is true that in the appendix to the report of the Board of Trade the symbols f℥, fʒ and ♏ are also mentioned, but only in such a manner as to indicate that they may be used together with the recognized abbreviations, and not alone. This prescription of a particular form of abbreviated denomination for stamping graduated glass measures seems likely to cause some trouble, inasmuch as it might be assumed that such a measure stamped only with the symbols ℥, ʒ or ♏ was not a lawful measure. Certainly it is a point which might be taken up by some inspectors so as to cause annoyance, and when it is remembered that the use of symbols has hitherto been the most general, if not the only, way of marking such measures, it will be evident that there is some ground for apprehension.

It has been suggested that in consequence of the requirement of the letters fl. oz. etc., thousands of measures in use throughout the country are rendered useless inasmuch as they are unlawful without those marks. This, however, is but an exaggerated idea. The marking of a glass measure with a scratching diamond or with the corner of a file is a very simple and easy matter and if it be absolutely essential that measures should bear the marks fl. oz., etc., it would require but little time or trouble to place those marks upon them by that means.

But we are disposed to think that there is at least some reason for doubting whether the use of the abbreviations indicated by the Board of Trade report is absolutely necessary for insuring conformity with the Act; or to put the matter in another way, that a sufficiently strong case might be stated in favour of the use of symbols to induce the Board of Trade to recognize them equally with the other abbreviated marks. In any case there seems to be good grounds for submitting to the Board a representation of the case as affecting chemists and druggists, and asking for such action to be taken as will suffice to prevent undue interference with them in the customary and ordinary course of their business.

While dealing with this subject it may be useful to state that upon the application of several local authorities, the Board of Trade represented to Her Majesty that it would be expedient to alter the fees taken by such authorities for stamping weights and measures, and that an Order in Council has been made specifying the maximum fees to be charged in such cases. For apothecaries' weights the fee is twopence, for each weight from 10 oz. to 1 oz. inclusive, and one penny for each weight from 4 drachms to half a grain. For each graduated measure containing more than one hundred subdivisions the fee is one shilling; for one containing less than one hundred but more than fifty subdivisions, sixpence; for one with less than fifty sub-divisions, fourpence; for each separate measure of 40 fluid ozs. to 1 fluid oz. respectively, threepence; and for one of 4 fluid drachms to one minim, twopence.

This scale of fees has been adopted by the counties of Bucks, Cornwall, Cumberland, Derby, Durham, Essex, Middlesex, Surrey, Carnarvon, Ayr, Dumfries, Edinburgh, Elgin, Kirkcudbright, and the boroughs of Abingdon, Basingstoke, Chester, Leeds, Leicester, Manchester, Nottingham, Salford, Sheffield, Tenterden, Westminster, Great Yarmouth, Aberdeen, Edinburgh, Elgin, Galashields, Glasgow, Hawick, Kirkcaldy, Paisley, Perth, and Dublin.

CO-OPERATIVE MEDICAL DISPENSING.

A MEDICAL contemporary publishes an account of a scheme that has just been proposed by some medical men in a provincial town which is considered to offer promise of overcoming certain of the difficulties and objectionable features of private dispensing. The promoters of this enterprise—medical practitioners—have agreed to form a joint stock company in order that they may provide common premises and a qualified dispenser to make up their prescriptions, and if desired the prescriptions of others. This is considered to be simply a new form of co-operation, and it is added that as such there cannot be any possible objection to it, but on the contrary advice is given to extend the privileges of membership as widely as possible. This scheme appears, therefore, to be a new departure in the endeavour to prevent the survival of the dispensing chemist, and, as being directed against that side of the chemist and druggist's business which it is most desirable to develop, is worthy the consideration of those members of the trade who look upon the dispensing of medicine as being rather a right belonging to them in the abstract than as an acquisition to be secured on the ground of superior qualification. One of the reasons given for approving this scheme is the opinion expressed by our contemporary that when medical men cease to dispense their own medicines they throw away a certain profit to which they are entitled, and though this view seems to reflect but too well the leading idea of the old apothecary of last century it shows little appreciation of the differentiation of function by which alone we can hope to achieve reform and improvement in the practice of medicine and pharmacy.

PROSECUTION UNDER THE WEIGHTS AND MEASURES ACT.

WE understand that the Chemists and Druggists' Trade Association will undertake the defence of Mr. WHITTLE in the action brought against him under the Weights and Measures Act at Marylebone Petty Sessions, the further hearing of which stands adjourned until the 6th of December next. On that occasion we may anticipate that the York Glass Company and the Pharmaceutical Society will also have representatives present to watch the case, and on the one hand to defend the company against the insinuation that the measures in question had not been stamped in accordance with the requirements of the Act, on the other hand to ascertain whether in the carrying out of the Act chemists and druggists are liable to inconveniences such as would admit of being provided against in the future.

To the list of pharmacists already mentioned as having received municipal honours, we have to add the name of Mr. WILLIAM GUNN, of Dunse, who was at the beginning of this month unanimously elected Chief Magistrate of that place, and on Tuesday last was appointed a Justice of the Peace for the county of Berwick.

AMONG the items of news telegraphed from America we learn that the first prize of five hundred dollars, offered by the National Board of Trade of the United States of America, for the best essay upon injurious adulteration and the draft of an Act to prevent the same and regulate the sale of food without imposing unnecessary burdens upon trade, has been awarded to Mr. G. W. WIGNER, the Honorary Secretary of the Society of Public Analysts of London.

DEATH OF AN ANNUITANT.

WE are sorry to learn that another annuitant on the Benevolent Fund, Mr. EDWARD GILBERT, died on the 16th inst., in his 68th year. Mr. GILBERT was elected in 1877.

THE NEXT EVENING MEETING.

AN Evening Meeting of the Pharmaceutical Society will be held on Wednesday next, when the following papers will be read:—"Note on the History of Saffron," by Mr. C. B. ALLEN, and "On the Use of Saffron in Pharmacy," by Mr. E. M. HOLMES. The chair will be taken at half-past eight.

Pharmaceutical Society of Ireland.

SPECIAL MEETING OF THE COUNCIL.

November 17, 1880.

Present—Professor Tichborne, President; Dr. Aquilla Smith, Vice-President; Messrs. Allen, Bennett, Brunker, Doran, Grindley, Hayes, Hodgson, Oldham and Simpson.

The meeting was called, in pursuance of the bye-laws, in consequence of the death of Mr. John Goodwin.

The following resolution was proposed by Mr. Grindley, seconded by Mr. Doran, and passed:—

> "That this Council, having heard with regret of the death of their esteemed colleague, Mr. John Goodwin, desire hereby to convey the expression of their sympathy with his family in their sad bereavement,"

and the Registrar was desired to forward the resolution.

Dr. Smith said that he had much pleasure in proposing Mr. Draper to fill the vacant seat upon the Council. From his connection with the Society as Examiner for the last five years, the active interest which he took, together with the President, in the evening meetings, and his well known abilities as a chemist, he considered that no better person could be selected; he therefore proposed that Mr. Draper be elected.

The nomination having been seconded by Mr. Allen,

Mr. Hayes said that he came to the meeting intending to propose Mr. Boileau, whom he would be glad to see again coöpted, but would not propose him in opposition to Mr. Draper.

Mr. Oldham also advocated Mr. Boileau's claim to be coöpted and said that the next vacancy occurring would be a favourable opportunity of repairing the slight put upon Mr. Boileau by the outside members of the Society at the last election.

Mr. Draper was then elected unanimously, and the meeting adjourned.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The third general meeting of the thirty-second session was held at the Royal Institution on Thursday evening, November 11th, the President, Dr. Symes, in the chair. The minutes of the previous meeting were read and confirmed, and the following donations were announced:—Specimens of crystallized duboisine and duboisia leaves, from A. W. Gerrard; specimen of the bark of *Quebracho blanco*, from the President; the current numbers of the *Pharmaceutical Journal*, and 'The History of Pharmacy,' by Bell and Redwood, from the Pharmaceutical Society.

Mr. A. E. Fletcher, F.C.S., gave an interesting description of the means employed for sub-dividing the electric light for household lighting.

The paper for the evening, on "Boron and its Compounds," was read by Mr. Edward Davies, F.C.S., F.I.C.

The paper, which will be printed in an early number, was discussed by the President, Messrs. T. F. Abraham, Conroy, Kehlstadt and Watt, and a hearty vote of thanks to Mr. Davies brought the meeting to a close.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

ASSISTANTS' SECTION.

The opening meeting of this Association was held in the Manager's Library, Anderson's College, on Wednesday 17th ult., at 9 o'clock p.m.

The retiring President (Mr. David Lee) occupied the chair, and delivered a short address, in which he earnestly importuned the necessity of the closest unity among the members, and urged that they would, as in past sessions, use every endeavour to preserve the reputation and name which this society had so long enjoyed. He said they had the advantage of possessing an organization which enabled them to give due consideration to events passing around, particularly to legislation, proposed or attempted, in which their future interests might be implicated, and which apparently they were to experience in the coming year in an attempt to amend the Pharmacy Act, an event of material importance to them all. This session promised to be one of an unusually interesting character, despite all the gloom which at present overhung the pharmaceutical dominion.

After a short conversation among the members and visitors, the following gentlemen were chosen to fill office during the ensuing year:—President, Walter Paris; Vice-President, David Lee; Secretary, G. S. Illingworth; Librarian, William Philp; Committee:—John Adams, A. C. Chalmers, James Paterson, and A. Paterson, jun.

Votes of thanks to retiring office bearers and enrolment of associates terminated the proceedings.

EDINBURGH CHEMISTS ASSISTANTS AND APPRENTICES' ASSOCIATION.

The second meeting of the third session was held on Wednesday, 17th inst., in the rooms of the North British Branch. Mr. J. D. Robertson, President, in the chair.

The minutes of the last meeting having been read and confirmed, the President called upon Mr. Boa to read a paper on

CHLORAL AND CROTON CHLORAL.

After referring to the discovery of chloral by Liebig, in 1832, and its introduction to medical practice by Liebreich, in 1869, he described the process for its manufacture on the commercial scale, by the chlorination of absolute alcohol, and illustrated by diagrams the chemical changes occurring in the different stages of the process.

Speaking of the different preparations of chloral, Mr. Boa said that it had occurred to him that chloral might be used as a stimulating application for the hair in the form of a pomade or cream, in combination with an alkali. Lime cream with chloral, for example, might supersede chloroform pomade.

Croton chloral, he went on to say, is prepared from aldehyde by a process similar to that by which ordinary chloral is prepared from alcohol. Croton chloral has nothing to do with croton oil; the name arises from the fact that it is the chloral of the aldehyde of crotonic acid, an acid which at one time was supposed to exist in the seeds of *Croton tiglium*, although it has now been shown that it does not contain an acid of this composition. As to whether this substance is croton chloral or butyl chloral, theory points to its being the former, $C_4H_3Cl_3O$, although Messrs. Krämer and Pinner assert it to be the latter, $C_4H_5Cl_3O$.

When chlorine is passed into aldehyde there is formation of hydrochloric acid gas, this gas acts upon the aldehyde and causes it to condense, as it were, into crotonic aldehyde, with elimination of water. The continued current of chlorine acts upon the crotonic aldehyde with formation of substitution products. The formation of croton chloral is explained in this way:—

$$2\,(C_2H_4O) = \overbrace{C_4H_6O}^{\text{Crotonic Aldehyde.}} + H_2O$$

$$C_4H_6O + 3\,Cl_2 = \overbrace{C_4H_3Cl_3O}^{\text{Croton Chloral.}} + 3\,HCl$$

That of butyl chloral thus:—

$$2\,(C_2H_4O) = C_4H_6O + H_2O.$$

$$C_4H_6O + Cl_2 = \overbrace{C_4H_5ClO}^{\text{Monochlorcroton Aldehyde.}} + HCl.$$

$$C_4H_5ClO + Cl_2 = \overbrace{C_4H_5Cl_3O}^{\text{Butyl Chloral.}}.$$

The formation of crotonic aldehyde during the process is favourable to its being croton chloral, whereas the explanation of its formation as butyl chloral is not so easy of acceptance.

Summarizing the physiological action of the two substances, the decomposition products of each indicate their respective actions. Trichlorinated compounds usually act upon the brain, spinal cord, and heart; bichlorinated substances upon the brain and spinal cord only. When decomposed by an alkali chloral yields chloroform, $CHCl_3$, a trichlorinated substance; croton chloral yields bichlorallylene, $C_3H_2Cl_2$, a bichlorinated substance. Accordingly, chloral acts upon the brain, spinal cord, and heart: croton chloral upon the brain and spinal cord, but not upon the heart, hence the latter is the safer in cases where disease of the heart exists.

On the motion of Mr. W. Aitken, seconded by Mr. R. Aitken, a hearty vote of thanks was awarded to Mr. Boa.

Afterwards a number of queries were submitted by the Secretary, but owing to the late hour to which the meeting had extended they were deferred till next meeting, after one or two had been answered.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, November 18, Professor H. E. Roscoe, President, in the chair.

It was announced that a ballot for the election of Fellows would take place at the next meeting (December 2).

The following certificates were read for the first time:-- S. Harvey, J. W. James, W. E. Kay.

Mr. Spencer Pickering then communicated a lengthy paper entitled—

Notes on the Oxides of Manganese.—Various samples of oxides of manganese were obtained and heated to various temperatures until their weight was constant. The results obtained showed that these oxides sometimes lost and sometimes gained in weight; at other times their weight remained constant. This loss or gain of oxygen does not appear to bear any relation to the degree of oxidation of the oxide. It appears to be greatly dependent on the amount of water present in the sample. The greatest loss was found to occur in those oxides which were examined soon after they were prepared. The oxides of manganese appear to undergo a molecular change on being kept in air for any length of time, whereby their behaviour on heating may be entirely reversed, a gain of oxygen taking place instead of a loss. This molecular change is not accompanied by a variation in composition. When small quantities of manganese oxides were heated in a platinum dish over a Bunsen burner, the oxide obtained was remarkably constant in composition, when the gas was at the day pressure; with a larger supply of gas less constant results were obtained.

The President said that the oxides of manganese seemed sometimes to lose and sometimes to gain in weight when heated to 100°. The circumstances which governed this alteration he hoped the author would eventually succeed in determining. He should like to ask if any special tests had been made for the presence of organic matter and whether any specific gravities of the oxides had been taken.

Dr. Wright asked if the absence of other metallic oxides had been secured, as in his researches great care was found to be necessary in this respect.

Mr. Pickering replied that the pure oxides used in his research, after solution in acid and precipitation with ammonium sulphide, gave no fixed residue on evaporation with sulphuric acid. Some of the specimens were very light and some very heavy powders. The presence of organic matter could not account for a gain in weight.

Professor McLeod said that it would be interesting to know if any oxygen was given off at ordinary temperatures in a Sprengel vacuum.

The President then called upon Dr. Gladstone to read a paper by himself and Mr. A. Tribe entitled—

Aluminium Alcohols. Part I. Their Preparation by means of the Aluminium-Iodine Reaction.—In 1876 the authors showed that either aluminium or aluminium-iodide singly is without action on absolute alcohol, but that together they decompose that liquid with facility. The resulting bodies are hydrogen and two new organic aluminic compounds, aluminic iodoethylate $(C_2H_5O)_3I_3Al_2$ and aluminic ethylate $Al_2(C_2H_5O)_6$. It was also shown that one molecule of the iodide suffices to bring about the combination of very many atoms of aluminium with the oxy-radical of the alcohol and that the amount of hydrogen set free is equivalent to that of the metal which disappears. In the present communication the authors have studied more completely the composition and properties of the ethylate and have applied the aluminium iodine reaction to the preparation of analogous aluminium derivatives of other alcohols. Twenty c.c. of alcohol, 2 grams of aluminium foil and 1 gram of iodine are heated in a flask to 100°, the decomposition proceeds with tolerable rapidity until the metal has disappeared. The flask is then heated to 300°, until distillation at that temperature ends. It is then connected with a receiver and, the apparatus exhausted of air, the product in the flask melted and distilled under diminished pressure. The authors have prepared and examined aluminic methylate, aluminic ethylate, aluminic propylate. No reaction took place when isopropyl alcohol was used; although the isoiodide and the zinc isopropide are less stable than the corresponding normal compounds. Aluminic isobutylate, and aluminic amylate were prepared without difficulty, aluminic cetylate was formed, but was to a great extent decomposed by the temperature necessary for its formation by this reaction. On trying the reaction with allyl alcohol, aluminic allylate was apparently formed but could not be isolated by distillation in vacuo. Aluminic phenylate, cresylate and thymolate were prepared, but could not be distilled; they were, however, obtained tolerably pure by heating the respective alcohols to about 200° with the theoretical quantity of aluminium and enough iodine to start the action, and then pouring off the semi-fluid product. The hydrogen of benzylic alcohol can be replaced by aluminium, but the compound formed is completely decomposed when heated in vacuo. No aluminium compounds of ethene alcohol or propenyl alcohol were obtained. The aluminic alcohols are solid non-crystalline greyish white bodies and are more or less decomposed on heating at the ordinary atmospheric pressure, but those of the methyl series distil at reduced pressure and have the property of remaining fluid below their fusing points.

In reply to Dr. Armstrong, Dr. Gladstone said that an attempt had been made to determine the vapour densities of these bodies, but up to the present time had not been successful.

Mr. W. H. Perkin then gave an account of the artificial production of indigo, and prepared some before the Society. He stated that through the kindness of Dr. Caro he was enabled to exhibit some specimens of artificial indigo and to demonstrate its preparation. We are indebted to Professor Adolph Baeyer for the discovery of the process. The starting point is practically toluene, C_7H_6O; indigo, therefore, may be classed among the coal tar colours. From this hydrocarbon cinnamic acid is prepared by a process which was suggested by Mr. Perkin not long ago and which at the time did not seem likely to be so soon turned to a practical application. The next step is the conversion of the cinnamic acid into its nitro-derivative by the action of nitric acid. Two isomers can be thus formed, the ortho and the para; the ortho is the only one which is useful in this process. Fortunately by employing certain precautions this ortho body can be obtained as the chief product of the reaction. On exposing this nitro body to the vapour of bromine orthonitrodibromhydrocinnamic acid is prepared, by treatment with caustic soda orthonitropropiolic acid is obtained, which on reduction by grape sugar in a solution rendered alkaline by an alkali or an alkaline earth is converted into indigo. The steps in the process are, therefore, toluene, C_7H_6O; dichloride of benzyl, $C_6H_5CHCl_2$; cinnamic acid, $C_9H_8O_2$; next, orthonitrocinnamic acid, $C_9H_7(NO_2)O_2$; then, orthonitrodibromhydrocinnamic acid, $C_9H_7Br_2O_2(NO_2)$; next, orthonitrophenylpropiolic acid, $C_9H_5(NO_2)O_2$; and finally indigo. $C_{16}H_{10}N_2O_2$. Professor Baeyer has also discovered a second process by heating orthonitrophenyloxyacrylic acid to about 110°, but practically this process is not so good as the one just mentioned. The artificial indigo is identical with the natural product in every respect, it can be reduced to form an indigo vat and gives a sulpho-acid soluble in water which dyes silk. The colouring matter may be made in the fibres of the fabric by passing them through or printing them with a mixture of $C_9H_5(NO_2)O_2$, alkali and grape sugar and then steaming or heating them for a few minutes. Every effort is being made on the continent to produce the colouring matter commercially and there is but little doubt as to the ultimate and speedy success of these endeavours.

The President, in thanking Mr. Perkin for his interesting demonstration, commented on the very superior facilities which existed in Germany in the technical institutions and the large manufactories for working out such questions as the above. In one large works no less than thirty chemists were employed at liberal salaries, working at subjects connected with chemical technology. If such arrangements existed in this country we should have nothing to fear from competition.

On the Absorption Spectrum of Ozone. By W. N. Hartley.—The author has photographed by means of the light afforded by the coil and Leyden jar (which also served to ozonize the air) the absorption spectrum. The absorption band stretches from wave length 285 to 233 millionths of mm., the air contained 1 vol. of ozone in 2000 of oxygen. Great care was taken to exclude chlorine and oxides of nitrogen. The mean wave length of the rays intercepted by ozone is 256 millionths mm. from this the author deduces the mean rate of vibration of the molecule of ozone as 1231 billions per second.

On the Probable Absorption of the Solar Rays by Atmospheric Ozone. By W. N. Hartley.—The author refers to the recent experiments of Cornu on the shortening of the solar spectrum in the ultra violet portion. This observer has photographed the spectrum at different altitudes. He finds that the longest spectrum was obtained at the greatest height at mid-day. The shortening is therefore due to the atmosphere. From various considerations the author concludes that it is highly probable that the absorbing substance in the atmosphere is the ozone. He also attributes the blue tint of the atmosphere to a great extent to ozone. The blue colour cannot be due to the aqueous vapour nor the oxides of nitrogen. Some further experiments on this interesting question are promised.

On the Synthetical Production of New Acids of the Pyruvic Series. By E. Moritz. *Part II. Isobutyryl and Butyryl Formic Acids.*—The author has prepared and studied the following bodies, isobutyrylformic amide, diisobutyryl, dicyanide, and isobutyryl formic acid. The acid was prepared by treating the polymeric cyanide with hydrochloric acid and subsequent boiling in a water-bath. If the mixture of cyanide and hydrochloric be poured into cold water before boiling, oily drops form at the bottom, which subsequently solidify. Two substances were isolated from this deposit, one soluble in solid carbonate fusing at 187°, the other insoluble, fusing at 207–208°. The author has also prepared and studied butyrylformic-amide, dibutyryldicyanide, and butyrylformic acid. In conclusion the author states that an improved method for preparing the acid-radical cyanide is necessary for the success of further investigations.

On the Ancient Alum Well at Harrogate. By R. H. Davis.—This old well was noticed by Dr. Garnet in 1791 as containing alum and iron. Up till 1870 the well seems to have been forgotten: in that year, however, it was brought to light again during some excavations made for increasing the supply of sulphur water. It is a pale reddish brown water, strongly acid to litmus, and very astringent to the taste. The well is surrounded with sulphur wells, and is of comparatively superficial origin. The author gives an analysis of the water in grains per gallon. $Fe_2(SO_4)_3$, 78·76; Fe_2SO_4, 69·33; $Al_2(SO_4)_3$, 89·47; $CaSO_4$, 56·91; $MgSO_4$, 57·38; K_2SO_4, 3·14; Am_2SO_4, 2·19; NaCl, 33·9; SiO_2, 3·27. Total residue 397·25.

On Peppermint Camphor. By M. Moriya of Tokiô.—This paper forms No. IV of the contributions from the University Laboratory of Tokiô, and forms part of a thesis presented by the author on graduating in chemistry. In 1862, Oppenheim concluded that this camphor was a monatomic alcohol $\left.\begin{matrix}C_{10}H_{19}\\H\end{matrix}\right\}O$ and named it menthol; in 1876 Beckett and Wright showed that menthol was connected with the aromatic and the paraffin series. The sample examined by the author was obtained from Yonezawa. Its specific rotatory power was – 59·3°; specific gravity at 15° 0·89, melting point 37 – 35°, distils over at 210 – 212°; crystallized in long needles, soluble in absolute alcohol, ether, CS_2 chloroform and glacial acetic acid. By the action of bichromate and sulphuric acid at 120° for ten hours a colourless oil was obtained, $C_{10}H_{18}O$, boiling 204 – 205°, specific gravity 0·9032, insoluble in water, soluble in ether, alcohol, and chloroform. By the action of nitric acid an explosive nitro body, probably $C_{10}H_{19}NO$, was obtained yielding an amide, $C_{10}H_{19}NH_2$. By heating the camphor with twenty times its volume of fuming nitric acid, a yellow liquid was obtained, which on evaporation yielded a white crystalline substance, soluble in water, which contained no nitrogen: analyis indicated the compound to be normal pyrotartaric acid. Bromo menthol, $C_{10}H_{19}Br$, was also prepared. By the action of zinc chloride menthene was obtained.

By freezing the oil of peppermint obtained by distilling the plant, separating the crystals, and subsequently fractionally distilling, a liquid was obtained which the author concludes to be the liquid which holds the camphor in solution; it has the composition $C_{10}H_{18}O$. In a note to the paper Professor Atkinson suggests constitutional formulæ for menthol founded on the above researches.

The Society then adjourned to December 2nd, when a ballot will be held for the election of Fellows and the following papers will be read:—

1. "Communication from the Laboratory of the University College of Bristol," by W. Ramsay; 2. "On the Specific Volume of Chloral," by Laura Maude Passavant, Brown Scholar at the Yorkshire College; 3. "On the Formation of Carbon Tetrabromide in the Manufacture of Bromine," by J. W. Hamilton.

Obituary.

Notice has been received of the death of the following:—

On the 4th of November, 1880, Mr. Charles Rogers, Chemist and Druggist, Watery Lane, Birmingham. Aged 71 years.

On the 5th of November, 1880, Mr. Edward Vincer, Chemist and Druggist, London Road, Sevenoaks. Aged 76 years.

On the 9th of November, 1880, Mr. Ferrand G. U. Hinchliff, Pharmaceutical Chemist, Greenheys, Manchester. Aged 58 years. Mr. Hinchliff became a Member of the Pharmaceutical Society in 1858.

On the 14th of November, 1880, Mr. Joseph Hall, Pharmaceutical Chemist, Salford, Manchester. Aged 59 years. Mr. Hall had been a Member of the Pharmaceutical Society since 1843.

On the 16th of November, 1880, Mr. Henry Gambling, Chemist and Druggist, Chichester. Aged 41 years.

On the 18th of November, 1880, Mr. Hugh Mackay Anderson, Chemist and Druggist, Evelyn Street, Leeds. Aged 35 years. Mr. Anderson had been an Associate of the Pharmaceutical Society since 1876.

On the 18th of November, 1880, Mr. William Golding, Pharmaceutical Chemist, Albany Street, N.W. Aged 61 years. Mr. Golding had been a Member of the Pharmaceutical Society since 1853.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[451]. After the number of replies to the query of J. G. P. S., perhaps a few further remarks from one who has read the whole discussion with great interest may not be superfluous.

It is only because this point has been most ably argued against overwhelming weight and probability by Messrs. H. Brown and R. H. Parker that a few remarks are ventured on the crucial points advanced by these gentlemen.

Was Mr. Brown right in asserting hyd. chlor. to be hydrargyri perchloridum of the British Pharmacopœia of 1867, and in giving as his authority the definition of the United States Pharmacopœia, hydrargyri *chloridum* corrosivum? (The italic is my own.) Ought not Mr. Brown to have considered when he made this statement that the very opposite assertion might be made and an equally good authority given from that same "excellent guide" of his (the U. S. Pharmacopœia), which defines calomel as hydrargyri *chloridum* mite?

Does Mr. Parker bring forward the solitary statement of an admittedly faulty edition of the B. P. (that of 1864) as of any authority in settling this matter? I do not conclude that he does, as further on he admits that "the weight of evidence on the ground of nomenclature is certainly in favour of hydrarg. subchlor. being used;" but he adds that the question must be regarded from a physiological point of view, which he thinks is far more important than a mere literary quibble over nomenclature.

Granted that this is so, in a doubtful reading of a prescription like that submitted by J. G. P. S., would a dispenser possessing the most advanced knowledge of physiology and therapeutics be justified in pronouncing for a comparatively large amount of a corrosive substance being applied to the surface of one of the most delicate organs of the human body, without so much as having the chance, perhaps, of looking at the eye in order to verify the possibility of his guess being correct as to the doubtful kind of remedy proposed?

I think that an advanced physiologist, in calculating the chances under such circumstances, would most probably go on the side of safety (if he dispensed the prescription at all), and put in calomel instead of corrosive sublimate.

In conclusion, perhaps I may be permitted to hope that the definition of calomel (hydrargyri chloridum) bequeathed us by the London Pharmacopœia will ultimately give place in prescriptions to that of the British Pharmacopœia (hydrargyri subchloridum), which (with all deference to Mr. Brown and the U. S. Pharmacopœia) is more to the point as a chemical definition and simpler to write than hydrargyri choridum mite.

Specific Gravity.

[451]. It would serve no useful purpose were I to attempt to go over all the authorities on materia medica and chemistry so as to settle what is meant by hyd. chlor. The name is applied to corrosive sublimate and to calomel in a most irregular fashion, each author suiting his own fancy as to nomenclature.

I find Taylor on 'Poisons' saying (*vide* page 389): "This substance (calomel), also called chloride or subchloride of mercury." On page 363: "Corrosive sublimate is also known by the chemical name of chloride, perchloride, etc."

Dr. Tidy, in his work on 'Chemistry,' page 425, calls corrosive sublimate, chloride, bichloride, etc., and calomel, subchloride or protochloride.

In entering upon the discussion I knew what diversity of opinion was likely to crop up on the point, but, although J. G. P. S. says he knows calomel was meant, I still look to the reasonable and therapeutic view in solving such matters.

Take it then for granted calomel was intended, and what is the position? One grain is suspended in 192 minims of water, to which extract of opium is added. Calomel, in the dry state, is used in eye affections twice or thrice a day, in portions of 1 grain or more. Corrosive sublimate is used in the form of solution, 2 grains to the ounce of water, with or without opium. Now, I ask, is it a reasonable inference to suppose hyd. chlor. means calomel, which in the form of suspension, in watery solution of opium, is so weak that 192 minims only equal one ordinary dose, when used by the dry process, namely, that of insufflation? I am quite willing to allow that by a private mode of understanding J. G. P. S. knew it was calomel the prescriber meant by hyd. chlor. in this instance, but if I sent to Preston a prescription, thus—

Hyd. Chlor. . . . . 5 grains.
Aquæ . . . . ℥ij.
Solve. Ft. lotio. Sig. "For itch."

Would he follow the B.P. and send out the lotion made with calomel? Would common everyday experience not at once say by hyd. chlor., corrosive sublimate was meant? Again, if I ordered hyd. chlor. with spt. vini rect., and write "To be pencilled over the affected parts," would any sensible compounder weigh out the proportion of calomel as "hyd. chlor." in such an instance? I think not. Such then being the case, and knowing corrosive sublimate is used in solution in eye affections, in proportions equally as strong as the formula No. 451, that calomel is always used, so far as I know, in the dry state, or in the form of ointment in eye affections, I still hold a dispenser would be justified in using corrosive sublimate in the case given, and not calomel, for hyd. chlor., unless he privately was aware of some crotchet peculiar to the writer of certain prescriptions. The mildness of calomel, and the quantity of extract of opium in formula No. 451, would point to hyd. chlor. as meaning corrosive sublimate.

I may remark, in reply to T. G. M., I take no book as a "guiding star," but if I were to choose between English pharmacy and American, in every shape and form, I should give a decided preference to the latter.

I may add it is a mistake to suppose that because opium was contained in the lotion, No. 451, therefore it added to its strength. From my standpoint the opium was meant to allay irritation,—in a word, to sooth and modify the action of the active ingredients. This was a chief reason why I said I considered hyd. chlor. meant corrosive sublimate, and not calomel, in the case of "Memorandum" No. 451.

Northallerton. HENRY BROWN.

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[465]. Mr. F. Davis, in his reply, says had I used boiling water, I would have obtained a clear mixture, without sediment, and Mr. T. G. Morris says "no wonder the customer brought it back, and complained of the undissolved potass. chlor." I maintain that if the mixture was sent out without a sediment, it did not contain the quantity of potass. chlor. ordered; and I think Messrs. Davis and Morris will admit that finely powdered chlorate of potash is more desirable in a mixture, than "crystals," which are certain to be deposited, were it dispensed with boiling water.

Does Mr. T. G. Morris really mean to say that 1 part of the salt dissolved in 2 parts of boiling water will remain in solution, when it has cooled?

JOHN.

[465]. I quite sympathize with "John" in not making a solution free from sediment. If he had made it with boiling water as directed, he would have had the same result when cold. It is evident that neither H. A. T., Mr. F. Davis nor Mr. T. G. Morris have ever made up a similar prescription, or they would have found out that the pot. chlor., when dissolved in the boiling water, precipitates on cooling.

J. BLAKE BENJAMIN.

[465]. "John" should have used boiling water, when the mixture would have been free from sediment. This remark applies to all mixtures containing potass. chlor.

Tunbridge Wells. C. FILTNESS.

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[466]. A very satisfactory emulsion is formed by first emulsifying the ol. olivæ with liq. potass., filling up with aqua, and well shaking.

Tunbridge Wells. C. FILTNESS.

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[468]. The precipitated ferric hydrate obtained by "Q" was probably due to the water he used, more than to the liq. Fowleri, the neutralization of which would have made but little difference.

Acids, alkalies, and neutral salts, if in sufficient quantity, precipitate dialysed iron. Common water effects the change completely; distilled water does not affect its equilibrium.

In the prescription before us, if the dialysed iron be diluted with distilled water and the liq. Fowleri added (also diluted), a slight precipitate occurs which disappears on agitation and a perfectly bright mixture results having no tendency to deposit. A considerably larger proportion of liq. Fowleri may be added before a permanent precipitate makes its appearance.

R. H. PARKER.

[468]. All that is necessary in order to turn out a clear mixture is to dilute the iron and the liq. Fowleri before mixing and use distilled water.

CYMRO.

[468]. I should dispense this without neutralizing liq. Fowleri.

Tunbridge Wells. C. FILTNESS.

[468]. This should be dispensed as written, with a "shake" on the bottle, taking the precaution to dilute the liq. Fowleri with 1 oz., and the ferri dialysati with 4 ozs. of pure distilled water before mixing. If this mode of procedure be adopted, a dark mixture will be sent out perfectly bright, and having a tendency to deposit only after some considerable time.

"Neutralizing" the liq. Fowleri would only add to the difficulty, as dialysed iron is precipitated not only by alkaline solutions, but by solutions of neutral salts as well.

SPECIFIC GRAVITY.

[469]. If "Provincial Chemist" will refer to Squire's 'Companion,' eleventh edition, he will find what he requires.

LAVANDULA.

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[471]. I should say a chemist would not be justified in refusing to dispense this. No doubt teriodide of nitrogen would be formed, but not to such an extent as to require any great precaution.

Tunbridge Wells. C. FILTNESS.

[471]. "Dartmoor" would not be justified in refusing to dispense this prescription. I have repeatedly dispensed a similar one with perfect safety, and I may say that the prescription has been in use at intervals for the last ten years. Possibly "Dartmoor" has forgotten that teriodide of nitrogen is only explosive in the dry, and not in the wet state.

LAVANDULA.

[471]. Iodine mixed with an excess of ammonia (NH_3) forms iodide of ammonium, and liberates nitrogen according to the following equation:—$4NH_3 + I_3 = 3HN_4I + N$.

This reaction also occurs either in aqueous or alcoholic solutions of the two substances. When the iodine is in excess it unites with the nascent nitrogen to form an explosive compound, the formula of which is somewhat doubtful.

In the above equation 4 molecules of ammonia (NH_3) or 68 parts by weight, combine with 3 atoms of the element iodine, or 381 parts by weight, forming 3 molecules of iodide of ammonium, and liberating 1 atom of nitrogen.

In every fluid ounce of lin. camph. co. there are about 30 grains by weight of gaseous ammonia (NH_3), and in every fluid ounce of lin. iodi, B.P. (which preparation would most probably be dispensed for lin. iodi comp.), there are about 48 grains by weight of free iodine. There is, therefore, according to the above equation, enough ammonia (NH_3) by weight in the lin. camph. co. to combine with three and a half times the quantity of the free iodine contained in the lin. iodi, B.P., and thus "Dartmoor" may dispense such a prescription without any fear of an explosion whatever occurring, as there cannot possibly be any explosive compound of iodine and nitrogen formed. The liberation of the gaseous nitrogen itself is so gradual that no special care need be taken on that head in dispensing the liniment.

SPECIFIC GRAVITY.

[471]. In reply to "Dartmoor," nitrogen iodide would not be formed.

ELBORNE.

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[472]. In answer to F. S. M. the formula for aqua caryophylli in Beasley is:—

Cloves	℔ii. tr.
Water	q.s.

Macerate for twelve hours, and distil ℔viij.

J. B. P.

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[473]. When sulphate of iron is prescribed in pills a dispenser must use either ferri sulphas or ferri sulphas granulata, B.P. (preferably the granulated), as both contain the same amount of water of crystallization.

The dried sulphate of iron should only be used when specially indicated in a prescription.

SPECIFIC GRAVITY.

[473]. It is customary to use ferri sulph. exsiccata for pills; of course, allowing for the difference in the percentage of iron, caused by the loss of water in drying.

Tunbridge Wells. C. FILTNESS.

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[474]. Mr. Watkins has only to put the pulv. alum. in a vial, and add sp. æther. nit., attaching a "shake the bottle" label. It is a remedy in frequent demand here.

Tunbridge Wells. C. FILTNESS.

[475]. I have had the following prescription to dispense recently. Can anyone inform me how to send it out so that it shall not separate afterwards?—

℞	Bals. Copaib.	ʒij.
	Acid. Sulph. Ar.	ʒj.
	Infus. Rosæ . . . . ad	℥viij.

RETORT.

[476]. This day I had the following to prepare:—

℞	White Wax	1 oz.
	Juice of Soloman's Seal Bulbs . .	2 oz.
	Honey	2 oz.
	Rose Water	2 drms.
	Otto of Rose	1 drop.

Misce.

Will some one kindly tell me what appearance when made it ought to have, the best way to mix it, and also the best method to get the juice? D. H. F.

[477]. Should the following prescription be made up to ℥iss. with a mixture of syrup and water or should ʒiss. of each be added:—

℞	Tr. Nucis Vom.	ʒij.
	Ferri Citratis	ʒj.
	Syr. Aurant.	ʒj.
	Syr. Simp.,	
	Aquæ Destil.	āā ad ʒiss.

M. Take a teaspoonful in a little water after dinner.

B.

[478]. Will some one kindly inform me of the best method of preparing the following prescription, and oblige?—

℞	Ol. Tereb.	℥ij.
	Tinct. Opii.	℥ij.
	Iodine	ʒss.

Sig. "For outward application." For rubbing the part affected two or three times a day. ASSISTANT.

Notes and Queries.

[687]. If S. will persevere in using animal charcoal in sufficient quantity, and repeated filtration, he will be rewarded with a colourless lavender water.

LAVANDULA.

[690]. PARAFFIN AND OLIVE OIL.—Can any reader inform me in what quantity paraffin oil may be used mixed with ol. olivæ for the hair?

R. FOUNTAIN.

[691]. PEPSINE IN GLYCERINE.—Can any reader oblige by giving a reliable formula for a solution of pepsine in glycerine of such a strength that the dose may be one drachm? W. MILLER.

[692]. GLYCERINE AND VASELINE.—I should be glad to know what substance could be added to glycerine and vaseline when mixed to solidify them, so as to form a nearly transparent jelly.

F. D. B. MARCHANT.

BOOKS, PAMPHLETS, ETC., RECEIVED.

THE ELECTRIC LIGHT FOR INDUSTRIAL PURPOSES. By R. E. CROMPTON. London: Mansion House Buildings. From the Author.

PHARMACOGNOSIE DES PFLANZENREICHES. Von F. A. FLÜCKIGER. Zweite Auflage. Erste Lieferung. Berlin: Rudolf Gaertner. 1881. From the Publisher.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PRESENT AND FUTURE OF PHARMACY.

Sir,—The question that now agitates the majority of our calling is "What is to become of us?" While some few look on with philosophic complacency, others rejoice in the prospect of a glorious state of independence, the result of scientific culture; others again suggest combination and a bold front, with "No surrender" for a motto; but no prospect of consentaneous action appears.

The ideas expressed by your correspondents are what may be termed viewy, and end where they begin.

It would be a bootless task to follow these writers in the varied positions they occupy, although their compositions display much ability and a command of good English.

The grievance usually complained of is the sale of proprietary medicines by irresponsible and unscrupulous traders. Since the reduction of the duty to 5*s.* a legion of competitors has arisen, persons who never before dreamed of meddling with physic. The majority of these adopt for their maxim "Small profits, quick returns."

A neighbouring grocer displays a long list of patents, some at prices below those of wholesale houses; adding to this, carbonate of soda, 6*d.* per lb.; tartaric acid, 1*s.* 8*d.* per lb.; borax, 8*d.* per lb.; chemical food, 1*s.* ℥iv. bottle, and a host of other drugs at equally tempting prices.

Unfortunately some of our fraternity descend to the lower level, and compete with these "potsherds of the earth," instead of leaving them to "strive among themselves." But the giant evil, the insatiable monster to which all seem destined eventually to succumb, is the co-operative system. Only those who live in the suburbs or in the midst of a great city can fully realize the power of its voracity, which, like a cancer in a living body, cruelly invades the whole structure, and eventually destroys existence.

Several years since, I received a letter from one of our Presidents:—He said, "Last year my loses were not less than £200 through the stores, and I expect a still further reduction this year."

Another President, wrote "I do not at present find much diminution in my returns, but cannot expect to escape the injurious influence that threatens us all." Both these good men and true rest from their labours, but the evil they deplored has progressed, and is still progressing with accelerated spread and power, and the amount of capital absorbed from circulation must in the end have a most prejudicial effect upon society at large, by impoverishing a large class hitherto esteemed as an essential element of our social system.

It will scarcely be credited, but I have the statement from shareholders, that the Army and Navy Co-operative Stores take no less than £7000 per day, and the Civil Service Stores £4000 per day,—their weekly average,—other minor concerns in proportion,—calculate the annual amount abstracted from circulation!

The Manchester stores banked one million profits; during the process many shops were closed and the former occupants reduced to want. On a recent occasion of great distress in the city, the benevolent shareholders gave the poor starving tradespeople tickets for goods obtainable at their own stores.

Now as those unfortunate recipients can no longer afford to give to public charities, these free trading philosophers contribute noble sums to hospitals and other Christian institutions; they even announce concerts in the same amiable spirit.

I know many chemists who are debarred from exercising kindly feelings simply by the want of means. They would gladly contribute to the Benevolent Fund, to the Attfield testimonial, and the Pharmaceutical Conference, they would enjoy a little occasional recreation, but their whole time is occupied in providing for physical wants.

SEXAGENARIUS.

Sir,—Perhaps some cutting chemist would kindly enlighten the pharmaceutical world, or those employed in dispensing of prescriptions and sale of patent medicines, what will become of the rising young men who are preparing themselves for the stringent examinations enforced by the present Pharmacy Act? In this neighbourhood the state of reduced prices is becoming alarming, varying from 9½*d.*, 10½*d.*, and even 10 per cent. discount on all purchases. If anyone connected with pharmacy would only peruse the Medical Act, he will find the surgeon has full protection against intruders. The Pharmacy Act, 1868, clause xv., states, that any person not being duly registered as a chemist and druggist, or who shall fail to conform with the rules and regulations as to the keeping or selling of poisons is liable to a penalty of £5. If such is the existing law, why allow drapers, grocers, oilmen to sell poisonous patent medicines, namely, chlorodyne, etc.? Anyone who has a small retail business, selling only drugs, patent medicines, mineral waters, and a few prescriptions to dispense occasionally, and who is compelled to compete with his cutting neighbours, can barely get together sufficient profit out of his returns to pay rent, rates and taxes, and provide the common necessaries of life. I could mention men who are in business not returning £300 per annum, with wife and family. For argument's sake, say he realizes one-third profit, a great doubt in these cutting times. Why, an ordinary mechanic can earn that without any compulsory examinations, risk or interference. I do not wish to claim to be the only chemist, but I do maintain that when a man starts in business on his own account, let him do so on a fair footing with unity of prices, combined with neighbourly friendship.

302, *Mare Street, Hackney.* W. M. COVELL.

P.S.—To corroborate the state of things, only the other day I sent to a chemist for two boxes of Seigel's Pills, price 1*s.* 7*d.*; the following day obtained ¼ doz. from my wholesale house, those were invoiced at 2*s.* 11*d.*

DISPENSING BY COUNTRY PRACTITIONERS.

Sir,—Your correspondent, "Filius," got himself rather severely handled by Mr. James D. Robertson and "A (sometime) Country Doctor," but his letter contains more than a germ of truth, and no harm can result, but possibly much good, from further ventilating the subject that he broached, viz., the dispensing by general practitioners of the physic they prescribe. A varied experience of nearly fifty years enables me to say that such dispensing is generally performed in the most perfunctory manner, and if our legislators could thoroughly realize the very grave evils that may, and undoubtedly do, arise from it, they would endeavour, by some enactments, to remedy them. No honest druggist but will admit that the passing of the Adulteration of Food and Drugs Act was a most desirable and beneficial act, that before its enactment drugs and chemicals, in anything but a state of purity, were bought and sold by not a few who wrote themselves chemists and druggists. But the evils arising from such practice were small, compared with the evils that result from the practice now in question.

The records of our coroners' inquests prove that at times deaths are occasioned by the want of sufficient care in the dispensing of medicines in the establishments of dispensing chemists; but those instances, it is gratifying to know, are very rare indeed, and the reason is the almost universal systematic and intelligent arrangement of the bottles, etc., in chemists' pharmacies, especially in their dispensing departments, and the generally ceaseless control exercised by those who have the charge of the dispensing, even in small establishments, where perhaps a competent assistant cannot be kept, but only an apprentice or improver, the vigilant eye and constant direction of the principal reduce the chances of a mistake to a minimum. And there is no reason for the public to fear that a death arising from a druggist's error ever escapes detection. A medical man in such cases, is always immediately summoned, and the facts of the case are speedily revealed and made public, without the slightest regard (and very properly) as to whether such publicity will blast the reputation of him by whom or in whose establishment the fatal mistake was committed. The conviction that everyone connected with a druggist's dispensary has, that Nemesis will assuredly and immediately follow any serious mistake, is the greatest possible safeguard to the public. Now contrast with the foregoing the character of dispensing and dispensing arrangements generally prevailing in "doctors'" private surgeries, especially in the "country." I would prelude it with the reminder that public analysts have no power to test the purity of drugs or chemicals employed in the surgeries of "doctors," and yet it must be equally necessary as—nay more necessary than—the power to test those dispensed by chemists. In such surgeries there is usually no systematic and intelligent arrangement, but confusion, as a rule, reigns supreme. Many of the bottles too are imperfectly labelled, some unlabelled, some without stoppers; infusions too are made by rule of thumb, and the slovenly manner in which the bottles of physic for the patients are corked, labelled and wrapped, proclaim unmistakably to the initiated the slovenly manner in which the medicines have been prepared.

But why should such dispensing be performed more slovenly than in druggists' establishments? Answer—Because it is a common practice for hundreds of medical men, even in large provincial towns, and still more in country places, to depute their wives or their sisters, or their daughters or their grooms—the latter the most frequently—to perform this onerous work. And what renders such practice more serious—more patently dangerous, is that it is not performed under the surveillance—the vigilant eye of the doctor, but is generally done while he is absent, either driving round visiting his patients, or testing his skill with a double barrel, or galloping across country. I know a medical practitioner, dwelling not far from the banks of a certain classic stream, in such good practice that he is able to keep a stud of some dozen horses, not all required for visiting his patients, but the majority for fox hunting, he being certainly as ardent a follower of Nimrod as a disciple of Æsculapius. The "dispenser" of this gentleman is the husband of his cook, and was erst his "boy in buttons," and I was once intimately acquainted with another (now gone to his rest), the origin of whose "dispenser" was precisely similar, who married one of his domestic servants, and who through long years had to support himself, wife and family on 20*s.* a week. And some while since the groom of a medical man, in a large town in which I was then living, came to me, and said "Mr. Veritas, please tell me the best way for me to get to be an assistant in a chemist's shop, I have done all Dr. Squill's dispensing" (and that would not be a little) "for the last nine months, and I should like now to be a chemist's assistant." The advice I then gave him has resulted in his now getting an honest living (and a much better living than being "a doctor's dispenser" at 20*s.* a week), as a carrier.

There can be no doubt that the number of prescriptions dispensed in private surgeries throughout the kingdom far exceeds those dispensed by chemists, and yet I believe that it is a fact that the number of coroner's inquests held consequent on misadventures occurring in druggists' establishments far exceed those—comparatively few though they be—arising from similar causes, in the surgeries of medical men. How is this apparent anomaly to be explained? Very readily. As I have said no fatal error can be made by a druggist without certain discovery and publicity resulting. Not so with errors occurring in private surgeries. In a hundred ways, besides the real one, deaths resulting can be accounted for, and doubtless often are. Having regard for your space, I will mention but two circumstances pertinent to this assertion, with which I will conclude my already long letter.

A medical man, in the dusk of an evening, went into his surgery, intending to give a patient, I think a club patient, a black draught. The laudanum bottle stood beside that containing senna mixture (!) and he poured out twelve drachms of the latter instead of the former, and death claimed the victim of the doctor's culpable negligence. Had a druggist been the offender, a verdict of manslaughter would have been recorded against him, but a brother medico was called in, and though he saw the dregs of the laudanum in the teacup out of which the fatal draught had been drunk, and knew for certain that the cause of death was narcotic poisoning, *esprit de corps* outweighed with him the sanctity of his oath, and he and the coroner so bamboozled the non-intelligent jury, that they returned a verdict that death was caused by painters' colic! He complained to me afterwards of the base ingratitude of his professional brother, who, after all risk of being caught in the meshes of the criminal law had passed, vowed that he did not believe that he had made a mistake!

A doctor in large practice in London, with whom pulv. antim. co. was apparently a panacea for a considerable moiety of the ills that flesh is heir to, suddenly found that numbers of his patients—children and adults—became far more ill after taking the medicines that he and his assistants prescribed than they were before, violent sickness being the chief symptom. On examining the last pound of "pulv. antimonialis" received from the druggist, the cause was discovered; it proved to be emetic tartar! Now I cannot say, at this lapse of time,—though I was one of the establishment,—whether any of the doctor's patients died from the substitution of the one chemical for the other, but it is very certain that if half a score had been killed, not a syllable of the sad business would have publicly transpired. I think I have said enough, and more than enough, to prove that the public have not the safeguards to secure them against accidental poisoning by medicines dispensed in doctors' surgeries as they have with regard to those dispensed in chemists' establishments; in fact, they have no safeguards, and a remedy ought to be found for so frightful an evil.

VERITAS.

Sir,—"A (sometime) Country Doctor" ventures to administer to one "Filius" what he seems to consider a very severe castigation for presuming to comment on the practice of a certain class of medical men. As to the attainments of country practioners, of whose methods I have during a rather long life had much experience, I am constrained to acknowledge that although "Filius" expressed himself rather freely, his statements are quite borne out by my own observation—I have known the putting up of medicines entrusted to not only members of the doctor's family but also to domestic servants and others who possessed no technical knowledge whatever of the articles they handled.

The "(sometime) Country Doctor" speaks of the number of prescriptions he was accustomed to dispense. I must demur to the term prescription as applied to the ready-made cheap stuff the country doctor keeps in his surgery and which is filled out into bottles, then duly labelled and despatched.

I once called on one of these duly qualified men, who was baffled by a prescription he had undertaken to dispense for a high-class patient. The formula contained chlorodyne and compound tragacanth powder, and such a mess as he had compounded I never have seen before or since. He was struck with admiration to see the mixture prepared *secundum artem*, and said "he should never have thought of doing it in that way."

One other instance. A young practitioner who had passed in everything but pharmacy (which they do not teach at his hospital) offered me £2 for a little instruction in dispensing, etc., for a few weeks, when said he "You can sign me up." Of course I declined the proposal. But would it not be well for medical students to get well grounded in pharmacy before entering upon their future career? It would do them good in many ways; prevent the formation of loose habits, so unfortunately the rule with the class.

Several distinguished doctors are known as having first graduated as dispensing chemists.

ASMODEUS.

IRIDESCENT CRYSTALS OF CHLORATE OF POTASH.

Sir,—In Mr. Holmes's interesting remarks on the drugs and chemicals at the last Evening Meeting, he said, respecting the iridescence of some crystals of chlorate of potash, that a very few were found in a large quantity of chlorate, and that he did not know the cause.

I think it will be found due to the presence of a minute quantity of lead. What makes me think so, is, that in the preparation of sal prunel. glob., where several hundredweights of nitre are kept in fusion some hours, a beautiful iridescent film of lead rises to the surface, which is carefully removed by skimming before moulding. I think this accidental presence of lead is from the vessel in which it is crystallized, as it does not occur when I use the natural nitre of India, but I always see it when using that manufactured artificially.

H. O. HUSKISSON.

PATCHOULI.

Sir,—In the very interesting article "Notes on Patchouli' by J. Ch. Sawer, in last week's Journal, the author refers to the great differences observed in the aroma of the oil, which he considers to arise either from the method of production or from adulteration.

The mixture of other leaves with those of the true patchouli in the bales which find their way to Europe, has engaged the attention of Dr. Heinrich Paschkis,* who submitted several samples of those found in commerce to careful histological examination, with this result, that in addition to the true patchouli leaf, the characters of which he illustrates and describes in his pamphlet, he found the leaves of several plants differing specifically from the patchouli, not even any of its varieties, and these, although varying in relative proportions, were always present in considerable quantity, in some instances to the extent of 80 per cent., and he adds that of the many samples examined by him, one only was found to consist of the true leaves.

The form of the patchouli leaf, the simple hairs with their several cells, the oil containing druses on both surfaces, are characters, in addition to others of lesser value, which serve to distinguish the true leaf from its adulterant.

Patchouli oil, therefore, drawn "from baled leaves without reliable pedigree," such as is imported into England or Germany, and probably for the most part corresponding in quality with those which came under the notice of Dr. Heinrich Paschkis, must be of inferior quality as compared with that drawn from selected leaves at the place of their growth.

THOMAS GREENISH.

GLYCEROLE OF CINCHONA.

Sir,—I am glad to see by an article published in your last issue that the solubility of cinchona principles in glycerine is again attracting attention. In 1876 I read a paper on the subject at the meeting of the Pharmaceutical Conference in Glasgow, and the preparation then made is still perfectly bright and without deposit; nor does it gelatinize as was stated by Mr. Martindale to be the case with a somewhat similar preparation included in the U.S. Pharmacopœia.

The solvent powers of glycerine on vegetable matters generally is a subject well worthy of careful attention and experiment, for it is very probable that series of glyceroles might be made that would advantageously replace some of our present tinctures.

34, Leinster Terrace, W. FREDERICK ANDREWS.

MIDLAND CHEMISTS' ASSOCIATION.—A CORRECTION.

Sir,—In your report of the proceedings of the meeting held last week, some remarks were incorrectly attributed to me respecting spirits of nitre, cream of tartar and tartaric acid.

The fact is I made no reference whatever to any of these articles. It is no doubt an unintentional error on the part of the Secretary.

THOMAS BARCLAY.

Norsk.—Moller's pamphlet was published in Christiania in 1862. A copy of it is in the Library of the Pharmaceutical Society.

J. Lowe.—We cannot comply with your request to advertise for the formula of a certain maker's preparation; but a large number of recipes for cements have been published at different times in this Journal, and may be referred to with the aid of the indexes.

R. Hall is recommended to use a weak alkaline solution for the purpose.

"*Inquirer.*"—The formula for Mr. Wilson's lotion for the hair has been given several times. See *Pharm. Journ.* for March 29, 1879, p. 812.

"*Cymro*" and "*Minor*" are referred to the rule respecting anonymous communications.

Kenbaan.—We do not think that the publication of your question would elicit any opinion more authoritative or more clearly expressed than that given in the judgments of Lords Justices Cotton and Lush, as printed before, p. 424.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Stoakes, Calvert, Bartlett, Brady, Lister, Martin, Haydon, Langbeck, Turney, Subscriber, Eblana, Alpha, Pimlico, Carbo, J. P. N. B., J. W.

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* 'Zur näheren Kentniss einiger minder bekannten Blätter.'

NOTE ON THE HISTORY OF SAFFRON.*

BY CHARLES B. ALLEN.

Having served my apprenticeship in a town of West Cornwall, it was with more than ordinary interest that I noticed the following passage under the heading of "Uses of Saffron" in the 'Pharmacographia':—"A peculiar preference for it (saffron) as a condiment exists in various countries, but especially in Austria, Germany and Switzerland. This predilection prevails even in England, at least in Cornwall, where the use of saffron for colouring cakes is still common."

To what an extent this is the case, even the author of the above paragraph could scarcely have been aware; for, after many years' residence in the county, and after a few years' separation from it, nothing strikes me as being more peculiar than the universal adoption of this drug to the purposes of a condiment, and I have for a long while felt certain that so singular a custom must have originated in some other way than that of fashion alone.

It will, perhaps, not be too much to say that more saffron is used in Cornwall than in all the counties of England placed together. Every week, in the ordinary Cornish household, huge pans of dough, highly coloured by an infusion of saffron, are made up into plain cake, which is generally recognized as an article of daily diet; but when it happens to be a time of special importance, such as the annual feast day of the parish, or at Christmas, it is then that saffron cake occupies as prominent a position as the loving cup which graces the civic banquet, for portions of the "feasten cake" are on such occasions sent around for friends to taste.

"As dear as saffron" is a Cornish proverb, and signifies the ideal of expensiveness. Only very lately a Cornish merchant of my acquaintance kindly informed me that although, in his estimation, it was not used as freely as in earlier days, he yet bought it in quantities of 100 or 200 lbs. at a time. I have no doubt that he is one of the largest buyers in the western district; but at the same time every chemist, grocer, and village shopkeeper, throughout the county, retails annually a large quantity, selling it almost solely for use as a condiment in the manner I have explained.

There are various stories to account for the introduction of saffron into England. The 'Pharmacographia' gives the reign of Edward III., between A.D. 1327 and 1377, as a probable date. It has also been attributed to the Crusaders; whilst yet another account states that a bulb was brought from the East by a pilgrim in his staff, who secreted it at the peril of his life. Whichever version may be correct, it does not seem satisfactory to suppose that it was introduced to the Cornish at that date, or in the annals of the county authentic evidence would have been easily forthcoming; moreover, in the progress westward of so strange a practice, it would most assuredly have left its traces in some other county, which I cannot find to have been the case, and although there is abundant evidence to prove that it was cultivated largely in Essex and other districts of England, at one period actually forming an article of export, there is, on the other hand, nothing to show that its use was adopted widely by any particular county or class of people in the British Islands.

Saffron is known to be indigenous to Persia, Arabia, and other districts of the East, and to have held a prominent place amongst the fragrant spices of the Orientals. One thousand and fourteen years before the Christian Era, in the Song of Solomon, it is exalted as amongst the chief spices. It must have been in regular use by the Jews at that period, and at the present day it is largely used by them in all parts of the world; they use it in rice and also in a peculiar kind of soup, and strictly as a condiment. Probably its use, as mentioned in the 'Pharmacographia,' in Austria, Germany and Switzerland, is attribntable to the large number of Jews who have lived in those countries. Noticing the very frequent sale of saffron to people of the Jewish persuasion, I have been gradually led to connect them in some degree with the origin of its use in Cornwall.

With the very earliest dawn of authentic history there exists in Cornwall records of the Phœnicians, certainly the most remarkable people of the ancient world, seeing that we stand indebted to them for the invention of letters. The strip of land which they inhabited in the northern portion of Palestine, containing the cities of Tyre and Sidon, was never conquered by the Jews. According to Herodotus they said of themselves in his time that they came in days of old from the shores of the Red Sea, and they spoke a language cognate to that of the Arabians who inhabited the east coast of that sea. Though the Jews had conquered the greater portion of the land of Canaan, Solomon evidently considered it politic to cultivate a friendly intercourse with the Phœnicians, who were Canaanites, and his own people, because of the superior knowledge of the former both in pilotage and navigation; we, therefore, find them trading together and eventually voyaging together. Of these voyages it is recorded that their general practice was to form permanent settlements wherever they carried on commerce, in the islands of the Mediterranean, in Asia Minor, in Greece, in Spain, possibly in England, certainly at Carthage and along the northern coast of Africa. They carried on a regular system of trade to Ophir for gold; but once in three years made longer voyages, not only for gold, but even extending their journeys to the Cassiterides, or tin islands of Cornwall, for procuring tin. Botallack, a mine still in existence near the Land's End, is said to have been frequently visited by the Phœnicians. Many of the remains discovered in Cornwall have proved its inhabitants to have been under some foreign influence, probably of oriental origin, whilst the religion of the Celts points to a similar conclusion. Marazion or Market-Jew, a small village near Penzance, has by some been supposed to be of Jewish origin and it is said that the Jews held a market there. Marazion is a corruption of the two words 'marah,' bitter, and 'zion,' haven, so-called from the fact of a brackish pool which still exists on the outskirts of the village. One of the principal streets of Penzance is called Market-Jew Street, and as may be supposed is the direct road to the above-mentioned place. In McIan's 'Costumes of the Clans' two figures of Celtic tribes or clans are depicted, clad in one of the oldest garments peculiar to the Celts, one of the clan Artair, McArthur of southern Ireland, the other Fergus McFheargus or Fergusons of the Highlands; this garment was called the 'Lein-croich,' or saffron-coloured shirt, which was the habit of people of distinction, and as its name imports, was dyed of a yellow colour from that plant.

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* Read at the Evening Meeting of the Pharmaceutical Society, December 1, 1880.

This custom of dyeing garments seems to have been pursued also in Ireland, as late as the time of Henry VIII., for a statute in that monarch's reign forbids the Irish, under penalty, from wearing "any shirt, smock, kercher, bendel, neckercher, mocket or linen cap dyed with saffron."

There is but little light to be thrown on the introduction of saffron into Cornwall, or its distribution in different countries by the names of saffron in their several languages. In all European countries the name is some modification of the Arabic word Zaferān, which may be a corruption of the Arabic word Asfar, yellow, giving in the feminine Safrā, meaning the same thing. In Russian it is written Schaphran; in Turkish (as in Arabic), Zăferān; in Armenian, Zafron; in Italian, Zafferano; in German, French and Norwegian, Safran; in Spanish, Açafron; in Portuguese, Azafrao; in Dutch, Saffraän; in Welsh, Safrwn and Safyr; and in Bengali and Hindu, Jáfrán; in Chinese, Sah-fah-yùr. All these appear to have come from the same source, though the Chinese may have received saffron through the Tartars, since Grossier, 'Déscr. de la Chine,' vols. 1–2, says that in some parts of Tartary tribute is paid to the princes in saffron.

Mr. J. W. Redhouse kindly informs me that the derivation of the word carcôm, mentioned in the 'Pharmacographia' as the Hebrew name used by Solomon in alluding to the plant, should be written krkm, and that as several names, such as kurkam kurkoom, and in Sanskrit, kurkuma, occur in different districts of India, it may have originally come to the Hebrews through that country. Solomon may have adopted this name during the traffic for gold, peacocks, etc., which was carried on with India in his reign. Under its Arabic name zăferān, it would have been known to the Canaanites long before the time of Solomon; and in the northern part of Turkey in Asia, a district is known as Zafferan Boli, meaning the district of saffron. The origin of the word curcuma is perhaps derived from the same Hebrew root, krkum, but it is a curious fact that while kurkum is Sanskrit for saffron, the word for turmeric is totally different, viz., nisa; in Hindi it is haldi or huldi, and in Bengali, halud; the Greek name for saffron, krokos, is supposed to be derived from the same Hebrew root, krkm, according to the 'Pharmacographia,' but Lemery, in his dictionary, published in 1727, states that the word crocus is supposed to be derived from the Greek *κρωκὶς*, meaning a thread. In the Latin language, crocus was applied by Pliny, not only to the crocus but to the yellow threads in the centre of flowers. Had the saffron come through the Romans there would probably be a word in the Cornish language similar to that of crocus.

Taking these facts into consideration it is not impossible that saffron may have been known to the Celts before the advent of Cæsar, and it is in the highest degree probable that it was originally introduced by the Phœnicians and bartered by them for tin to the western barbarians who, from their love for fine colours, would first have been attracted by it for the stain that it would produce, while subsequent and closer intercourse with the Phœnicians would doubtless have taught them to use it as they—the Phœnicians—used it, in the form of a condiment, and this knowledge has probably descended from generation to generation, until it stands exemplified as a peculiar custom, existing in the homes of our Cornish kinsmen of to-day.

It is with the hope of raising a discussion upon this matter, and for the sake of gaining clearer information upon it, that I am induced to communicate this paper.

[*The discussion on this paper is printed at p.* 462].

THE USE OF SAFFRON IN THE PHARMACOPŒIA.*

BY E. M. HOLMES.

Saffron occurs in seven preparations of the British Pharmacopœia, and is an official article in the French, German, Hamburg, Belgian, Russian, Danish, Swiss, Netherlands, United States, Norwegian, Portuguese, Spanish, Austrian and Greek Pharmacopœias, but not in the Finland one.

Of the seven preparations alluded to as occurring in the British Pharmacopœia, namely, decoctum aloës co., pil. aloës et myrrhæ, pulv. cretæ aromat., tinct. cinch. co., tinct. croci, tinct. opii ammoniata, and tinct. rhei, in the simple tincture of saffron only can it be said to be a necessary ingredient, and the pharmacist who makes the above preparations may well ask why this expensive drug, so liable to adulteration, enters into their composition.

From the time of Pliny, who says concerning saffron: "Adulteratur nihil æque," it has always been expensive and adulterated more or less. In most of the leading works on therapeutics at the present day, *e.g.*, Ringer, Bartholow, Wood and Headland, saffron is entirely ignored as a therapeutic agent. Only in Phillips's work on 'Materia Medica and Therapeutics' do we find it mentioned, as follows:—"Taken internally as a medicine, saffron is a slightly exhilarating stimulant. The properties which give this power depend upon a volatile oil; but unless employed in large doses the service it may render appears to be inconsiderable, and used in excess it is said to have proved fatal." Dr. W. G. Smith, in his 'Commentary on the British Pharmacopœia,' says of saffron: "Formerly much esteemed as an antispasmodic and emmenagogue, but is not now believed to possess any real activity. It is frequently ignorantly taken by patients labouring under exanthemata, with the intention of favouring the development of the eruption." Dr. R. H. Semple, in the *Medico-Chirurgical Review*, 1876, p. 500—1, remarks: "Although saffron was very much extolled as a medicine by the ancients, and subsequently employed by the Arabian physicians, and although it is still largely employed by the medical practitioners of all civilized countries, it has lately been regarded only as a colouring and flavouring ingredient in various medicinal compounds." In 'Pharmacographia,' the authors remark: "Saffron is of no value for any medicinal effect, and retains its place in the Pharmacopœia solely on the ground of a colouring agent." Bentley and Trimen in their 'Medicinal Plants,' state that "at present it is scarcely ever employed in this country or in the United States as a medicinal agent. Its chief use in medicine is as a colouring and flavouring agent, for which purpose it is an ingredient in several official preparations."

With regard to the tinctura croci, it appears to form an agreeable colouring and flavouring agent; but if saffron be used only as a colouring or flavouring agent in the Pharmacopœia it is difficult on that ground to account for its presence in decoct.

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* Read at the Evening Meeting of the Pharmaceutical Society, December 1, 1880.

aloës co., pil. aloës cum myrrha, tinct. rhei and tinct. cinchonæ co., from either of which its presence would hardly be missed. The use of saffron in these official preparations must therefore be traced to another source. If we examine into their history it will be found that, like many other valuable preparations of the Pharmacopœia, they were made at first to imitate or supplant patent medicines or proprietary articles which the medical practitioner of former times found advantageous to use, just as those of the present day have adopted chlorodyne or liquor bismuthi. Thus, decoctum aloës replaces baume de vie or balsam of life; pil. aloës et myrrhæ is still called pil. rufi; pulvis cretæ aromaticus may be traced back through the names of confectio cardiaca from the London Pharmacopœia of 1745 to that 1724, where it occurs as Raleigh's electuary or confectio Raleighana, with over forty ingredients; tinct. cinchonæ co. is still known as Huxham's tincture of bark in England, Belgium and Spain; and tinct. opii ammoniata as paregoric elixir in Scotland. The use of saffron in some of the above preparations, such as pil. rufi, may be traced back to the time of Culpepper, and indeed to the influence of astrology on medicine, for Culpepper, who lived between 1616 and 1654, says of it, "It is an herb of the sun and under the lion, and therefore strengthens the heart exceedingly. Let not above ten grains be given at one time, for being taken in immoderate quantity it may hurt the heart instead of helping it. It quickeneth the brain, for the sun is exalted in Aries, as well as he hath his house in Leo. It helpeth the consumption of the lungs and difficulty of breathing and is an excellent thing in epidemical disease or pestilence, small pox or measles. It is a notable expulsive medicine and remedy for the yellow jaundice."

But that Culpepper only reflected the beliefs of the preceding generations is evident from the remark of Christopher Calton, who, in 1591, says, "The saffron hath power over the spirit and the virtue thereof pierceth by-and-by to the heart provoking laughter and merriment, and they say that those properties come by the influence of the sun."

All succeeding writers seem to have adopted these views of its use up to the end of the last century; indeed the fact that Culpepper's herbal has retained its popularity among the less educated classes during the last two hundred years is sufficient to account for the widespread use of saffron by nurses, etc., in this country, for measles and other exanthematous diseases.

Before leaving the origin of the medicinal use of this drug it may be interesting to notice how history repeats itself in the case of saffron.

Homer speaks of the yellow-haired Achilles, as if yellow hair was considered beautiful in his time, and we find that in the time of the Christian Fathers saffron was used by the ladies of Italy, who envied the fair-haired beauties of the north, to dye their hair; for Tertullian, Cyprian and Jerome denounced the practice, and declared that the hue thus obtained was a presage of the fires of hell. In the present day we find the practice repeated, with the difference that peroxide of hydrogen is used instead of saffron.

As a perfume the costly essential oil of saffron was used by the Romans as a cosmetic for the skin and as a perfume for the hair, and it is interesting to note that spray diffusers were used by them on a large scale; for an infusion of saffron, made by steeping it either in water or wine, was diffused by means of a powerful syringe in their theatres to refresh the atmosphere, so that the liquid fell over the multitude in the form of an "almost impalpable dust."

But my object in calling attention to the use of saffron in the Pharmacopœia was to demonstrate that in future Pharmacopœias it might with advantage be omitted from all the preparations except a tincture or syrup, or preferably, a glycerole of saffron.

Although all the European Pharmacopœias except that of Finland include a compound tincture of rhubarb, none of the formulæ, nor that of the United States Pharmacopœia, contains saffron. The same remark applies to tinct. cinchonæ co., with the exception of the Belgian and Spanish formulæ, which are both headed with the synonym of Huxham's tincture of bark, and contain saffron. Pil. aloës et myrrhæ, occurs only I believe, in the Belgian, Swedish and Portuguese Pharmacopœias, and contains saffron in each.

In the United States Pharmacopœia the pulvis aromaticus does not contain saffron. It is obvious that there is something to be gained by the omission of saffron from the above-mentioned tinctures, for the nearer the approach to a universal formula for such preparations as are used in every Pharmacopœia, the less difficulty and delay there will be for the dispenser of foreign prescriptions in different countries and the greater satisfaction there will be to the patient, whose belief in the non-identity of the medicine, arising, perhaps, from a slight difference of tint of the liquid, is in some cases liable to nullify the good effect of the prescription; in other words, the curative power of faith may be suspended by a want of exact uniformity in the appearance of the medicine. Again, in those preparations which have replaced patent medicines, it is evident if drugs which the medical profession consider worthless, or nearly so, and which may be traced back to astrology, are retained, that the Pharmacopœia is descending to popular prejudice, and is attempting to formulate for trade preparations rather than for the medical profession.

Since the above paper was read, I have been informed, through the kindness of Mr. H. B. Baildon, that the Celtic for saffron is Cròch, not Croich, and that Liòn is Celtic for flax, Lein meaning a shroud and Croich a gallows or gibbet in the same language

[*The discussion on this paper is printed at p.* 462].

BORON AND ITS COMPOUNDS.*

BY EDWARD DAVIES, F.C.S., F.I.C.

In choosing a subject for a paper I was influenced by a desire to more fully satisfy myself as to the nature of the boron compounds, and the place of boron in relation to other elements. M. Mendeleef's recent work has thrown much light upon these points, and although they may seem to be chiefly of scientific interest, the scientific side of chemistry has an equal right with the practical and pharmaceutical to come before the consideration of this Association. Boron, as an element, was discovered by Gay Lussac and Thénard, in 1808, and immediately after by Sir H. Davy. Its oxide, B_2O_3, is not decomposed by carbon, but potassium and sodium readily take away the oxygen To prepare it, 60 grams of sodium, in small pieces, are mixed with 100 grams of fused boron trioxide in an iron crucible, and the mixture is covered with 30 grams of ignited chloride of sodium. A vigorous action ensues on heating; the fused mass is stirred with an iron rod, poured into water acidulated with hydrochloric acid, washed and dried. This gives amorphous boron as a brown powder, infusible at white heat, burning at 300° C., and in oxygen with a brilliant light, forming boron trioxide. Like carbon, boron has three modifications: amorphous, graphitic and adamantine. The two latter are produced when B_2O_3 is fused with aluminium. At a moderate heat the graphitic form is produced, and at a white heat, the diamond form.

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* Paper read before the Liverpool Chemists' Association, November, 1880.

Graphitic boron has a semi-metallic lustre and a copper red tinge. It does not burn in air.

Adamantine boron is found in crystals, having the form of an octahedron. The colour varies from yellow to deep red. The hardness is nearly equal to that of diamond. It does not burn even when heated in oxygen, and is only oxidized slightly, but is slowly dissolved by fused KHO.

Boron unites with oxygen, nitrogen, chlorine, bromine, fluorine and sulphur. It does not readily unite with metals, except platinum and palladium.

I do not propose to enter upon a description of all the boron compounds, but confine myself to those which present points of special interest. Of these, boric acid is perhaps the most remarkable.

The origin, basicity and properties of this substance are alike interesting, and in some respects paradoxical. We are ignorant as to the source whence boric acid is derived. The action of steam at high temperatures on sulphide of boron or nitride of boron at great depths in the earth has been supposed to be its source, but these explanations are purely hypothetical, as these bodies have not been met with in nature. Borates decomposed by carbonic acid in presence of steam is the most probable source, but this theory gives no explanation of the occurrence of ammonia as the constant companion of boric acid. The subject is one which still requires investigation. The manner in which the vapour of steam, issuing from fissures in volcanic countries, especially in Tuscany, brings up with it boric acid is well known. The entire district is still the seat of earthquakes, and immense clouds of vapour issue from crevices in the earth. The vapours consist of steam, carbonic acid gas, sulphuretted hydrogen, hydrogen, nitrogen and mineral matters carried up mechanically, with very small quantities of boric acid. The condensed liquors are concentrated by the heat of steam issuing from crevices and allowed to crystallize. The boric acid thus obtained contains many impurities, principally the sulphates of ammonium, calcium, magnesium, sodium and potassium. This sulphate of ammonium is the source of the so-called volcanic ammonia, valuable as being free from the traces of tarry matters which ordinary ammonia contains.

Crystallized boric acid is H_3BO_3. If this is to be considered as the anhydrous acid it is tribasic; if only as boric acid and water its formula will be HBO_2H_2O, and the acid will be monobasic. Another view combines both, and considers H_3BO_3 as orthoboric acid, analogous to H_3PO_4 orthophosphoric acid, and HBO_2 as metaboric acid, like HPO_3 metaphosphoric acid.

If ability to form chemically neutral salts be taken as an indication, H_3BO_3 would have to be given up, as there are no salts having the formula M_3BO_3, at least none have been obtained in the free or crystalline state. Bloxam has shown that by fusing B_2O_3 with Na_2CO_3, two molecules of CO_2 can be separated, and with $SrCO_3$ three molecules, in the latter case forming a salt with the required formula $Sr_3B_2O_6$. Still stronger evidence is, that when B_2O_3 is fused with excess of NaHO the reaction occurs $B_2O_3 + 6\,NaHO = 2\,Na_3BO_3 + 3\,H_2O$. Neither of the salts appears to have been isolated, nor any attempt made to show that the solution of the sodium salt had properties differing from those of $NaBO_2$.

The strongest evidence is the formation of a borate of ethyl $(C_2H_5)_3BO_3$, as this replacement of the hydrogen of the acid by ethyl in all other cases marks the basicity of an acid, as $(C_2H_5)_4SiO_4$, $(C_2H_5)_3PO_4$. Metaboric acid appears to be capable of isolation, although the most conflicting statements have been made about it. In Watt's 'Dictionary' it is stated that the crystallized acid loses half its water on heating to 80°–100° C., leaving $2B_2O_33H_2O$. Gmelin says that the crystals do not lose water at 100° C.; Schaffgotsch that they lose all their water at 100°, and Frankland that they lose H_2O and become HBO_2. I have made the experiment with some carefully recrystallized and air-dried boric acid. It lost 30·07 per cent. in a water-bath, rather more than corresponds to HBO_2, which requires 29·03; but this slight difference may result from the volatilization of a little boric acid, as when heated more strongly to expel all water, the total loss was 45·3 per cent. instead of 43·57 per cent., evidently showing loss of B_2O_3. There is a borate of ethyl, $C_2H_5BO_2$, but it appears to be very unstable, easily resolving itself into triborate of ethyl and boric anhydride. In my opinion the true constitution of the borates is, that they are derived from H_3BO_3, and are for the most part acid salts, at all events in solution or occurring as crystallized salts. Thus the following classed as metaborates can equally be represented as orthoborates:—

$$KHB_2O_4,2H_2O = KH_2BO_3H_3BO_3$$
$$NaBO_2,4H_2O = NaH_2BO_3,3H_2O$$
$$Na_2B_4O_7,5H_2O = 2(NaH_2BO_3H_3BO_3)$$
$$MgB_2O_6,2H_2O = MgHBO_3H_3BO_3$$

It sounds contradictory to call salts acid which are intensely alkaline to test paper; but a distinction is drawn between chemical and physical neutrality. Thus Na_2HPO_4 is an acid salt, though neutral to test paper, whilst Na_3PO_4 is chemically speaking neutral, though its reaction is strongly alkaline. If this is the case with phosphoric acid, which is a powerful acid, it is much more so with boric acid, whose action on litmus is much the same as that of carbonic acid.

Sodium Borates.—The metaborate, $NaBO_2$, as obtained by fusion, crystallizes with $4H_2O$, and may be looked upon as an acid orthoborate. This salt is now manufactured as an article of commerce in France. It is strongly alkaline, and absorbs carbonic acid from the air.

Sodium Anhydroborate. Borax.—At one time our only supply of this valuable salt was India. Into that country it was imported from Central Asia, especially from Thibet. Little appears to be known about the sources of this borax, as Thibet is jealously guarded from foreigners and its mineral resources are especially kept secret. All the information that I have been able to gather is that there is a lake, 6 miles by 2, which yields borax, in Thibet; but no details were given as to the manner of extraction. This borax is called tincal, and is coated with greasy matter, which is said to be added to diminish breakage of the crystals in carriage. It requires purification before it can be brought into the market.

Much borax is now made from boric acid by neutralizing it with carbonate of sodium. It is also made from the borate of calcium, and natroborocalcite, a borate of calcium and sodium. I do not intend to speak of the processes used for these materials in this paper.

Of late years a new source of borax has been discovered in America. I remember many years since seeing a very fine sample of borax brought to Dr. F. Crace-Calvert's laboratory, which had come from California, but it seems that nothing was done on a large scale until recently. In the 'Popular Science Review' for 1877 there is an interesting paper on the Borax Lakes of California, from which I have taken the following description:—

"The two Borax Lakes are situated near Clear Lake, in Lake County, California, 110 miles from San Francisco. The larger lake is about 300 acres in extent, from 2 to

5 feet deep, and in its muddy bottom borax is found in crystals, some of which are more than a pound in weight. They are disseminated through the clay which forms the bottom, the finest at a depth of about 3 feet, and above them a layer of smaller crystals. A borehole sunk to the depth of 60 feet showed crystals in its whole extent. The water of the lake contains about 18 per cent. of borax, with chloride and carbonate of sodium. The borax is obtained by sinking sheet iron coffer dams into the lake, pumping out the water and digging out the mud. This is then washed with the water of the lake, so as to remove the mud and leave the crystals. At one time 3000 pounds of crystals were thus obtained daily; they were dissolved in boiling water and recrystallized. Little Borax Lake is about 30 acres, and is generally dry in September and October. A white crust of borax is then left, which is collected by Chinese labourers and recrystallized. About a mile from Borax Lake is a tract of 6 or 7 acres, known as Sulphur Bank, consisting of decomposed volcanic rock, with innumerable fissures, whence issue steam and gas, the former laden with boric acid. The locality appears to resemble that in which the 'suffuoni' of Tuscany arise, and in time to come, no doubt, it will be utilized as a source of boric acid. There are also hot springs, containing 103 grains of borax to the gallon and also 107 grains of bicarbonate of ammonium, an amount of ammonium salt unequalled in any known water. On the eastern slopes of the Sierra Nevada, near Walker's Pass, there is the bed of an ancient lake, the mud of which contains half its weight of borax in crystals; similar deposits are found in Lower Nevada."

Boronatrocalcite ($Na_2B_4O_7 2CaB_4O_7, 18H_2O$, or
$2NaH_2BO_3, 2CaHBO_3, 8H_3BO_3, 3H_2O$,
also called *Hayesite* and *Ulexite*).—Of this mineral there appears to be several varieties. It generally contains sulphate and chloride of sodium, sulphate of calcium and other impurities. This mineral is found along the western slopes of the Andes, and then in the continuation of the chain in North America, especially in the state of Nevada, where there are districts covered with alkaline salts, under which the ulexite is found at a depth of a few inches.

Hydrated Borate of Calcium.—This is a mineral recently imported, I believe, from Turkey, and exceedingly pure.

Chloride of Boron.—Obtained pure by heating boron in dry chlorine; its formula is BCl_3, and establishes the atomicity of boron as triadic.

Nitride of Boron.—Few of the elements combine directly with nitrogen, but when boron is heated in a current of nitrogen it forms BN. It is also obtained by heating borax with ammonium chloride. On heating this substance in steam it forms B_2O_3 and NH_3.

There are many organic compounds containing boron. The most important of these are the various boric ethers. True to the indefinite character of boron compounds, there are no fewer than three ethyl borates: $(C_2H_5)_3BO_3$, $C_2H_5BO_2$, and a compound given as $(C_2H_5)_2O2B_2O_3$. As the formula of the last compound by no means agrees with its analysis, it is probably a mixture.

The chemical relations of boron are very interesting. The fact that it in common with C and Si has three allotropic modifications, similar in character in the three elements, suggests some bond of union. This fact is, however, the only patent relation as, unlike other triads of elements, there is no relation of atomic weights, their atomicities are different, and their acids all differ in basicity. Certain researches, of which the periodic law of Mendeleef is the crowning point, have thrown much light on the relation of these elements.

In Mendeleef's classification of the elements they are arranged in the order of their atomic weights (as in the diagram shown at the meeting), where in the horizontal series there is a gradual increase in the maximum amount of oxygen, and a corresponding diminution in the amount of hydrogen with which the elements can combine. There is also a strongly marked tendency to form strong bases in the left hand elements, with a corresponding tendency to form acids in the left hand elements. On the other hand, in the perpendicular groups we have elements of similar character, as Cl, Br, I, and it will be noticed that the elements in the odd series are related to one another more closely than they are with those of the even series, and *vice versâ*. On looking at boron we see that in the series the order is Li, Be, B, C, N, O, H. Boron thus stands between Be, which forms a distinct base, and C, which does not form any basic compound. It thus stands as an element whose oxidized compound may form either an acid or base, and this is just the character of B_2O_3. With water it forms an acid which scarcely affects litmus and is partially expelled from its compounds by CO_2 in the cold.

The close relations of boron with carbon and silicon are also explained, for carbon is its next neighbour, and carbon and silicon are following members of the same group. There are no known compounds of an element with 5 H. Boron stands in the place of an element whose compound with hydrogen should contain 5 atoms, and all attempts to make boruretted hydrogen have failed. In its own group it stands next to aluminium, whose oxide can act either as an acid or base. The nearest element in an even series was in Mendeleef's chart represented by a blank space. He prophesied that an element would probably be found to fill the place; he was even able to predict its properties, and provisionally he named it ekaboron. Since then a new element has been discovered, to which the name of scandium has been given. Its atomic weight fits it for the vacant place, and its properties agree exactly with the forecast.

Those are some of the less known facts in relation to boron, and I trust that their interest has justified my choice of a subject.

POISONOUS PROPERTY OF A "STAR ANISE."

The following communication upon this subject is published in a recent number of the *Pharmaceutische Zeitung*,* and appears to be from the pen of Professor Theodor Husemann:—

In No. 18 of the *Pharmac. Weekblad*, A. J. C. Geerts makes a communication from Yokohama upon a poisonous fruit allied to the star anise, which, notwithstanding that it is described in some works as poisonous, or at least doubtful, has hitherto received very little consideration from pharmacognosists and toxicologists, and the mother-plant of which has moreover been repeatedly described as that of star anise. It is the fruit of *Illicium religiosum*, Sieb., a Japanese tree, of which the evergreen branches have from ancient times been used in Japan in the decoration of the temples and the statues of the gods; but the fruit of which is looked upon as poisonous. This, in fact, it is, as is shown by some cases of poisoning that have occurred in the prefecture of Kanagawa, where the eating of some food prepared with oil pressed from the seeds in the place of rapeseed oil caused the death of one adult and the severe poisoning of five other persons, characterized by repeated vomiting. In Japan the oil in question is used as a cheap lighting material, and as a lubricating oil, but not as a culinary oil; neither is the fruit used as a condiment, whilst the fruit imported from China of the star anise tree, *Illicium anisatum*, Lour., which does not grow in Japan, is generally used.

The confounding or identifying of *Illicium religiosum*, Sieb., and *Illicium anisatum*, carelessly permitted until recent times in various handbooks, had its origin in a mistake of Linnæus's, who looked upon the Japanese tree, as first figured by Kämpfer in his famous 'Amœnitates Exoticæ' (Lemgoviæ, 1712), as the mother-plant of the true star anise, and described it as *Illicium anisatum*,

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* *Pharm. Zeit.*, Sept. 1, p. 530.

Linn., which name is consequently a synonym of *Illicium religiosum* and perfectly distinct from the Cochin Chinese mother-plant of star anise, described under the name *Illicium anisatum* by the Portuguese missionary Loureiro, in his 'Flora Cochinensis,' where he speaks of the carpel as "ovato-lanceolatæ horizontaliter in orbem dispositæ," and emphasizes its agreeable smell of anise, and sweetish taste. Even Loureiro, however, notwithstanding the characteristic difference in the fruits, which is clearly shown in Kämpfer's figure, held that the Japanese and Cochin Chinese Illiciums were identical. Thunberg, who in his 'Flora Japonica' used the name *Illicium anisatum*, L., for the Japanese species, expressly remarked, on the other hand, that the fruit of the Japanese tree did not possess such aromatic properties, and that the star anise used in Japan as a condiment was imported. The first who demonstrated with certainty the difference in the two species, and called attention to the poisonous property attributed to the Japanese fruit by Japanese writers, was Ph. F. R. von Siebold.

Siebold's name, *Illicium religiosum*, referred to the use of the branches in the temple services. In his 'Flora Japonica' Siebold mentions that although, apart from the want of aroma, the fruit of the Japanese species might be very similar to the true star anise fruit, yet the true star anise tree of the provinces situated west of Canton presented, according to Loureiro's description, essential differences; especially that it was smaller (8 feet high) and had smaller ovate leaves, rounded at both ends, whilst the flowers had more than thirty stamens. The fact, already mentioned by Kämpfer, that it is the bark and not the fruit which is aromatic, is confirmed by Siebold, who also refers to its use as incense in temples. He also remarked that poisonous properties were ascribed to the leaves and that they were also used as an antidote in cases of poisoning by tropical fish, especially by the much dreaded *Tetrodon hispidus*. The opinion expressed by the Dutch botanist, De Vriese, that *Illicium religiosum* is only a variety due to local and climatic influences, was combated by Siebold in a special brochure, in which he produced irrefutable evidence from Chinese literature that *Illicium anisatum*, Lour., was not indigenous in either Japan or China, but had been introduced into the latter from the country bounding it on the south.

But according to Geerts an exact examination of the Sikimi fruit shows that besides the want of aroma it presents characteristic differences from the star anise. The ends of the carpels of the Japanese fruit are pointed and curved upwards, whilst the apex of the star anise is mostly pressed in and extended horizontally. The former are more woody, rougher on the surface and enclose brighter and yellowish seeds; moreover, they are more compressed and boat-like than the rosette-formed star anise. The smell and taste of the Japanese drug recall camphor or the laurel, but not at all star anise.

The poisonous property of the fruit in question has been proved by Geerts in experiments made on animals with the oil which caused the poisonings mentioned above, as well as with a purchased oil and another prepared by himself. The oil in question is a thick clear yellow, sometimes greenish-yellow liquid, of peculiar smell and taste, and containing a large quantity of free fatty acids,—in the fresh condition 5·9 per cent. Two grams of powdered seed acted as an emetic and 10 grams of oil produced intense irritation of the stomach or intestines in dogs. In a preliminary examination the presence of an alkaloid could not be established.

The facts communicated by Geerts are certainly of no inconsiderable toxicological and pharmaceutical interest, and are adapted to clear up the errors which, notwithstanding the earlier attempt of Siebold in 1825, are tenaciously retained in books. The whole of the plates in the widest spread illustrated works on official plants, —E. von Hayne, Berg and Schmidt,—figure the Japanese species, which would be erroneous even if the opinion of De Vriese, that they are two varieties of one and the same plants,—an opinion which some celebrated botanists, such as Miquel and Baillon, have endorsed,—were actually correct, since the Japanese *Illicium* certainly does not yield the official drug, star anise. If toxicology has recognized in the hemp and the almond tree plants which under different conditions of climate and soil yield fruit that is sometimes poisonous and sometimes non-poisonous, and if, consequently, *Illicium religiosum*, Sieb., and *Illicium anisatum*, Lour., are not correctly looked upon as specifically distinct on account of their differently acting fruit, nevertheless it must be remarked that the Japanese *Illicium* also yields poisonous fruit in China, whilst the Cochin Chinese on its introduction into China has suffered no change in the properties of its fruit. Add to this the before-mentioned differences in the leaf form and in the number of stamens, and I believe that there is ground for considering them to be two species rather than two varieties. I would call to mind besides that in the tropics of the old as well as of the new world, species of *Illicium* occur which in respect to the aromatic principle they contain stand much nearer to the star anise tree than *Illicium religiosum*, some, as the "sanki" tree of the Philippines, agreeing with it exactly in smell. But so far as I am aware, there is no other species of *Illicium* with poisonous fruit known.

A FEW SPECIES OF RHUBARB.*

BY H. VON SCHLAGINTWEIT.

The cultivation of rhubarb in India has been hitherto unsuccessful. The so-called "India rhubarb" of commerce consists of roots cultivated in the neighbouring districts of High Asia. There is as little of this in the market as of the Persian product, while the so-called "Turkey rhubarb" is supplied by the Chinese, and is considered the best root. The exact species which yield the rhubarb of commerce do not seem to be known so far. The following species were noticed by the author on the side of the Himalaya towards India and in Thibet:—

1. *Rheum Emodi*, Wallich, a large plant, having a thick stem, growing from Bhutan and Sikkim to Kaschmia on the India side of the Himalaya, frequently reaching a height of more than 6 feet, and also indigenous to western Thibet, but less abundant. In most districts of north-eastern and central dry High Asia its efficacy is greatly praised, while in the damp and warm districts of Sikkim and Bhutan the root seems to be inefficacious. The whole sour stems are eaten both stewed and raw, while the leaves are dried and smoked in Thibet and in the eastern Himalaya.

2. *Rheum leucorrhizum*, Poll. (*Rh. tartaricum*, L.)— During the period of inflorescence it is usually 2 inches (Engl.) high, then gradually grows to a height of 1 foot. It grows plentifully in the dry districts. The root is said to be very efficacious, and the leaves are also smoked.

The following species were met with less frequently:—

3. *Rheum webbianum*, Royle, is indigenous to the vicinity of Simla at an elevation of more than 12,000 feet, and is also found in Kumáou, principally in the passes over the Niti Ghat towards Gnári Khórsum.

4. *Rheum moorcroftianum*, Royle, is indigenous to Kumáou and Gurhvál at an elevation of 12,000 feet; this species has very small stems.

5. *Rheum spiciforme*, Royle. The root of this species is lighter and harder than usual, while the leaves are thick and tough. It is indigenous to north-western Thibet.

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MEDICAL DISPENSING.

IN reference to our observations upon the projected dispensing enterprise to be started in an important town in the midland counties, we have received a letter from a resident pharmaceutical chemist, giving some information as to circumstances which he considers have given rise to the idea. It appears that the condition of pharmaceutical affairs in this place is very peculiar and of a nature to illustrate the fact that the worst attacks upon the interests of pharmacy are made by members of the trade. We are informed that a chemist and druggist in the town referred to has laid himself out to carry on a cutting trade, not only in drugs, patent medicines and sundries, but also in dispensing, and that he advertises his readiness to dispense prescriptions at from threepence to sixpence each. We quite agree with our correspondent in regarding such a state of things as being a scandal and disgrace to the trade, but we do not quite perceive how the remedy for it is to be sought from the contemplated action of the medical practitioners in establishing a kind of co-operative dispensary in the way mentioned by us last week.

There really seems to be no obvious way of meeting the evil wrought by selfish members of the trade who, regardless of the interests of the body to which they belong, resolve to act upon extreme free trade principles, and place themselves upon a level with grocers, co-operative stores and others, who are abstracting from chemists and druggists so much of the trade in patent medicines formerly done by them alone. It is indeed scarcely possible in regard to that description of business to hope for any remedy being furnished by amendment of the law, since there is an absence of any sufficient ground for arguing that it should be restricted to persons possessing special competence as the result of systematic technical training.

It is more reasonable to regard the trade in patent medicines and such articles as a branch of business that is surely and rapidly passing altogether out of the hands of chemists and druggists, and were it not for the probability that this change will cause severe injury and loss to a great number of those engaged in the business it might be regarded as matter for congratulation that it had been brought about. In any case it is essential that the fact of this change being in progress should be boldly faced and that at the same time some thought should be taken as to the means by which the damage may be repaired. For this purpose we venture to suggest that the course most natural and most desirable is the endeavour to establish with the medical profession an amicable concert, and we may add one of mutual interest. As things now stand there is no proper separation of the duties appertaining respectively to medicine and to pharmacy, and most likely it will be many years before such a separation can be generally realized; but it is the thing to strive after above all others, and for this reason we deprecate the tone of some of the letters that have lately appeared in our correspondence columns upon the subject of medical dispensing. We do not pretend to doubt that the dispensing of medicines is often done by medical practitioners in a very slovenly way; anyone who has had the chance of examining the dispensaries of country practitioners will have met with abundant evidence of this fact and will not be slow to admit that neither the interests of the medical men nor those of their patients are well served by that practice.

We will not imitate our correspondents by going into instances and details to establish the justice of the view just expressed, or to condemn the defective way in which medical dispensing is done, because it is not upon that ground that we think its continuance is to be argued against. It is not because medical dispensing is badly done as a rule or in very many cases that we would urge the transfer of this work from the medical practitioner to the pharmacist, but because dispensing is the natural occupation of the latter, and because it can only be done by the former under difficulties and at the cost of disregard for other matters more properly appertaining to his function.

Since the publication of the letter signed "Veritas" we have received a number of other communications of similar tenor, but we do not think any good purpose would be served by their appearance. On the contrary such letters are certain to create irritation, if it be only by reason of the foundation there may be for some of the statements. They are sure also to call forth angry reprisals from medical men and to produce antagonism instead of that harmony of feeling which is to be desired between medical men and pharmacists. We trust, therefore, that the endeavour to achieve a proper allocation of work to medical men and pharmacists will be prosecuted with more kindly consideration and without giving rise to mutual recriminations.

PROSECUTION UNDER THE PHARMACY ACT.

WITHOUT being unduly jubilant, we may congratulate our readers upon the ultimate issue of the prosecution instituted by the Pharmaceutical Society against Messrs. JOHNSTONE and Co., of Edgware Road, for infringement of the Pharmacy Act. When the case was adjourned last month, we were utterly at a loss to conceive what manner of defence could be relied upon by the defendants, and our view of the matter has now been justified by their determination to acknowledge their offence and to pay the penalty imposed by law.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, December 1, 1880.

MR. THOMAS GREENISH, PRESIDENT,

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present — Messrs. Andrews, Atkins, Bottle, Butt, Churchill, Frazer, Gostling, Hampson, Hills, Mackay, Radley, Richardson, Robbins, Sandford, Savage, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

The Council went into committee whilst the President stated the result of a visit which he had paid in company with the Secretary to an annuitant, who has since died.

The Council also considered in committee a letter from the Board of Examiners for Scotland, with reference to the report of the Curator on the Society's Museum in Edinburgh. The Council having resumed, this letter was ordered to be entered on the minutes.

Appointment of Examiners for 1881.

The Council went into committee to consider and discuss the merits of the respective gentlemen who had been nominated.

The Council having resumed, a ballot was taken, and the President declared the following pharmaceutical chemists to be appointed Examiners for the ensuing year, subject to the approval of the Privy Council:—

England and Wales.

Allchin, Alfred, England House, Primrose Hill Road, N.W.
Barnes, James Benjamin, 1, Trevor Terrace, Knightsbridge, S.W.
Benger, Frederick Baden, 7, Exchange Street, Manchester.
Brady, Henry Bowman, Hillfield, Gateshead-on-Tyne.
Carteighe, Michael, 180, New Bond Street, W.
Corder, Octavius, 31, London Street, Norwich.
Ekin, Charles, Whitmore House, Hampton Road, Hounslow.
Gale, Samuel, 338, Oxford Street, W.
Greenish, Thomas Edward, 20, New Street, Dorset Square, N.W.
Linford, John Samuel, 2, Lancing Terrace, Kirchen Road, Ealing Dean, W.
Martindale, William, 10, New Cavendish Street, W.
Plowman, Sidney, 2, Residence, St. Thomas's Hospital, S.E.
Southall, William, 17, Bull Street, Birmingham.
Taylor, George Spratt, 13, Queen's Terrace, St. John's Wood, N.W.

Scotland.

Ainslie, William, 58, George Street, Edinburgh.
Borland, John, 7, King Street, Kilmarnock.
Gilmour, William, 11, Elm Row, Edinburgh.
Kemp, David, High Street, Portobello.
Kinninmont, Alexander, 69, South Portland Street, Glasgow.
Nesbit, John, 162, High Street, Portobello.
Stephenson, John Bertram, 71, George Street, Edinburgh.
Young, James Robertson, 17, North Bridge, Edinburgh.

Elections.

The following, having passed their respective examinations and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Burford, Samuel Francis	Leicester.
McDonald, John	Liverpool.
Walkley, James Byron	Bollington.

Addition to the Register.

The Registrar reported that—

Cornelius Cotter, 11, Nursery Street, Wandsworth Road, London, S.W.,

having made the statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been supported by a duly qualified medical practitioner, his name had been placed on the Register.

Mr. Woolley having asked what inquiries were made in these cases,

Mr. Richardson asked when this registering was to cease. There was great dissatisfaction in the country at persons getting on the Register who ought not to get there. If the Registrar would give a little more publicity to these applications there would not be so much of that in the future. Last month he gave the Registrar a letter he had received from a gentleman in Lincolnshire, complaining that persons were put on the Register who would not have obtained that privilege if inquiries had been made in the neighbourhood. He feared, with all deference to the medical profession, that there was sometimes a little laxity in signing these certificates.

Mr. Robbins thought if the Registrar were to inform the Council that a certain person had applied, and the name were published, persons in the neighbourhood would be able to make inquiries. At present, a person was able to obtain registration before the chemists in his neighbourhood heard of his application.

The President said there was a difficulty about this matter. Six months ago he suggested that the Registrar should mention these applications at the Council Meeting, so that they might be reported and the chemists in the neighbourhood or those who might have any valid objections to the application should have an opportunity of bringing them forward, previously to the name being placed on the Register. Strong objections, however, were at the time brought forward to that being done, and he thought everything was done which the law allowed to prevent improper persons getting on the Register.

Mr. Sandford remarked that making any regulations of the kind referred to would be going beyond the law. The law said that if a man brought forward proof, which was described in the schedule, the Registrar was bound to register him. If a man's name were held out, and he, as it were, put into the pillory for a month, no doubt there would be a lot of objections made to him; petty jealousies would come in, in all sorts of ways, and the Council would be inundated with letters objecting to so and so being placed on the Register. Now the remedy was simple and sufficient; when a man's name was placed on the Register the announcement was made that this had been done, and it was then quite open to anybody who could prove disqualification to send the information, and then, if necessary, the name would be erased; but he thought it would be most unwise to invite objections beforehand.

The President said the difference in practice would be that instead of receiving objections after a man was on the Register they would be received previously.

Mr. Sandford said that was what the law did not justify.

Mr. Frazer remarked that a hundred negatives did not disprove one positive statement. When a medical man said a man was qualified, a thousand negatives could not upset it.

Mr. Bottle said it occurred to him that in the new Bill which some of them were thinking of this might be provided for. The Bill might, he thought, shut out for the future those who had not hitherto availed themselves of the Act, and all those who wished to get on the Register should do so in the proper way by examination.

Mr. Williams said that a clause of that kind was inserted in a Bill which he submitted to the Council some two years ago, in which only two years more were allowed for these applications. That Bill had, however, been thrown aside, and he understood that in the new bill, now being drafted, no such clause was inserted.

The **President** remarked that this question might advantageously stand over to a later period of the day, when the Solicitor would be in attendance.

Local Associations.

The **Vice-President** said he had an application to make on behalf of the Bristol Pharmaceutical Association, of which he had the honour to be President. The members of that body, appreciating very highly the assistance it had received from the parent Society, and encouraged by the kindness shown on a previous occasion, were once more petitioners,—not for money help, but for materials to strengthen their museum. In preferring this request he ought to state that he had a list of all the Association possessed, including the previous gifts from the Society; these materials were nicely arranged in a cabinet occupying a side of the large local museum; it was a very creditable show as far as it went, and he could assure the Council that it was very decidedly appreciated, not only by the members of the Association, but by medical students and others in the neighbourhood. The Association was anxious, however, that it should be a thoroughly useful educational museum, and he had, therefore, with him a supplementary list of what was required, in order to complete it. He had shown this list to the Curator, who had ticked off a number of articles as being those which he could supply from his duplicate stores if the Council authorized him to do so. He hoped the Council would allow this to be done.

Mr. **Williams** said the proper course would be to refer the application to the Library, Museum and Laboratory Committee, and he was quite sure it would receive its best attention.

Mr. **Richardson** thought the Council should also remember that there were a great many other kindred associations all through the country, and probably there might be applications from some of these educational bodies. It would be well, therefore, to know if the Council was justified in holding out hopes that other societies in the kingdom would be similarly treated. He sincerely hoped there might be sufficient specimens in the museum to afford assistance to the societies which were growing up throughout the kingdom, and which he was very glad to see for the sake of the young men engaged in the trade.

Mr. **Robbins** hoped that many of the provincial educational associations would follow the example of the Bristol Association. He thought it was the very best way in which the Council could assist the country, and supply what was said to be a want. Sometimes such Associations came for a money grant, which he thought was objectionable, but when they came to ask for specimens to make their museums perfect, the Council ought, he thought, to further that object as far as possible.

Mr. **Richardson** had no doubt that when provincial associations knew they were not trespassing on the kindness of the Society, they would send in applications.

Mr. **Hampson** said it was surprising to find they were not aware of it; they had had very many opportunities of knowing it.

Mr. **Williams** suggested that the Committee might be authorized to look into and revise the regulations which were made some twelve years ago with a view to encourage education in the provinces, and the assistance of local bodies. The condition of things had very much changed since then; the Act of Parliament had been in operation a great many years, and what was perhaps a proper arrangement then was hardly so suitable now. He thought the Council might be of great service to local bodies by encouraging and assisting educational projects, and he should be very happy to assist any reasonable course for attaining such an end.

Mr. **Mackay** said he should be happy to second such a motion. He thought the assistance to be granted should not be confined to specimens only. He thought money grants should in some cases be given. This was an old question being again revived. He was quite sure the Council had the inclination to assist in this matter as far as the means allowed.

Mr. **Williams** said he was reminded that he ought to give notice of motion on this matter, and he would do so, so that the Council might have an opportunity of fairly discussing the question and then refer the question to the Library Committee.

The **President** did not think there ever had been on the part of the Council anything but a wish to support as much as possible all educational means existing in the country. But it always wished to be informed what amount of local support was coming forward; because it could scarcely be expected that an ephemeral institution, which had just been formed and could not show a position that commended itself to the Council, would be assisted. The Council must exercise a considerable discretion in sending specimens or money into different parts of the country, where there was not evidence of proper local support.

Mr. **Frazer** was under the impression that regulations already existed, and it was really the country which was to blame for not applying.

Mr. **Hampson** thought that this inquiry was quite unnecessary. He could not see that the conditions were at all altered; the regulations already existed under which any application could be made, entertained, and decided upon.

The **President** stated the main points of the regulations at present existing. It was then resolved, on the motion of Mr. **Bottle**, seconded by Mr. **Sandford**:—

> "That the application from the Bristol Pharmaceutical Association for materia medica specimens be referred to the Library, Museum and Laboratory Committee to consider and report thereon."

The Evening Meetings.

Mr. **Symes** moved—

> "That the Evening Meetings Committee be requested to consider the position of the Society with regard to the Evening Meetings and to report to the next meeting of this Council thereon."

The Committee met each month, but he should like it to present a report to the next Council meeting.

The **President** asked Mr. Symes to give a notice of motion if he wished to bring the subject forward, but he would beg him to reconsider the matter. A great change had only lately taken place, the Committee having decided not to pay for papers read at the Evening Meetings, and a little difficulty naturally arose in consequence. He suggested that it would be better to let matters go on for the present session and see what the result was before taking any action.

Mr. **Symes** said he had no wish to press the matter. If the President was satisfied with the state of the Evening Meetings, he had no occasion to be dissatisfied; but he should be very sorry if they were so badly off in Liverpool. He certainly regretted to see that either the new regulations or something else was operating prejudicially to the Society, and was desirous of doing something before the meetings fell too low; but at the request of the President he would withdraw it for the present.

The **President** said he was not satisfied with the present state of things, but he thought it would be better to wait a little before taking any action.

Exhibition at the Annual Meeting.

Mr. **Richardson**, referring to the exhibition which was held on the occasion of the last Annual Meeting, said he hoped Mr. Symes would act as energetically in the matter next year, and seeing that one great objection taken was that the question was not brought forward in time, he hoped Mr. Symes would give a notice of motion for next month.

Mr. **Symes** said he should be very happy to give the notice of motion required.

Pharmacy Act Amendment Bill.

The Council then went into committee, and spent upwards of three hours in discussing, with the assistance of the Solicitor, the recommendations of the Pharmacy Act Amendment Committee, and a draft Bill which had been prepared in accordance therewith.

On resuming, it was resolved, on the motion of Mr. **Hampson**, seconded by Mr. **Andrews**:—

> "That Mr. Flux be requested to revise the Pharmacy Act Amendment Bill as now agreed to in principle by this Council; that a copy of the revised Bill be sent to each member of the Council, and that a special meeting of the Council be convened on the 14th inst., to settle the form in which the Bill shall be introduced into Parliament."

Mr. **Frazer** wished to state that he had not agreed to any of the proposed amendments.

Loan of Specimens.

It was resolved that the President be empowered to lend Mr. Plowman from the Society's Museum such specimens of drugs as he may think proper for the annual *soirée* of the Medical and Physical Society of St. Thomas's Hospital.

Reports of Committees.

FINANCE.

The report and recommendations of this Committee were received and adopted, and sundry accounts were ordered to be paid.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£15 to the widow of a registered chemist and druggist and late member of the Society. Applicant has had two previous grants of like amount.

£10 to the widow of a member, who had had four previous grants.

£10 to a registered chemist and druggist, suffering from ill health. He had had two previous grants.

£5 to the widow of a registered chemist and druggist.

£10 to the widow of a member.

£20 to a member suffering from ill-health, who has had several previous grants.

£15 to be applied in the education of the youngest child of a deceased chemist and druggist, the other children having been provided for previously in a similar manner.

£20 to the widow of a former member, residing in Tasmania. Applicant had had one previous grant in 1876, of like amount.

£10 to the widow of a late member.

£5 to a former member, in business for some years, but now unable to earn his livelihood.

The report and recommendations were received and adopted.

HOUSE.

The report of this Committee included a letter from the Clerk to the District Board of Works, saying that the question of paving Great Russell Street with wood would come before the Board at the beginning of the year, when the application of the Council should be considered. It also referred to the cleaning and regilding of the portraits and frames belonging to the Society, but the further consideration of this matter had been deferred.

The Committee reported that the names of prizemen, etc., could be exhibited on the walls of the lecture theatre.

Mr. **Hills** recommended that the pictures should be dealt with at once.

The report was received and adopted.

The **President** reported that one stove had been placed in the laboratory and worked very well. It had been seen by the surveyor to the Fire Insurance Company, who had reported that it would not affect their policy.

LIBRARY, MUSEUM AND LABORATORY.

Librarian's Report.

The Librarian's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
October . .	Day . .	218	14	3	9 nearly.
	Evening .	97	13	1	5 nearly.

Circulation of books.	Town.	Country.	Total.
No. of entries . . .	161	129	290

Carriage paid . . . £2 13s. 5*d*.

The following donations to the Library had been received:—

Beddoes (T.), Collection of Testimonies respecting the Treatment of Venereal Disease by Nitrous Acid, 1799.

Paris (J. A.), Treatise on Diet, 3rd ed., 1828.

Pearson (G.), Arranged Catalogues of Food, Seasonings and Drinks, 4th ed., 1821.

Skeete (T.), Experiments and Observations on Quilled and Red Peruvian Bark, etc., 1786.

From W. **Brace**, Esq.

New York, Hospital Formulary, etc., 1878-9.

Squire (B.), On the Treatment of Eczema, 2nd ed., 1878. From Mr. E. M. **Holmes**.

Newcastle-upon-Tyne Public Libraries, Catalogue of Books in Lending Department, 1880.

From the **Libraries**.

Paschkis (H.), Zur näheren Kenntniss einiger minder bekannten Blätter, 1879.

Paschkis (H.), Pharmakognostische Beiträge, 1880.

Paschkis (H.), Über zwei schleimliefernde Droguen.

From the **Author**.

Reidemeister (A. W. v.), Ein Beitrag zur Kenntniss des Levulins, Triticins und Sinistrins, 1880.

From Professor **Dragendorff**.

Royal Medical and Chirurgical Society of London, Catalogue of Library, Additions, 1879-80.

From the **Society**.

St. Bartholomew's Hospital, Statistical Table of Patients during 1879. From the **Hospital**.

St. Thomas's Hospital, Reports, etc., new ser., vol. 10, 1880. From the **Hospital**.

Flückiger (F. A.), Pharmakognosie des Pflanzenreiches, 1881, 2e Aufl., 1e Lief.

Heusinger (C. F.), Meletemata quaedam de Antiquitatibus Castorei et Moschi, [1852].

From Professor **Flückiger**.

The Committee had recommended the purchase of the undermentioned works for the Library:—

Mexican Pharmacopœia, 1874.

Colmeiro (M.), Diccionario de los Diversos Nombres Vulgares de Muchas Plantas, etc., 1871.

Ronquillo, Diccionario de Materia Mercantil, Industrial y Agricola, etc. 4 vols.

Remsen (I.), Principles of Theoretical Chemistry. 1877.

Orosi (G.), Farmacologia ovvero Farmacopea Italiana, 4a ed., 1866-76.

New Italian Pharmacopœia, when ready.

Chiarlone (Q.) and C. Mallaina, Historia de la Farmacia, 1865.

Garrod (A. B.), Essentials of Materia Medica, 8th ed., 1880.

Huxley (T. H.), Lessons in Elementary Physiology, latest ed.

Kirkes, Handbook of Physiology, 10th ed., 1880.

Piesse (G. W. S.), Art of Perfumery, 4th ed., 1879. (Second copy for reference.)

Curator's Report.

Attendance.		Total.	Highest.	Lowest.	Average.
October .	Day .	333	27	5	12
	Evening	57	13	0	2

The following donations had been received:—

Japanese Infusion Pot, exhibited at the Conference.
From H. B. BRADY, F.R.S.

Specimen of Native Emery from Smyrna.
From Mons. CHANTRE.

Specimen of Fruit of the Chian Turpentine Tree and Lesser Sassafras Nuts. Herbarium Specimens of *Gastrolobium grandiflorum.*
From Messrs. T. CHRISTY and Co.

Specimens illustrating a paper on Myrrh.
From Mr. R. H. PARKER.

Specimens of Mocha Aloes offered as Cape Aloes.
From Messrs. W. FOX and SON.

Specimen of "Crabs' Eyes" from Japan.
From Mr. E. H. DAVIES.

Specimen of Australian Sandal Wood.
From the DIRECTOR of the Royal Gardens, Kew.

The following Russian donations had been presented through the President.

Specimens of Naphthas and Paraffins from Russia.
From Professor CARL SCHMIDT.

Specimens of Rare Salts of Ruthenium and other Metals of the Platinum Group prepared by Professor Claus; False Saffron; False Cinnamon; Riga Balsam; "Paprika" Cayenne Pepper; Nux Vomica Bark. From Professor DRAGENDORFF.

Specimen of Persian Galbanum.
From Mr. E. HIRSCHSOHN.

Specimens illustrating the chemistry of *Nigella sativa.*
From Mr. H. G. GREENISH.

The following German donations had been presented through Dr. Paul.

Two Specimens of Quebracho Bark (Red and False).
From Messrs. WOLFF and RASIM, Breslau.

Specimen of White Quebracho Bark.
From Herr KATHE, Halle.

Letters of thanks had been received for duplicate specimens of Indian and other drugs, from:—

Professor Soubeiran, of Montpellier.
Dr. Vogl, of Vienna.
Herr Dittrich, of Prague.
Professor Davidson, of Aberdeen.

The tin boxes for specimens had been forwarded to Mr. Presslie, the Secretary of the Aberdeen Chemists' Association.

Lists of the remaining duplicates of Indian drugs had been distributed, and applications for the specimens had been received from:—

Professor Bernardin, of Melle, Ghent.
Dr. Aquilla Smith.
Professor Bentley.
" Dragendorff.
Messrs. Luff and Woodland.
M. Chantre.

Fresh specimens of some drugs and the additions required by the examiners on materia medica, had been placed in the examination cupboard as directed. The Curator recommended that the cardboard boxes containing the specimens should be replaced by new ones.

The Professors had attended and reported favourably as to their respective classes.

The Committee recommended that four tablets containing the names of First Prizemen (Sessional); Pereira Medallists; Herbarium Medallists (First Prize), and Jacob Bell Scholars be placed in the lecture theatre.

The report and recommendations were received and adopted.

The name of Mr. Gostling was added to the Library, Museum, and Laboratory Committee, and also to the House Committee.

GENERAL PURPOSES.

The report of this Committee included the usual report from the Solicitor as to the progress of cases which had been placed in his hands.

Several other cases had been considered by the Committee and directed to be placed in the hands of the Solicitor.

The Council went into committee as usual to consider this report.

On resuming the report and recommendations were received and adopted.

On the recommendation of the Committee the name of Charles Robert Fenn, 83, Regency Street, Westminster, was ordered to be removed from the Register.

PHARMACY ACT AMENDMENT.

This report, which was read in committee, stated that the Pharmacy Act Amendment Committee had considered the resolution of the Council passed in August last requesting the Committee to take into consideration the probable effect of the recent decision of the House of Lords, and to report to the Council any course it might think it desirable for the Society to adopt.

The Committee stated the action it had taken in drawing up a Bill for the amendment of the Pharmacy Acts.

The report was received.

Mr. SYMES protested against the minutes of this Committee being read in committee.

Mr. ANDREWS joined in the protest, as there was nothing in the minutes which might not be published.

THE EXAMINATIONS.

It was moved by the PRESIDENT, seconded by Mr. MACKAY:—

"That the following joint recommendation of the Boards of Examiners for England and Scotland be adopted":—

> "'That candidates should not be permitted to use their own books or memoranda of any kind in the practical portion of the Major examination, but that during the examination they be allowed, at the discretion of the Examiner, to make use of any standard book of reference.
>
> "'That the Council be requested to provide for the London and Edinburgh Boards the necessary volumes.
>
> "'The above regulation to come into operation in October, 1881.'"

The PRESIDENT stated that both Boards of Examiners recommended that this change should be made.

Mr. ANDREWS objected to such an important alteration without due consideration, and without the reasons for it being stated.

Mr. BOTTLE thought the Boards of Examiners had full power to make this regulation themselves; the only necessity for it was that the Council were asked to provide the books.

The resolution was carried *nem. con.*

PHARMACEUTICAL MEETING.

Wednesday, December 1, 1880.

MR. T. GREENISH, PRESIDENT, IN THE CHAIR.

The Third Evening Meeting of the Session was held on Wednesday, the chair being taken at half-past eight.

SUGAR FOR PHARMACEUTIC PURPOSES.

Dr. SYMES referred to the specimens of cane sugar which he had placed on the table. He said that sugar as it was usually sent out contained ultramarine. One of the samples on the table was a pure dead white, and the other had a tinge of yellow about it. They both consisted of the same sugar, the only difference being the addition of colouring matter to one of them. These were English samples. German samples were very much more loaded with blue than English samples. Sugar refiners could get one shilling a hundredweight more for sugar containing a trace of blue than for the pure article. He believed that if pharmacists found it desirable to have pure sugar, the refiners would place it in the market. He mentioned at the last Pharmaceutical Conference that when a sugar which contained a decided blue tint was used for acid syrups an unpleasant odour of hydrosulphuric acid appeared after a time. Sugar refiners usually mixed cane sugar and beet sugar together, as they got the best results from such a mixture, but in the month of September the stock of beet sugar was generally exhausted, and there was nothing but cane sugar left to work upon, and therefore it was very easy to get cane sugar in the month of September.

RESORCIN.

Dr. **SYMES** also showed two samples of resorcin, which he thought might possibly become an article in demand among pharmacists. He had obtained in England some resorcin which had something of the smell of carbolic acid and a dark mahogany colour, and he afterwards obtained a specimen from Switzerland. This he had ordered pure, but it was not sent pure, though it was very much lighter in colour than the English specimen and had no smell of carbolic acid. Resorcin had been used as a colouring matter. It was a body of the benzole series, in which two atoms of hydrogen were replaced by two molecules of hydroxyl. He had not received it in time to attempt to purify it, but pure resorcin ought to be in the form of perfectly white crystals. It was stated to be soluble in almost anything but disulphide of carbon and chloroform, but he found that on heating it with benzole and also benzoline that they had scarcely any solvent action, and therefore it was probably insoluble in many other things. It was soluble in water, 100 parts of which would dissolve as much as 80 parts of resorcin. It was given in doses of 3 or 4 or 5 grams. Probably when there was more demand for resorcin it would become cheaper and purer.

The **CHAIRMAN**, referring to the samples of sugar, said that unfortunately whenever a pharmacist spoke to a manufacturer about an improved production of any article, he was at once asked the question, how much he was likely to want. The pharmacist might want so many pounds, but the manufacturer could only take the question of tons into consideration, so that the poor pharmacist was obliged to walk away, feeling that pharmacy occupied a very low position indeed in the estimation of manufacturers, and that a manufacturer was not likely to make any special difference to suit the pharmacist. With regard to the question of ultramarine in sugar, a great many observations had been made, and he should like to hear from gentlemen who were practically acquainted with the subject whether the ultramarine which had been occasionally found in sugar really interfered with the quality of the preparations in which sugar was used.

Mr. **PLOWMAN** said that he should like to ask Dr. Symes a question. Some time ago he had occasion to examine various samples of sugar which were to be used for simple syrup. Some of them formed a perfectly thick opaque syrup, and when this sugar was used for syrup of phosphate of iron, the odour of sulphurous acid was so strong as to cause the supposition that the syrup of phosphate of iron was made with dilute sulphurous acid instead of with dilute phosphoric acid. By various means he proved that the sulphur existed as a combined sulphite in the sugar; but he was unaware how the sulphite got into the sugar. He should like to ask Dr. Symes whether he could inform him on that point.

Mr. **WILLIAMS** said that pure sugar was absolutely important in making chemical syrups. He had found that syrups which had been rendered white by means of ultramarine had never yielded satisfactory results. The ultramarine was easily discovered by simply dissolving some of the sugar in water, and allowing it to stand for a few days; a distinct deposit would take place, and there could be no mistake whatever that it was an impurity which had been added to kill the original yellow colour of the sugar. It was very difficult to get a pure sugar which would make a syrup with any of the chemical compounds which were now so freely used, such as the phosphates and other compounds of iron, and when they did hit upon pure sugar they had still more difficulty in tracing the history of it. There was no doubt that the success of the chemical syrups mainly depended upon the purity of the sugar. As to resorcin, he did not think that it was a thing which was yet met with in a perfect state. They had it in various states of what he might call impurity and decomposition. Its principal use had hitherto been in the arts, for the purpose of producing a beautiful colour, fluorescene. It had now come into use in medicine, but he had not much confidence in its chance of success. It looked to him like a very weak imitation of salicylic acid. He had no doubt that when they understood resorcin as well as they understood salicylic acid they would find a superior article. It was now more or less contaminated, and rather more than less. Aniline was an analogous body in many respects, and for years it was stated in chemical works that aniline would turn brown. But that was not true. He had succeeded by very great care in making an aniline which for six or eight months had kept white, and after eighteen months was only of a light straw colour. He was quite sure that the colour depended only upon impurity. They might depend that if a demand arose for resorcin, there would soon be produced an article which would be very much more creditable to the chemist than the resorcin which was at present in the market. The dose of resorcin which Dr. Symes had mentioned seemed to be an enormous one. He should be very sorry to swallow such doses as those which were mentioned in German works.

Dr. **SYMES**, in reply, said with regard to the sulphurous acid in sugar, he should imagine that the sugar had been decolorized to a great extent by means of sulphurous acid instead of charcoal. He knew that that method was adopted for experimental purposes in the laboratories of sugar works, for sugar works had their laboratories and their own analytical chemist or chemists. It was quite possible that the same method might have been adopted on a larger scale. But he could scarcely say that he knew of any works where they used sulphurous acid in this way. There were many processes used by sugar refiners. One of these was the lime process. The large crystals which were now in the market were obtained by producing sucrate of lime. The blue colour in sugar might be detected by looking through the sample by daylight. That was the method adopted, and might be used in sampling sugar without the trouble of dissolving it. With regard to the dose of resorcin, the dose which he had referred to applied to the twenty-four hours. The Germans and the French had a way of stating the quantity to be given during twenty four hours, this quantity being divided into smaller doses during that period.

Mr. **CLEAVER** attributed the inferior qualities of sugar which had crept into use to the fact that cheaper products had come greatly into demand. There were in the markets various brands of sugar which were perfectly pure and would analyse out 99·9 per cent. of sugar without any ultramarine or colouring agent whatever, and it was well known to those who habitually used these brands that they could be easily obtained. There was in the market a great deal of Dutch sugar which contained a large amount of phosphate of calcium in the residue. It was well known that of late years several processes had been used for the preparation of sugar for various purposes. Among these he might mention the sulphate of alumina process, in which sulphate of alumina was used as a purifying agent. There was also the sucrate of lime process, as mentioned by Dr. Symes, in which sucrate of lime was first prepared and then the lime was precipitated by carbonic acid. He had examined several samples of sugar, among which was one prepared by a firm which had its head quarters in Liverpool and also had a place in London. This sample contained a very large amount of residue in which there was a large proportion of phosphate of lime. He thought that the very purest sugar ought to be used in pharmaceutical preparations. A mention of the proper sugar would be found in a paper read by Mr. Umney a few years ago.

The **President** said there was no question about the desirableness of getting very pure sugar. Dr. Symes had done good service in bringing before them the fact that a certain portion of ultramarine which was put in by manufacturers for a specific purpose was injurious in pharmaceutical preparations. The next point was to know where and how pure sugar could be obtained. This was a most important matter, and he had no doubt many preparations in pharmacy would be influenced to a certain extent by the sugar which was used in their preparation. With regard to resorcin, he believed that there were very few manufactories in Switzerland of anything in a chemical way, and it was more than probable that the resorcin which Dr. Symes had obtained from Switzerland had been brought from Germany. The sample appeared to him (the President) to be a partially crystalline substance, and in a somewhat impure condition. Perhaps in its present state very little could be said about it. As to the dose, he thought it could be scarcely defined when the substance contained an unknown amount of impurity. At the same time the subject was of very great importance, and they were indebted to anyone who brought such subjects before them, and gave them information.

A paper was then read entitled—

A Note on the History of Saffron.

BY CHARLES B. ALLEN.

This paper is printed on page 449. The discussion was postponed until the reading of the next paper, which, in the absence of Mr. Holmes, through indisposition, was read by Mr. Elborne.

The Use of Saffron in the Pharmacopœia.

BY E. M. HOLMES.

This paper is printed on page 450.

Mr. **Allen** said that it was unfortunate for him that Mr. Holmes was absent, for he would have made some remarks on a glycerole of saffron which stood on the table. Dr. Symes had entrusted to his (Mr. Allen's) care a preparation illustrating the way in which he made syrup of saffron in his own pharmacy. He calculated the quantity of saffron to be used, and made a concentrated infusion of it. This was poured upon a calculated quantity of sugar, and the sugar was then dried. A yellow granulated sugar was thus produced. To 6 grams of this substance he added 2 grams of water, and thus made what Dr. Symes stated to be a first rate syrup of saffron. Mr. Allen also referred to a glycerole of saffron made in the ordinary way of a syrup, according to the London Pharmacopœia, with the exception that, instead of mixing with sugar, he had used equal quantities of sugar and of glycerine. The product would keep; he had himself kept it for three years. It would mix with water in a very capital manner, and was free from deposit for a considerable time. He had also prepared some fresh tincture of saffron. This looked admirable, but on being mixed with water did not give such a satisfactory result as the glycerole.

Professor **Redwood** said that Mr. Allen's paper contained some very interesting points with regard to the localities in which saffron had been principally used, and the history of its introduction. He had entered into conversation on this subject with a friend of his, who was a literary Spaniard, and the statement of this gentleman was to the effect that saffron was used in Spain from a very early period. He traced the introduction of it to the Arabs. He seemed somewhat disposed to ascribe the somewhat extensive use of saffron in Cornwall to the fact that several thousands of Spaniards were made prisoners in Cornwall at the time of the Spanish Armada. He thought it probable that saffron was brought at that time to supply the wants of these prisoners. As to the second paper, he thought that the subject was a very fair and proper one for discussion. He was not prepared at once to say that saffron might not be omitted from certain preparations in the Pharmacopœia, but he confessed that he felt a little hesitation in too readily giving his assent to that view of the subject. In the first place, he was not an advocate for carrying out too readily and exclusively the cheapening and the simplification of pharmacy. He thought that it would be a serious mistake to make any attempt in that direction. His idea was that in a certain sense the more difficult and complicated pharmacy was the better. They wanted to make pharmacy a profession. They wanted to make the practice of pharmacy a thing which involved, as it did involve, the exercise of a considerable amount of knowledge and of education, and therefore he was not one to rush at once at the adoption of the idea that they were to do away with everything which complicated the preparations. He had on several occasions expressed the opinion, which he strongly maintained, that therapeutics was closely allied to dietetics. In dietetics they did not limit their articles of food to those the constituents of which were the most nutritious, and abolish everything which appealed simply to the eye or the nose or the palate. He conceived that if they proceeded in that direction, and confined their diet simply to the articles which, according to physiologists, were the best capable of sustaining life and renewing the waste of the body, they would not be by any means contributing to one great object which they had in view; and so in like manner with regard to therapeutics, he conceived that there were effects which might be produced by such articles as saffron, and other materials of that description, which had been employed and obviously introduced with a view to appeal to some of the special senses. He was not thoroughly satisfied that saffron could do no good at all, and he should hesitate to join in that onslaught upon every constituent and every preparation in the Pharmacopœia which could not be clearly shown to possess very decided therapeutic value.

Mr. **Robbins** corroborated Mr. Allen's statements with regard to the extensive use of saffron in Cornwall. Saffron was in use to a certain extent also in Devonshire. If cake without saffron were offered to people in Cornwall, not only the boys but the grown up people would refuse it. He thought that there was a decided flavour about saffron, and an aroma which was very agreeable. The Cornish people rather wondered that the people of other parts should be so benighted as not to appreciate saffron. With regard to Mr. Holmes's paper, he fully agreed with the observations of Professor Redwood. He thought that if the Pharmacopœia preparations containing saffron were obtained at the shops of various chemists, the quality of the articles could frequently be distinguished simply by means of the saffron which they contained.

Mr. **Radley**, as one who had had considerable experience in the practical part of the business of pharmacy, was scarcely disposed to recommend the giving up of saffron. In a number of cases he had known decided advantage in the use of preparations containing saffron. Pil. rufi, he believed, answered very much better with saffron than without it. He believed that it was the same with decoctum aloës. A gentleman who had been brought up as a chemist and druggist, and was afterwards engaged in the wholesale trade, paid him (Mr. Radley) a visit, and asked him whether he had any compound tincture of cinchona containing the proper quantity of saffron. He had an affection of the liver, and he said that he was very careful to have the preparation with the right amount of saffron, as he found this more valuable to him as a medicine than other kinds. This gentleman was a man of intelligence and experience, and he (Mr. Radley) placed considerable confidence in his judgment.

Mr. Bland said that he could scarcely agree with the very sweeping denunciation contained in Mr. Holmes's paper with regard to the adulteration of saffron. Saffron was formerly very much adulterated. He remembered receiving, twenty years ago, from a wholesale druggist a parcel of so-called saffron, in which he found nearly 25 per cent. of the petals of the common marigold. He picked them out and returned them with the parcel. Since then he had never received from a wholesale druggist a parcel of saffron which he could say was wilfully adulterated. The addition of oil also used to be practised, to increase the weight of the saffron, but now the saffron came without that adulteration, and it did not stain the paper with the greasy mark which was formerly seen. There was one form of so-called saffron which had not been alluded to in either of the papers. He meant the "croci in placentâ," which was very much sought after at the time when he was an apprentice. He had never met with a sample of that substance which deserved to be called saffron at all. It generally consisted of some extractive matter and the florets of *Carthamus tincturius* or something of that kind. Fifty years ago, old women used to make an infusion of this substance and take it as tea. Though all, probably, felt sometimes a little annoyed at the great expense of saffron, still he did not think that so long as it was officially recognized in the Pharmacopœia they were at liberty to vary the formula. In one article the formula was altered in the last edition of the British Pharmacopœia, namely tinctura rhei, and he had found a strong popular objection to the change. People said that they wanted the tincture of rhubarb which they had always purchased. He could corroborate what Mr. Allen had stated in his paper with respect to the use of saffron by the Jews. Among those people it was very commonly used as an ingredient in soup. He believed, with the gentleman who spoke last, that there was a very delicate flavour and aroma about saffron which was exceedingly agreeable when one was used to it.

Mr. Tanner said that Mr. Holmes had not mentioned any special adulterant of saffron. He had with him a sample of saffron which was offered to him a short time since at not a high figure. Looked at casually it presented a very fair appearance, but upon closer observation he found it to contain a very considerable quantity of some red ferruginous earth. He believed that this was not at all an uncommon adulterant. It was very readily detected by placing some of the saffron in water, the water thereupon immediately becoming turbid and there being a separation of the adhering particles. Some years ago he frequently found in saffron another adulterant, the saffron so adulterated having a sticky moist feel which it never lost, however long it was kept. When such saffron was put into water, carbonate of lime separated from it, and this sank to the bottom of the vessel and was readily recognized by its effervescence with an acid and by the ordinary test for a calcium salt. With regard to the method followed by Dr. Symes for preparing syrup of saffron, he could confirm what Dr. Symes said respecting such a preparation. It kept for a much longer period than the syrup itself. As to the medicinal effect of saffron, he thought that if it had any, it owed it to the essential oil which it contained, and which he fancied would be found to possess stimulating properties. Saffron was largely used among the Spaniards in South America.

Mr. Cleaver said that Mr. Holmes had not demonstrated that there was a want of therapeutic effect in saffron. Many pharmacists thought that it had a decided therapeutic effect in tinctura rhei, and also in the decoctum aloës co. It was a fact that upon the addition of the saffron in making this preparation a volatile body was given off which had a very decided effect upon the person operating at the pan in which it was being concentrated. Mr. Holmes had stated that he thought that the presence of saffron in the Pharmacopœia preparations had its origin in the fact of saffron being used in certain quack medicines. Was it not the case that the presence of other medicines in the Pharmacopœia was due to the same fact?

Mr. Plowman asked what was the effect to which Mr. Cleaver alluded as being produced by the oil of saffron.

Mr. Cleaver said that it most strongly irritated the mucous membrane of the nose and eyes.

Mr. Gerrard was inclined to consider that Mr. Holmes had made out a case against saffron. It was the custom in most large London hospitals to omit the saffron from their compounds, and that was done by the consent of the medical committees, which consisted of eminent members of the medical profession, some of them, he believed, being members of the General Medical Council which produced the Pharmacopœia. The preparations made without saffron answered very well, and there was no difference observed in their general action. He thought that there were also other products in the Pharmacopœia which might be better omitted than saffron, especially the animal substances, notably cochineal. Professor Redwood had referred to the art and mystery of pharmacy. He (Mr. Gerrard) objected to mystery and complication. He very much preferred simplicity and light. If they sought to make matters mysterious they would be degenerating and would be reducing themselves to the level of the city guilds—a condition which he hoped they would never reach.

Mr. Collier said that it was almost impossible to say anything positive with regard to the therapeutic effects of saffron. The reason that it was left out of hospital preparations was its expense. He had recommended its omission from some of the preparations at Guy's. In fact, it was almost impossible to tell whether saffron had any value in the preparations to which allusion had been made, the circumstances under which medicines were administered being unfavourable for the exact comparison of results.

Mr. Cleaver said that it was a curious fact that it was almost always the expensive substances that were omitted from the preparations in hospitals. This applied with regard to the substitution of cinchonidine for quinine.

Mr. Passmore said he noticed that Mr. Allen had supported his ingenious and interesting speculation as to the introduction of saffron into Cornwall by a positive statement in which he, without doubt, attributed to the name of the little village in Mount's Bay a derivation having a very strong Hebrew flavour. He would ask him, however, whether the statement was not subject to some qualification. Sixteen or eighteen years ago, a discussion on the question of the alleged settlement of the Jews in Cornwall in early times was carried on either in *Notes and Queries* or in the *Athenæum*, and this little place was quoted as favouring the theory of the settlement because it had the very curious and tempting names of Marazion and Market-Jew. But that evidence seemed to him to have been put out of court by a statement that those two names were corruptions of two declensions of a Celtic word meaning "the markets." The village still bore a third name, Margashiewe. It was well known that the intolerance of the guttural in the modern English language had led to many curiosities in pronunciation which perplexed whilst they amused the foreigner.

The President said that perhaps the best saffron produced in Europe was grown in Lower Austria. This fetched the highest price of any in the market, and, in fact, only sufficient for home consumption was grown.

It was really a curious fact which impressed those who went into other countries, that saffron was very frequently met with abroad in connection with cakes and other articles of diet. He could not say whether this was due to its colour, or to its having been presumed at some earlier period that saffron possessed a dietetic or medicinal influence. He was not one of those who would put aside entirely what were called old women's remedies. Saffron was one of these, and it was considered a very excellent remedy in measles. It was considered a very excellent thing for birds that were moulting. He thought that it was very likely that it possessed some influence upon the skin, and possibly that might be the reason why it had retained its place as a remedial agent. With regard to the use of saffron in pharmaceutical preparations, he confessed that it had occurred to him whether the saffron was of any value. In some of the preparations the quantity was very large indeed, and when the saffron cost from 32*s.* to 35*s.* a pound it was a really important item in the expenses of the preparations. If it was of no value it might just as well be excluded. There was an inducement to pharmacists to omit it or to use it in a smaller quantity than that ordered. There was a difficulty in keeping syrup of saffron. Medical men prescribed it, and it was very desirable to have a nice syrup. In experimenting on the subject he had found that glycerole of saffron was a preparation that kept uncommonly well. It was prepared by simply putting saffron into glycerine, allowing it to stand for some time, and straining it off. This gave a very beautiful preparation which would keep indefinitely. About the time that he was engaged in experimenting on the subject some one brought the preparation before the Society. It was uniform, and he thought that it might supersede the very troublesome preparation of syrup. With regard to the adulteration of saffron, he had exhibited before the Society a sample of so-called saffron which he brought from Russia. It consisted entirely of calendula, and there was no saffron in it. In this case they wanted the microscope in pharmacy. One of the best means of determining saffron was the observation of the pollen grains. These were entirely different from the pollen grains of calendula. With regard to the omission of saffron from certain hospital preparations, they, as a Pharmaceutical Society, did not exactly follow what was being done in hospitals. In those institutions things were sometimes done as cheaply as possible; but pharmacists were glad to take a hint from hospitals, and he should consider that those gentlemen who were at the head of hospitals, and who very much assisted in bringing new preparations before the public, were the very best men to determine whether saffron was of any value or not. He had had put into his hands by Mr. Bottle, who was not present, the following note on the subject before the meeting:—"Saffron Walden appears to be the English home of saffron. The place took the name from extensive cultivation of saffron, and was formerly Wealdenbury. A very interesting account of the cultivation of saffron at Saffron Walden is to be seen in early editions of 'Encyclopædia Britannica,' notably in 3rd edition, 1747."

Mr. **Allen**, in reply, first thanked Professor Redwood for his kindly notice of his paper. He had had some diffidence in presenting it, as it was not a strictly pharmaceutical one. Mr. Passmore had disputed, as many people had disputed, that the Jews could be traced back as having settled in Cornwall. In the preparation of a short paper it was impossible to give all the authorities, or all the reasons for deducing certain conclusions. Many most learned antiquaries of the past generation were strongly in favour of the supposition that the Jews not only visited Cornwall, but formed a colony there. Dr. Borlase, the greatest modern historian of the county, held that opinion. On the cliffs round the Land's End there were large burrows, which were attributed to the mining operations of the Phœnicians, who, having no machinery, worked on the surface and cast their ore into metal on the spot. There was discovered on the cliff the rude figure of a bull, and this was considered to be a sacred emblem of the Phœnicians. There was a mine, known as Ding-Dong Mine, which was supposed to have been worked by the Jews, and whenever the tinners found an old smelting place they called it a "Jew's house." They sometimes discovered rude blocks of metal which they called "Jew's pieces." There were also remains of rude smelting houses, which were denominated in the ancient Cornish language by a term which signified "The leaving of the Saracens." There were also some rude crosses, which apparently belonged to a time prior to the Druidic period. A bitter controversy had arisen on this subject, but Dr. Borlase and other very learned men had given it as their opinion that these crosses existed before the Druids. Diodorus Siculus, who wrote quite sixty years B.C., spoke of the Cornish as being very civilized in their living, owing to their mixture with foreign nations.

Mr. **Passmore** said that Mr. Allen appeared to be labouring under a mistake. He had expressed no opinion as to the early settlement of Cornwall by the Jews, but merely asked a question as to the derivation of the name Marazion which Mr. Allen had adopted.

Mr. **Allen**: As to the Spaniards, if there were any Spanish prisoners in Cornwall it must have been at the time of the Armada. The Spaniards had on two or three occasions landed in Cornwall. At the time of the Armada, two hundred of them landed in four galleys. They were repulsed by Sir Francis Godolphin, a good old Cornishman, but not before they had done considerable damage. A record existed at Paul church, a short distance from the sea, that the Spaniards landed at Paul, in 1595, and burnt the church and did other mischief. Unfortunately, Professor Redwood's friend had not given him the date.

The next meeting was announced for February 2.

Provincial Transactions.

MANCHESTER CHEMISTS AND DRUGGISTS' ASSOCIATION AND SCHOOL OF PHARMACY.

The twelfth annual meeting took place at the Memorial Hall, Albert Square, on Friday, November 26. In the absence of the President, Mr. Councillor Brown, who was prevented by illness from attending the meeting, Mr. G. S. Woolley occupied the chair.

The following Report of the Council was read by Mr. Benger, Honorary Secretary, and, with the Treasurer's statement of account, was received and adopted:—

Report.

It may be remembered that on the last occasion the Council of this Association presented its Annual Report it was announced that a grant of £35 had been made by the Council of the Pharmaceutical Society of Great Britain to supplement the fees of our students in remunerating the lecturer. Your Council was thus enabled to make a considerable reduction in the fees. Circulars setting forth particulars of the classes were drawn up and very widely distributed. The result was that fairly satisfactory classes were established, as the following particulars will show:—

Lectures Delivered in Session 1879 80.

Chemistry.—35 lectures, on Fridays 7.30 to 9 p.m. Commenced October 3. Number of entries 16.

Materia Medica and Pharmacy.—30 lectures, on Tuesdays 7.30 to 8.45 p.m. Commenced October 7. Number of entries 15.

Qualitative Analysis.—20 lectures, on Tuesdays, 8.45 to 9.45. Commenced October 7. Number of entries 11.

Botany.—15 lectures, on Fridays 9 to 10 p.m. Commenced January 9, 1880. Number of entries 5.

Total, 100 lectures. Total number of entries, 47.

The fees were 25*s.* for the chemistry course; 20*s.* for the course on materia medica and pharmacy; 15*s.* for the course on qualitative analysis; 50*s.* for the three courses combined; 12*s.* 6*d.* for the course on botany.

Fees received.—9 entries for chemistry, materia medica, and qualitative analysis £22 10*s.*; 2 entries for chemistry and materia medica £4 10*s.*; 1 entry for materia medica and qualitative analysis £1 15*s.*; 1 entry for chemistry and qualitative analysis £2; 4 entries for chemistry only £5; 3 entries for materia medica only £3; 5 entries for botany only £3 2*s.* 6*d.* Total fees £41 17*s.* 6*d.* Contribution from the Pharmaceutical Society £35. Total £76 17*s.* 6*d.*

Your Committee did not feel justified in again appealing to the Pharmaceutical Society for help, and in issuing the Prospectus of Lectures for the present session, a return was made to the old scale of fees; they regret, however, that the number of entries have been insufficient to enable Mr. Siebold to recommence his classes. It is possible that the school may reopen after Christmas, but it must be borne in mind that in Manchester, as in most large towns, there are now numerous classes available for chemical students. The evening classes at Owens College (Victoria University) and others, in connection with the Science and Art Department, afford instruction at very moderate cost, and your Committee is aware that many pharmaceutical students have availed themselves of these.

During the early part of last session your Committee was engaged in the revision of the price list issued by the Association, and a new edition was published. A large proportion of this has been sold.

At a meeting of your Committee held in February, a resolution was unanimously carried, pressing on the attention of the Council of the Pharmaceutical Society the necessity of procuring the repeal of that portion of the Pharmacy Act of 1868 which excludes patent medicines from its operations; a copy of this resolution was forwarded by the secretaries to the Pharmaceutical Society, and also to the various chemists' associations throughout the country, requesting their co-operation. Your Committee understand that the subject is now under the consideration of the Pharmaceutical Council.

Your Committee regrets that so small a number of members take an active interest in the affairs of the Association. It is willing to believe that many who neglect to support meetings having scientific or educational objects would flock to the standard should any great trade question loom in the distance. The pharmaceutical horizon is not cloudless at the present moment, and your Committee feels that a thoroughly comprehensive, or at least representative, association of chemists and druggists in this district is as desirable now as it ever was in the past.

The balance sheet for two years ending October 31, 1880, was read, showing a balance of £7 8*s.* 6*d.* in the hands of the Treasurer.

On the motion of Mr. Cooper, seconded by Mr. Boor, the following gentlemen were elected officers and Council for 1880–1:—President, Mr. Councillor W. Scott Brown; Vice-Presidents, Messrs. J. T. Slugg, F.R.A.S., and W. Wilkinson; Treasurer, Mr. G. S. Woolley; Hon. Secretary, Mr. F. Baden Benger, F.C.S.; other members of Council, Messrs. Blain, Boor, Botham, Bowdon, Harrison, S. Kay, B. Robinson, R. Robinson, Slack, Westmacott and H. Woolley.

BRISTOL PHARMACEUTICAL ASSOCIATION.

A general meeting of this Association was held at the Museum and Library, Queen's Road, Mr. G. F. Schacht, President, in the chair.

The President said that before commencing the business of the evening, namely, the reading and discussion of papers, he wished to draw the attention of all the members and associates to the very kind services recently rendered them by their friend, Mr. Little, who had now completed the systematic arrangement of the contents of the museum. He had also drawn up a very useful list of the specimens they possessed, and had gone to the further trouble and pains of preparing a table of such other specimens as were most urgently needed to complete the educational value of the collection. This was really a very valuable piece of work, and he asked all present to join with him in thanking Mr. Little very warmly.

A paper upon "Emulsions" was read by Mr. Berry, in which the processes recommended by Gerrard, Gilmour, Collier and others, were illustrated and discussed, and a method was advocated which consisted in the employment of subcarbonate of potash in the proportion of 5 grains to ½ an ounce of oil and ½ an ounce of water.

Mr. Algernon Warren, jun., made an informal communication upon the bark of *Alstonia constricta*, the intensely bitter quality of which had attracted to itself considerable attention. Some of those who were endeavouring to introduce it for practical purposes had stated that it was a febrifuge equal to quinine. The speaker exhibited specimens of the bark, both entire and in powder, and also some tincture, which the members were desired to compare with that of the cinchona bark (cortex Cinchonæ flavæ), and to note how much the more persistently bitter of the two was the sample prepared from the Alstonia. After expressing belief that there could be little doubt of its value as a tonic, and that the more important point—its value as a febrifuge—would be speedily determined, he concluded with a few remarks on the result of the comparison of the two barks under the microscope, having found that in both the vascular bundles are distinct, numerous and marked at regular intervals, but that in the cinchona each vascular channel is larger and the transverse marks more irregular than in the Alstonia; also that its woody fibres are more compact and smaller, and that in the Alstonia bark there appear some square thick-walled cells of somewhat unusual shapes.

The President, Mr. Schacht, detailed some experiments he had made upon the solubility of phosphorus in alcohol, about which differences of opinion appeared to exist that occasionally placed the dispenser in some difficulty. He had met with prescriptions in which a solution of the strength 2 grains to the ounce was ordered, and one medical gentleman of the neighbourhood had assured him that an ounce of genuine alcohol would dissolve 5 grains of phosphorus. As he, the speaker, had never succeeded in extemporizing a solution so strong as even the weaker of those just indicated, he thought the matter worth some careful experimenting. He had accordingly secured a sample of almost absolute alcohol, one that contained 99 per cent. of C_2H_6O, and of sp. gr. 0·798 at 60° F., and a large stick of phosphorus from a fresh inner portion of which he had cut the portion for each experiment.

The temperature at which each attempt at solution had been made was 160° F.

When the experiment was conducted in such a manner as to prevent the access of air, the phosphorus in the proportion of 1 grain to the ounce disappeared very slowly, the mixture requiring very frequent shaking during about four hours, and the constant maintenance of the above temperature.

When, however, the experiment was conducted in a bath of two or three times the capacity of the solution, the phosphorus disappeared much more rapidly, about twenty minutes usually sufficing for complete solution.

This difference in the behaviour of the phosphorus under the two sets of circumstances had led to a closer examination of the two resulting solutions. He had found them both distinctly acid, but the latter much more acid than the former. Carefully titrating them with a definite solution of soda in alcohol, he had found in a solution prepared as above, without access of air, that one-tenth of the grain of phosphorus had passed into the solution as an acid oxide of phosphorus, and upon similarly treating a corresponding solution made with access of air, one-fourth of the grain of phosphorus had been thus oxidized.

He had in all cases completely failed to get 2 grains of phosphorus to remain dissolved in 1 ounce of alcohol after it had become cool.

The conclusions to which his experiments had led him were that phosphorus was capable of being retained in solution by cold alcohol to the extent of about 1 grain to 1 ounce, but that about one-fourth of the phosphorus would be found to exist in the solution as one of its acid oxides.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, November 25, Professor Attfield, F.R.S., President, in the chair.

Dr. Senier read a paper on "The Object of Study, including that of Pharmaceutical Study."

A discussion ensued, in which the President, Secretary, Messrs. Parker, Collinson and Holmes took part.

A vote of thanks was passed to Dr. Senier for his paper.

The Secretary announced that the following gentlemen had been elected Reporters on Science for the ensuing session:—

Pharmacy	Mr. W. H. Symons.
Botany	Mr. D. Hooper.
Materia Medica	Mr. R. H. Parker.
Chemical Physics	Dr. A. Senier.
Organic Chemistry	Mr. W. R. Dunstan.
Inorganic „	Mr. C. H. Hutchinson.
Analytical „	Mr. A. F. Dimmock.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association held on Wednesday, November 10, a paper entitled "British Mosses," was read by Mr. E. M. Holmes, F.L.S.

The author, after commenting upon the history of our knowledge of mosses since the time of Dillenino, and the rapid increase in the number of species, and our knowledge of their life history during the present century, proceeded to describe in detail the structure and functions of the different organs of mosses, their modes of propagating by spores, tubes, gemmæ, rhizinæ, etc., and finally pointed out that a classification by leaf structure was very much easier and more natural than that formerly adopted of classification according to the character of the peristome, many species never having been found in fructification. In conclusion, the process of mossing, as applied to cinchona culture, was explained.

The paper was illustrated by numerous excellent diagrams, to which frequent allusions were made by the lecturer.

After the award of a most hearty vote of thanks, on the proposal of Mr. R. H. Parker, seconded by Mr. F. W. Collinson, a number of microscopic slides, illustrative of the subject, and a large number of mosses in the fresh and dried state, were viewed by the members.

Review.

HEATING BY GAS. Cooking in Private Families and Use in Workshops. By THOS. FLETCHER, F.C.S. 1880.

This pamphlet consists of a paper recently read before the Philosophical Society of Glasgow, and although evidently issued for trade purposes it is none the less worthy of perusal by any person interested in the relative usefulness and economy of coal gas as a heating material. Mr. Fletcher has done so much towards the development of the use of gas in this direction that he is sure to secure attention to what he has to say upon the subject, and the confidence is increased by outspoken opinions that might hardly have been expected from such a quarter. Thus he shows that he is not a mere hobby-rider when he says: "I know many cases where gas fires have been fixed and I know none where they have remained in use twelve months. They are far too costly in fuel and I do not see how a good gas fire is to be made at a cost of less than 1*d*. to 1½*d*. an hour. Of course a small poor fire can be made for less, but it is practically useless, even to look at."

Indeed Mr. Fletcher admits that where the work done by fires is continuous and extensive gas cannot be substituted for coal economically; but for temporary purposes, such as family cooking, occasional furnace work, as well as in metallurgical operations requring nice regulation of temperature, he claims that it can be used with considerable advantage. Concerning Mr. Fletcher's numerous and excellent apparatus for these purposes full information can be obtained from himself by those who desire it, and nothing need be said here unless exception be made in favour of the solid flame cooking burner, which is really of wide application and for efficacy and cleanliness leaves nothing to be desired.

In view of the present large and increasing consumption of gas as a fuel Mr. Fletcher urges upon the gas companies the policy of in some cases lowering the standard of the illuminating power so as to produce a gas lower in price and better suited for heating purposes, and he proposes the adoption of a maximum standard of fourteen candle power.

Parliamentary and Law Proceedings.

PROSECUTION UNDER THE PHARMACY ACT.

THE PHARMACEUTICAL SOCIETY OF GREAT BRITAIN *v.* D. B. JOHNSTONE AND CO.

This case, which was adjourned by arrangement on November 17, was fixed for hearing on Thursday, December 2, at 12 o'clock, but the defendants' solicitor, Mr. Rylands, then appeared and said he did not intend to resist an order being made against the defendants. He did not know whether he might be allowed to say anything as to reducing the penalty.

Mr. Flux said there was no power in the court to reduce the penalty.

Mr. Rylands suggested that Mr. Flux might agree to accept a reduced penalty.

Mr. Flux said that was the last thing he should think of doing. There was no doubt that this illegal course had been most deliberately entered upon by the defendants and that the offence for which they were sued was not the first occasion of their selling poison.

Mr. Rylands added that the reason they withdrew was not that they did not consider that they had no argument to set up, but they did not want to be landed in an appeal to the House of Lords.

The Registrar then asked if Mr. Rylands consented to judgment for £5 against the defendants, to which Mr. Rylands assented.

Mr. Flux said he must ask for the costs, which the Registrar accordingly allowed on the ordinary county court scale.

ILLEGAL SALE OF ARSENIC.

At the Ruthin County Police Court, on Monday November 22, before Mr. R. G. Johnson and the Rev. the

Warden of Ruthin, Robert Lloyd, chemist, Ruthin, was summoned by Inspector Humphreys for unlawfully selling six ounces of arsenic to one Richard Davies on October 11, 1880, the arsenic not having been mixed with soot or indigo in the proportion required by the Act.

Mr. Cartwright, Chester, appeared for the police, and in opening the case stated that on October 12, Captain Roberts, Rhewl, was going out shooting with a valuable setter dog. He missed the dog, and afterwards took from it a piece of cheese which it had picked up on the side of the road. He took the cheese from the dog after it had eaten part of it, and it immediately became very ill. The animal shivered very much, and died in a few minutes. Upon examining the locality in the road Captain Roberts found two more pieces of cheese covered with white powder. He handed them over to Inspector Humphreys.

Richard Davies, miller, Pwllglas, stated that on October 11 he purchased six ounces of arsenic from Mr. Lloyd, chemist. Mr. Lloyd served him.

In reply to Mr. Cartwright the witness said he never administered poison to a dog. He took the poison to Drovers' Arms, Rhewl, mixed it with three pounds of flour and laid it to kill rats. The powder which he bought was of a bluish colour.

Mrs. Jones, landlady of the Drovers' Arms, remembered the night of October 11, when Richard Davies came there to lay poison to assist in killing rats. The powder which Davies did not use she handed over to Inspector Humphreys.

John Jones (16), son of the last witness, said he remembered Davies coming to the Drovers' Arms on the day in question. Davies mixed a packet of white powder with the word "poison" on the paper. Inspector Humphreys here showed the witness two sample packages of powder, one containing pure arsenic and the other mixed with indigo. The lad selected the package containing pure arsenic as the sort used by Richard Davies.

Inspector Humphreys then gave evidence. He said that from information received from Captain Roberts and Mrs. Jones, Drovers' Arms, he made inquiries at the chemists in Ruthin on the next Wednesday. Among others he called on the defendant to ask if he had sold any poison to anyone during the week past. Mr. Lloyd replied that he had not; he had sold no poison to anyone for a long time. He called again on the Thursday, and particularly asked if any poison was sold on the Monday in question. Mr. Lloyd replied that he was sure no poison was sold on that date. Witness asked for the book of entries to be produced. They looked for it but did not produce it. Called again on Friday when Mr. Lloyd said he had been making inquiries of the young men but they were doubtful about it; he was afraid one of them might have sold some. Mr. Lloyd then said: "What poison is it you want to know about? Is the party who bought it known? Do they say they bought it here?" Witness replied, "Your book will tell you that. Where is your book?" to which Lloyd replied, "We never found it." Witness called again on the Saturday, and again on the 18th (Monday), when Mr. Lloyd produced the book of entries, but witness said, "Never mind now, I want to speak to you in private." In conversation the defendant then acknowledged that he sold the arsenic to Richard Davies, and that the fact was recorded in the book, but the name of David Edwards was down as a witness and not John Jones as stated by the purchaser. Witness said to defendant. "You denied all this to me last week," and defendant replied, "I did. It is to my interest to keep these things private." Witness asked Lloyd, "Is it not a fact that you sold that man some strychnine at the same time you sold the arsenic?" to which Lloyd replied, "What, do you mean to say so?" Witness replied, "That is my belief. Why should you withhold information from me?" Defendant then said he must at once see his lawyer. Witness asked to be allowed to examine the book and copy names of the last purchases, but defendant said, "No you will have nothing more from here. You want to bring me into trouble."

Mr. Bancroft said he had analysed some powder received from Inspector Humphreys and it was pure arsenic.

Mr. Osbert Edwards, who appeared for the defendant, said that it was sold on a market day and was an oversight. With regard to refusing information to the police the defendant was under the impression that the inquiry was being made about strychnine. If arsenic only had been mentioned he would have told the officer at once.

The Bench fined the defendant £2 10*s.* and £2 10*s.* costs.

Mr. Johnson said there was no excuse for a man to go and sell six ounces of arsenic to one person, enough to poison all the inhabitants of the borough.

Mr. Cartwright observed during the hearing that no entries of poison sold were made in the book from July 1877 until October 11, 1880.—*North Wales Chronicle.*

POISONING BY CHLORODYNE.

On Wednesday last Mr. W. Carter resumed an inquiry at the Star and Garter, Abbey Street, Bermondsey, as to the death of Thomas Pash, 60, which was alleged by Dr. J. Brindley James, of Jamaica Road, to have been caused by an overdose of chlorodyne.

Dr. James said he saw the deceased on Monday week last. He was then in a comatose state, and the pupils of his eyes were contracted. The witness was shown a bottle labelled "Dr. J. Collis Browne's Chlorodyne," and was told the deceased had taken several doses. His assumption was that the man had taken an overdose, and was really dying from poison. He used emetics, but the deceased never rallied. In reply to the coroner, the witness said there were half a dozen different sorts of chlorodyne; its constituents could only be known by analysis.

James Coldman, the coroner's officer, deposed to being told by one of the witnesses, Louisa Maynard, that the deceased had taken three doses of 15 drops each in water, which she had administered to him. A fourth dose, which was untouched, had been handed by him to the last witness. The bottle itself had been forwarded to Dr. Browning, who had been entrusted with the *post-mortem* examination and analysis according to the coroner's instructions.

Dr. Browning, Medical Officer of Health for Rotherhithe, and professional analyst, said on Friday last he received two bottles from the coroner's officer for the purpose of analysis. One bore the printed label, "Dr. J. Collis Browne's Chlorodyne," and the other contained the untouched quantity which had been given to Dr. James. On the 27th ult. the witness made a *post mortem* examination in the presence of Dr. James and several other qualified persons. There were no marks of violence about the body of deceased. There were appearances which fully justified Dr. James in his suspicion that the deceased had died from poison. The condition of the various organs was such as was found in cases of opium-poisoning. The viscera and their contents having been treated chemically, yielded in thirty-six hours a precipitate which gave crystals and morphia reactions estimated as equal to 0·15 of a grain by weight. The bottle marked "Chlorodyne" had in it a drachm of liquid made up of chloroform, peppermint, prussic acid, morphia and syrup, the amount of morphia being equivalent to 10 grains per ounce. In the second bottle were 4 drachms of similar mixture, diluted with water, from which was obtained 2½ grains of morphia, equal to 5 grains per ounce. Its deadly character could be judged from the fact that 1 grain had been known to cause death in an adult, and at least 2½ grains were missing from the bottle. The witness considered that such a dangerous fluid ought to have been labelled "poison." Two other samples of chlorodyne he had analysed contained respectively 5 grains and 8 grains to the ounce, and he considered that such medicines ought to be dealt with under the Sale of Poisons Act and labelled accordingly. Seeing that the deceased was suffering from a fatty heart, it was most injudicious to administer such a medicine to him. No medical man knowing his condition would have prescribed such a medicine for him. Looking at all the circumstances of the case, the witness believed that those who advised the deceased to take the medicine and those who administered it had inadvertently caused his death, but not with felonious intent. In answer to the jury, the witness said he could not swear that the quantity of poison found in the body had caused death, but that death was due to narcotic poisoning he had not the slightest doubt. In this, together with the report of the *post-mortem* examination at which he was present, Dr. J. Brindley James concurred.

The coroner then proceeded to censure Arthur Bowdidge, a friend of the deceased, who had advised him to take chlorodyne, and Louisa Maynard, for administering the medicine, and said it was injudicious for persons who were ignorant of the nature of a disease to prescribe for it; but under the circumstances the jury had acquitted them of any criminal intention, and they might leave the court, but he hoped it would be a lesson to them in the future. Eventually a verdict was returned of "Death by misadventure from an overdose of chlorodyne."—*Times.*

BOOKS, PAMPHLETS, ETC., RECEIVED.

AIDS TO THE CHEMISTRY AND TESTS OF THE PHARMACOPŒIA. By JAMES DAVISON, L.R.C.S.I., L.K. and Q.Q.C.P.I., etc. Dublin: Fannin and Co. 1880. From the Publishers.

INORGANIC CHEMISTRY: adapted for Students in the Elementary Classes of the Science and Art Department. By Dr. W. B. KEMSHEAD. London and Glasgow: W. Collins, Sons and Co. From the Publishers.

Correspondence.

DISPENSING BY COUNTRY PRACTITIONERS.

Sir,—Concerning the question of dispensing by medical men, which has been of late ventilated in the Journal, I beg to cite two cases that have come under my notice lately, showing, at any rate, that some dispensing doctors are a trifle lax in their method of sending out medicines. A woman came to me some time back with two ordinary vials, one being labelled, "The draught," etc. The other also had on a somewhat similar label. She said that the doctor had instructed her to use one liquid as a liniment and to take the other as a draught, but wished me to explain it, as she could not understand what was meant, both bottles being labelled as medicines for internal use. I of course sent her back to the doctor again.

Seeing the person who dispensed the medicines, some time after, I asked him about the case, and found that the liniment was composed of belladonna and chloroform. He candidly and laughingly informed me that he rarely troubled to label such bottles as poison.

The liniment had evidently been put into the first bottle handy and heedlessly sent out with the previously written directions for internal use still attached.

The other case was not so serious, but still indicative of the "slap-dash" style.

A prescription was sent me to be made up for a medical man, his dispenser being absent, which contained amongst other things one of his surgery nostrums, of the composition of which I was of course ignorant. I returned the prescription, saying that I could not prepare it unless this preparation was sent me. However, shortly after the patient returned with an instruction giving me *carte blanche* to put in the "nearest thing like it," the doctor being either out of the preparation or the bottle was not to be found in this well-ordered surgery.

I have no doubt that many chemists could point out similar cases if they chose to take the trouble.

Plymouth. GEORGE T. STARKEY.

Sir,—I take up my pen for the last time to reply to the letters of "Veritas" and "Asmodeus," and to protest again at the wholesale libels on the general body of practitioners, for I cannot admit that the few exceptions (assuming them to be true) mentioned by your correspondent, and magnified by "Veritas" into hundreds, can possibly justify such remarks on the great bulk of medical men scattered through the provinces.

"Veritas," for want of a better excuse, questions the purity of the drugs, infusions, etc., in the doctor's surgery, and "Asmodeus" calls them "ready-made cheap stuff," and so they both turn round and slander some of their own body,—the wholesale druggists,—for I suppose that in nine cases out of twelve the very same house supplies both the doctors and chemists in the same town or country place, for I think, sir, you would find very few doctors that make their own infusions, etc., as they can buy them as reasonably and at less trouble to themselves from the wholesale manufacturers.

As to the episode of the laudanum and senna mixture, it reads on the face of it an absurdity, as, supposing the doctors to have agreed together, fancy the coroner aiding and abetting in the affair by "bamboozling the non-intelligent jury" into returning such a verdict! No, sir; I am afraid "Veritas" must have been reading the trial from Dickens's 'Pickwick,' and muddled up the life-drawn picture of the chemist's "boy in buttons" mistaking laudanum for tincture of rhubarb, and so he has evolved this story of these two doctors out of the depths of his moral consciousness. Respecting the antimonial powder, that was evidently the fault of the druggist in sending the wrong article, and I am surprised that a man, speaking with so much apparent authority as "Veritas," and being so well versed in the purity, etc., of drugs, and being also "one of the establishment," did not himself discover the mistake in the article.

All I wish to say to "Asmodeus" is, that on taking up the first dictionary that came to hand, I find the word "prescription" defined as a doctor's receipt, and I take the derivation to be something written beforehand, therefore it would be a doctor's receipt written before the ingredients were put up, and as medical men are in the habit of writing their prescriptions in their day-books for their present and future guidance, I think I have shown you the absurdity of this remark. As to the meaning of "which is filled out into bottles," the English is so shaky that I give it up.

A (SOMETIME) COUNTRY DOCTOR.

THE RELATION BETWEEN MEDICINE AND PHARMACY.

Sir,—The *Lancet* of November 27 contains an article commenting upon the "joint discussion between chemists and doctors, in some meetings which have been held in the Philadelphia College of Pharmacy, with the object of improving the relations between the two classes." The view taken is such that I feel justified in bringing the matter (through the medium of the Journal) under the notice of my pharmaceutical brethren, with the hope that abler pens than mine will refute those statements which, if allowed to pass unnoticed, are calculated to convey very erroneous impressions to the minds of the medical fraternity.

Whilst condemning "patents," it acknowledged "that of late years specialties have been much more prescribed than formerly." But it is much to be lamented that they are not "much more," but almost "universally" prescribed, to the injury of the trade generally; for what with the small margin of profit obtained from them, compared to legitimate dispensing, the dead stock which results from these experiments of prescribers, together with the frequent necessity of having to obtain it specially, devolving upon the pharmacist extra expenditure, and delay and inconvenience to the patient, the evil is very great indeed. Not long since a prescription from one of the leading London physicians was presented at a well-known dispensing establishment in the city, ordering a 2-ounce concentrated mixture, together with five "specialties." To use the words of the *Lancet*, "it is not surprising that they are looked upon with some disfavour by pharmacists, since the profits derived from their sale must be very much less than those obtained upon medicines dispensed from an ordinary prescription." Our contemporary might well devote an article to those who are the cause of the influx of these many specialties into the market, viz., the physicians themselves. Only a few months since a well-dressed representative of a firm noted for these nostrums gave me a call, soliciting orders to meet the demand which would result from his waiting on all the medical men in the town with his various preparations. The usual consequences followed, viz., a certain number were prescribed, but soon ceased, probably owing to a similar personage calling with something fresh; at any rate, the remains of the supply I was compelled to obtain to meet the demand now stares me in the face as "dead stock."

It then goes on to condemn "counter prescribing," adding, "it deprives the medical practitioners of one-half the work which should legitimately come to them;" also that "it bears the impress of ingratitude to the medical profession, as the changes in the mode of medical practice, the extensive adoption of the system of prescriptions (*sic*), have put an enormous amount of business into the hands of pharmacists." In many towns which can boast three or four chemists, not a single medical man gives prescriptions; as, for instance, in my native town, there are four chemists and six medical men, the whole of the latter dispensing their own medicine; and here, with a population of 130,000 and seventy-four medical men, seven only (extensive adoption) give prescriptions. The article proceeds: "We would suggest that medical men should resolve to discountenance all chemists who are known to cultivate counter prescribing, and to encourage by their help those (if any such are to be found) who avoid it altogether." In return for this very kind advice, I would suggest that chemists generally discountenance those medical men who dispense their own medicines, and encourage those (the few that are to be found) who give prescriptions. PHARMACIST.

COMPETITION.

Sir,—As a mere distributor in petty commerce, the dispensing chemist is nowhere when opposed to selfish, unscrupulous men, armed with capital and energy, bent on plunder. His best defence must lie in the following directions: A deeper and wider knowledge of materia medica and pharmaceutical chemistry, enabling him to occupy the ground now being abandoned by the medical profession, making him essential to them and to the public. This increased knowledge will teach him how to prepare remedies far superior to those usually composing patent medicines, and these he will describe with modesty and truth, his increased value to the public giving confidence and ensuring a profitable sale. It must be with him as with the medical practitioner, personal value and service making him indispensable. F. C. S.

COPIES OF PRESCRIPTIONS.

Sir,—In reply to your query in a recent Journal, I am of an opinion that Z. was perfectly justified in declining to give a copy of prescription, or at least not without just remuneration. I look upon prescription books as the goodwill of a dispensing establishment, and as you state the medicine in this case had been regularly used by the whole family for some years, by this it is perfectly clear Z. by giving a copy of the prescription would be giving away not a small proportion of his goodwill, even at the price asked.

What lawyer, accountant or architect will give you a draft of any document without charge? But the poor, kind-hearted and unselfish chemist is a pattern to fallen humanity, for he will go to the expense of having notepaper headed for the special purpose of copying the thankless public his prescriptions on. He will even do more—he will hand it over the counter in a most bland manner and thank him for the honour. What would my poor brother think if he saw this same individual going half an hour after into a "co-operative" to get it dispensed? This is one of the many evils of giving copies. MUCILAGE.

IRIDESCENT CRYSTALS OF CHLORATE OF POTASH.

Sir,—I do not consider that the presence of lead is the cause of the beautiful iridescent colours occasionally displayed by crystals of chlorate of potash, as suggested by Mr. Huskisson, in your issue of November 27, but that the phenomenon is a simple case of "interference of light," resulting from the physical condition of the crystal.

A sufficiently thin lamina of any transparent body (*e.g.*, a soap bubble) reflects light from both its surfaces, and a reflected ray from the lower surface "interferes" with a reflected ray from the upper surface in such a manner that the waves of the one destroy or augment the waves of the other, according as they are in the same or opposite phases; consequently, coloured light is produced from white light by the obliteration of one or more of its constituents.

This condition is fulfilled in the crystal of chlorate of potash by the presence of an interstitial layer of air, the reflecting surfaces bounding which are close enough to produce "interference." The friable nature of the crystal accounts for the rare occurrence of iridescent specimens.

The same phenomenon may be observed at the extremity of a crack which penetrates and terminates within a thick piece of glass, or more frequently in a damaged fragment of calc-spar, a series of coloured rings being visible.

The iridescent film on the surface of fused nitre observed by Mr. Huskisson, the display of colours when oil is thinly spread on water, the gorgeous tints resulting from the presence of a coating of mixed sulphides and oxides on the surface of the polished copper still exposed to the vitiated atmosphere of the analytical laboratory, the blue or brown film of oxide on a watch spring or steel spatula which has been held in the flame, are further illustrations of the same phenomenon. R. H. PARKER.

"*Calcis Phosphas.*"—In his 'Free Phosphorus in Medicine,' Mr. J. Ashburton Thompson speaks of a saturated "tincture of phosphorus," prepared as follows, as being a useful and convenient solution:—"Take of absolute alcohol, a sufficiency; of phosphorus, an excess; heat the alcohol to ebullition in a Florence flask; add the phosphorus, and keep the mixture at boiling point for a few minutes. Close the flask accurately, and set the solution aside for twenty-four hours. Agitate until cool, and afterwards occasionally. Decant the solution from the excess of phosphorus with as little exposure to air as possible into small coloured bottles. Let each be quite filled, accurately stopped, and stored in the dark. Care should be exercised to use absolutely dehydrated spirit and perfectly dry vessels. This preparation is stated to contain 1 grain of phosphorus in 320 grains.

"*Euryowie.*"—Probably the following is the preparation referred to. It is given in 'Free Phosphorus in Medicine':—

Tincture of Phosphorus (prepared as described in preceding paragraph)	3 drachms 10 min.
Glycerine (free from water) . . .	1½ ounces.
Spirit of Peppermint	5 minims.

"374."—Your answer respecting the glycerine and pepsine preparation does not meet the request of our correspondent, which was for a formula for its preparation.

"*Bute.*"—"*Unguentum Hydrargyri Oleatis*" (20 per cent.). The following is the University College Hospital formula:—"Precipitated peroxide of mercury, 2 drachms; oleic acid, 10 drachms. To the oleic acid, kept agitated in a mortar, sprinkle in the peroxide gradually, and triturate frequently during twenty-four hours until the peroxide is dissolved and a gelatinous solution is formed."

A. Bond.—The questions set at each examination are printed in this Journal at the same time as the names of the successful candidates, and those for the last ten years may be easily found by reference to the indexes.

"*Minor.*"—The following formula for Mr. Startin's lotion, has already been published in this Journal:—

℞	Zinci Oxidi	ʒij.
	P. Calam. Ppt.	ʒij.
	P. Sulph. Præcip.	ʒj.
	Glycerini	ʒij.
	Aq. Rosæ	ad ℥iij
	Hydrarg. Bisulph.	gr.j.

M. Ft. lotio.

COMMUNICATIONS, LETTERS, etc. have been received from Messers. Kendall, Abbott, Dennett, Christy, Filtness, Bond, Atkinson, Dyer, Wall, Tylee, Spenser, Sardford, Jackson, Stevens, Dutton, Hance, Digit, Cymro, Zampa, Lubberly Lout, Pharmaceutical Chemist, Verax, Oxford, Argentum, Minor, Volo, Village Chemist, Hore, Illingworth, Despero, Ptochos, F.F., H.K., N.R., L.W.S., J.F., T.G.T., H.J.

NOTE ON HUNGARIAN RED PEPPER.

BY HENRY B. BRADY.

In the discussion upon Mr. Greenish's paper at the Pharmaceutical Conference at Swansea,[*] I had occasion to mention the fact that a sample of cayenne might be a perfectly genuine powder of capsicum fruits and still possess relatively a very small degree of pungency; that it might be of a richer red tint than we are accustomed to see, and might produce a bright orange-coloured, oily looking stain on the paper in which it had been wrapped, without the admixture of anything in the shape of an adulterant. I named as an illustration the red pepper commonly met with in some parts of southern Europe, notably the *paprika* of the Hungarians, as well as some similar condiments used in Algeria, and elsewhere.

Finding that very little was known amongst those who took part in the discussion of any cayenne except the powder prepared from the fruit of *Capsicum fastigiatum*, I wrote to a scientific friend in Vienna for some particulars respecting the Hungarian product, and the information I have received in reply may possibly be of interest to the readers of the Journal. He states that *paprika* is prepared entirely from the fruit of *Capsicum annuum*, Linn., which is grown generally throughout Hungary. Of this species, however, there exist a great number of varieties, distinguished by the size and shape of the fruits, and their milder or sharper flavour. The larger fruits are as a rule comparatively mild, and have a sweetish taste of their own, whilst the small pointed sorts are commonly the more pungent. The degree of pungency, as well as the particular flavour is said to depend in part upon locality, and in part also upon method of cultivation.

The *Szegediner paprika* is the sort most esteemed by the Hungarians. Some specimens of this variety which have been sent to me resemble the large capsicums seen in our own markets, except that they are broad or truncate at the apex, instead of pointed. The pepper is ground with very little preliminary drying, hence there is considerable difficulty in keeping the powder. It is the custom to put it on the table in a salt-cellar, not in a cruet; but many Hungarian dishes are seasoned with it before being brought to table. I have sometimes had small parcels of *paprika* sent to me by post, but the experiment has not been very satisfactory; when fresh, it is an agreeable condiment, but if kept in an open vessel it becomes dry and tasteless, whilst in a closed one it soon turns mouldy.

Szegedin is a town of some size, lying directly south of Pesth, perhaps half way to the Bosnian frontier. In connection with the subject it is interesting to note that the cultivation of the capsicum in this part of Europe dates back for three centuries. Flückiger and Hanbury quote Leonard Fuchs, who states that "he saw it cultivated in abundance at Brünn, in Moravia, in 1585." Moravia, it will be recollected, is the province of Austria adjoining Hungary on the north. The same authorities give it as their opinion that a considerable portion of the cayenne imported in powder is prepared from the fruits of *Capsicum annuum*.

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[*] See before, p. 345.

STUDIES OF THE GENUS STRYCHNOS.[*]

BY G. PLANCHON,

Professor in the Ecole Supérieure de Pharmacie, Paris, and Honorary Member of the Pharmaceutical Society of Great Britain.

I. UPON THE CHARACTERS OF STRUCTURE OF THE BARKS AND WOODS OF SPECIES OF STRYCHNOS.

In examining, some years since, the "hoang-nan" bark produced by a species of *Strychnos*,[†] I called attention to the structural relation which exists between it and the bark of *Strychnos Nux-vomica*, or false angustura. There was in this fact an indication that other species of *Strychnos* would present similar characters, and I thought there would be some interest in making new researches in this direction. I have, therefore, examined a certain number of barks from plants important in the materia medica, and belonging to the same genus,—namely, bark from lignum colubrinum, m'bondou bark, and the barks from American species furnishing different kinds of curare,—and in all of them, whatever may have been their geographical origin, Asiatic, American, or African, I have found a certain number of common characters, to which I wish briefly to call attention.

To give a fairly complete idea of the structure of these barks I would refer the reader to papers that have already appeared in the *Journal de Pharmacie* upon the false angustura[‡] and hoang-nan barks.[§] I would add here in some detail the description of a bark from a species of *Strychnos*, as yet undetermined, which yields on the banks of the Rio Negro a kind of curare. The stem had been sent to M. Gubler, who kindly entrusted me with it to study the characters; the root was exhibited in the Champ de Mars, in 1878, in the Venezuela section.[‖]

This bark is relatively thin, dark grey on the surface, marked here and there with large chalky white spots, rugose and irregularly furrowed longitudinally. The internal surface is yellowish-grey, and regularly striated longitudinally. A transverse section presents to the eye a broad central zone of whitish appearance, bordered on the exterior by a narrow layer having an ochraceous tint, and on the interior by a band much narrower still of the same colour.

Examined under the microscope this bark shows: (1) An exterior suberous zone, formed of numerous cubical or rectangular cells in several rows one above the other. (2) A subjacent zone of cellular tissue with the elements extended longitudinally, and filled with reddish matter. These two zones represent the external portion which bounds the large whitish zone. (3) This layer is formed only of cells with much thickened walls or stone cells grouped one by the side of the other in numerous rows. (4) Lastly, at the interior there is found a layer of liber tissue, intersected by medullary rays.

If a comparison be made between the three barks before mentioned,—the false angustura, hoang-nan and the curare bark from the Rio Negro,—the analogy between the characters is very striking. There is the same ochraceous suberous layer on the surface; the same subjacent cellular layer, with cells filled with reddish-brown matter and crystals; the same pale zone, characterized by stone cells; and lastly the same liber layer. There are only shades of structure between these barks. For example, the characteristic sclerenchymatous zone in the curare bark assumes a considerable development in relation to the other zone. But that is only a specific difference convenient for the determination of this bark. Taken altogether the structure is exactly similar in the three cases.

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[*] From the *Journal de Pharmacie*, [5], vol. i., p. 19.

[†] *Journal de Pharmacie*, [4], vol. xxv., p. 387.

[‡] Oberlin and Schlagdenhauffen, *Journ. de Pharm.*, [4], vol. xxviii., p. 225.

[§] G. Planchon, *Journ. de Pharm.* [4], vol. xxv.

[‖] *Journal de Thérapeutique*, March, 1879.

We find characters quite analogous in three interesting barks recently communicated by M. J. Crévaux, a distinguished naval physician, known by his explorations in Guiana and the tributaries of the Upper Amazon. Of these barks, one belongs to the stem of *Strychnos Castelnœana*, Wedd., or "ramon" of the Pébas Indians. The plant has been described by Weddell, after his journey with M. de Castelnau; it furnishes on the Upper Amazon a kind of curare. The other two are taken from the stem and root of a new species of *Strychnos*, which also yields a curare in French Upper Guiana. It is the "ourari" of those regions, and is certainly different from the "ourari" of British Guiana, which Schomburgk has referred to *Strychnos toxifera*, Benth.*

It is the same with fragments of bark that I have found adherent to lignum colubrinum, preserved in the stores of the Paris School of Pharmacy. It is known that this wood, which contains a certain proportion of strychnia and brucia, comes from a species of *Strychnos*, insufficiently determined, but probably *S. colubrina*, Cobb. In its general aspect the bark shows a whitish zone placed between two brown zones. The pale zone is the characteristic sclerenchymatous zone; it is relatively very narrow. The others are,—at the exterior, the suberous zone and the subjacent parenchymatous zone, broader than the sclerenchymatous zone; at the interior, the liber zone, more developed than either of the others, formed first of rather short elements, then quite at the interior of elongated elements bounded by numerous cells with crystals.

Lastly, if we pass from these American or Asiatic species to an African one, still defectively determined, that which yields m'bondou, we find the zones that have been indicated perfectly marked. I have two specimens of the root of this plant, which is used in the Gaboon as an ordeal poison. One was sent to me by M. Bernardin, director of the commercial museum of the firm of Mellelez-Gand; the other is a fragment left at the Montpellier School of Pharmacy by the author of an interesting thesis upon m'bondou. In these two barks are found—(1) the suberous zone, formed of seven to ten rows of cubical cells; (2) a layer of cellular elements, extended tangentially, having nearly the thickness of the suberous layer; (3) the whitish zone, formed of three or four rows of stone cells, narrower than the adjacent zones; (4) the liber zone, the broadest of all.

This constancy in the structural characters of the bark having attracted my attention, I desired to ascertain whether I could not find in the ligneous layers a similar means of determination. I have, therefore, examined, from this point of view, the various species that I had at my disposition.

The wood best known in this group is that which bears the name lignum colubrinum. Guibourt has described it in his 'Histoire naturelle des Drogues simples,' and he has noticed as characteristic, "the white and silky fibres which are mingled in great number with the ligneous fibres." The presence of these long, longitudinal trails, which show up by their colour upon the groundwork of the tissues, gives an aspect quite peculiar to these roots, and upon a comparative consideration of the other *Strychnos* woods,—that of hoang-nan, of which I have been able to examine a fragment adherent to the bark, those of various kinds of curare, and that of m'bondou,—one is led to the conclusion that there are great differences of structure between the ligneous portions of these various plants. However, a more attentive examination compelled me to abandon this first impression.

The most striking features in most of these woods are the numerous orifices which are apparent in a transverse section and the furrows that run along the length of the woody fibres. What are these furrows and these orifices? Do they belong to the large vessels of these barks and roots? This might appear to be the case at first. But a simple section examined under a microscope soon dissipates this error. These spaces are seen to be none other than long lacunæ, which extend a considerable distance, destroying all the tissues, medullary rays, ligneous tissue and vessels.

A description of the curare wood from the Rio Negro will give an idea of these ligneous layers. This wood does not show the concentric zones well marked, and nothing which corresponds to the annual layers of our dicotyledonous trees. The ligneous fibres, which are very numerous, regularly ranged one opposite another in radial series, are of inconsiderable diameter and all pitted. They surround numerous vessels, also pitted, of which the diameter is much less. The tissue is traversed, from the centre to the circumference by numerous medullary rays, composed sometimes of a single row, sometimes of two or three files of rectangular cells containing frequently a large crystal. At intervals are seen also bands of cellular tissue which pass through the ligneous tissue in a tangential direction and which form false annual layers. But the most curious and characteristic feature of this structure is the development of large lacunæ, which are formed by the tearing, or rather by the destruction, of the tissues, and which causes the disappearance over a considerable space of vessels, ligneous tissue, medullary rays and cellular tissue. In a transverse section these lacunæ have a very irregular contour, tending, however, generally towards the ellipsoid form with the principal axis in a tangential direction. They are not limited by any special wall, but by the various tissues in the midst of which they are developed. These are the lacunæ which form at the surface of the wood the characteristic openings that have been before referred to.

These curious lacunæ are shown very clearly in the wood of the stem and root of the Guiana ourari; they are also seen perfectly with the naked eye in the wood of hoang-nan. Lastly, they are very visible in a young stem of *Strychnos Nux-vomica*, L. "Ramon" wood (*Strychnos Castelnœana*, Wedd.), which is very hard and resistent to cutting instruments, appears at first sight not to possess this character; but in examining a well polished section, and especially one cut obliquely, the presence of these lacunæ is per-

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*** I will confine myself at present to indicating these analogies of structure, reserving the details of this structure for a succeeding section on the plants which yield curare.**

ceptible and is confirmed by the aid of a microscope. The same is the case with m'bondou wood, which in its compactness much resembles ramon wood. The lacunæ are less numerous, but they exist there and have quite the same mode of formation as in other species of *Strychnos*.

What relation can these stems thus furrowed have to the lignum colubrinum, with its white silky fibres? A microscopic examination shows that a relation exists and that the supposed silky fibres of Guibourt are nothing but a matter secreted in the interior of the lacunæ, filling them completely and thus presenting to the eye their peculiar course. There happens here what is seen in the rudimentary state in other species, where some lacunæ contain through a part of their length a resinoid product. The exudation is much more marked in the lignum colubrinum. It fills up the spaces that are made in the tissue; but the spaces none the less exist, and they have exactly the same characters as those in the stems and roots of other species of *Strychnos*.

I do not insist further upon the details of the structure. I will limit myself in this section to putting in evidence this important fact, the constancy of certain characters in the wood as well as in the bark of species of *Strychnos*, reserving for subsequent sections various special points that may arise in the study of this genus.

(*To be continued.*)

NOTE ON MIKANIA GUACO.

BY J. G. BAKER.

Mikania Guaco is a form of a plant widely diffused in Tropical America, which is known under a great many different botanical names. It is the *Eupatorium amarum* of Vahl; *Eupatorium parviflorum* of Aublet's 'Guiana,' tab. 315; *E. vincæfolium* of Lamarck, in the French 'Encyclopédie'; *Mikania amara* of Willdenow and De Candolle; *Mikania Huaco* of De Rieux; *M. argyrostigma* of Miquel's 'Stirpes Surinamenses,' tab. 55; and *M. Guaco* and *Tafallana* of H. B. K. and De Candolle. Under the name of *Mikania Guaco* there are figures in H. B. K., 'Pl. Equin.,' tab. 105, and Descourtilz's 'Medical Flora of the Antilles,' tab. 197, and under the name of *M. amara*, var. *Guaco*, in my 'Monograph of the Brazilian Compositæ,' t. 66. It ranges from Panama and Nicaragua to Peru and Central Brazil.

SYRUP OF CITRIC ACID.[*]

BY J. B. MOORE.

There is no flavouring substance more palatable or more popular than that of the lemon. In the form of lemon syrup, or its substitute, syrup of citric acid, it is very extensively used, not only in medicine, but as a beverage, as lemonade, etc. The syrup of lemon is now very rarely kept by pharmaceutists in the United States, the syrup of citric acid having almost entirely superseded it on account of the trouble and at times the expense of making the former, and the difficulty attending its preservation in good condition for a length of time.

Syrup of citric acid is easily and cheaply made, and when well prepared, so as to possess the true fruity lemon flavour, it is, in my opinion, in every respect equal, if not superior, to the veritable lemon syrup. Unfortunately, however, the formula of the U. S. Pharmacopœia for this syrup does not afford a well-flavoured and satisfactory preparation. The amount of oil of lemon employed (4 minims to 2 pints of syrup) in the officinal formula is inadequate to make a syrup of sufficient flavour.

The syrup of citric acid is used in medicine almost exclusively to impart flavour to mixtures and to disguise or modify the taste of unpalatable medicines. Is is, therefore, valuable, to a great extent, in proportion to its flavouring power.

If the process of the Pharmacopœia is followed a larger proportion of oil of lemon than is directed in the formula cannot be used, as it would not be held in solution, and would be liable to separate on standing and rise to the surface of the syrup, which would be objectionable.

I have for a number of years tried to improve this formula, and have met with much difficulty in devising a process by which I could form a clear and permanent syrup, with the lemon flavour sufficiently pronounced to answer all the purposes for which it may be required, not only as a flavouring for medicinal use, but also a beverage in the shape of lemonade.

As the result of my experiments I offer the following formula and process for the syrup of citric acid, which I have used for several years with much satisfaction:—

℞	Oil of lemon	10 to 15 minims.
	Citric acid, in powder . . .	68 grains.
	Carbonate of magnesia, fine powder	4 „
	Sugar in coarse powder . .	15 troy ounces.
	Boiling water	8 fluid „
	Water, sufficient.	

Add the oil of lemon to the boiling water in a 2-pint bottle; shake vigorously and add 9 troy ounces of the sugar; shake well occasionally until the mixture cools. Then add the carbonate of magnesium, and after the mixture has been again well shaken, filter through paper, passing sufficient water through the filter to make the filtered liquid measure 14 fluid ounces; to this add the remainder of the sugar and the citric acid, and shake occasionally until dissolved, and, if necessary, strain through muslin.

If after standing twenty-four hours the sugar is not all dissolved, the solution may be completed by placing the bottle in a water-bath at a temperature of from 140° to 150°.

This syrup, as thus prepared, keeps much better than the officinal one, and is, in my opinion, in all respects a better and more satisfactory preparation. If introduced immediately into 4- or 8-ounce bottles, filled to the cork, stoppered tightly, and kept in a cool, dark place, it will keep without scarcely any apparent change for three or four months. In fact, I have had samples preserved in this way that have remained in very good condition for eight months. But, like the officinal syrup, it is nevertheless liable to change in a short time, in hot weather, when brought up into the store-room. This teaches us the importance of keeping all such preparations in the cellar or some other dark, cool place, apart from the deteriorating influence of the warm store-room. This will, of course, give the dispenser a little extra trouble, for which, however, he will be amply rewarded by being thus enabled to supply these perishable preparations in a more desirable condition.

In the above formula I have employed an excess of oil of lemon, for the reason that it seems to yield a more highly flavoured syrup than when just sufficient oil is used for saturation.

The small quantity of carbonate of magnesium employed is barely sufficient to clear the syrup, and is much better when added to the syrup and shaken than when triturated with the oil in the usual way, as when triturated it appears to impair somewhat the flavour of the oil and to diminish the delicacy of the syrup.

The filtration of the syrup towards the close of the process, although continuous, is sometimes a little slow, which, however, may be remedied by a change of filters, and by mixing a little water, say a half fluid ounce or so' with the remaining contents of the filter.

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[*] From the *Druggists' Circular*.

It is hardly necessary for me to say that the oil of lemon used for making this syrup should be the best and freshest that can be obtained. If the oil is in the least changed it will detract from the elegance and delicacy of the flavour of the product.

When the syrup is intended for making a substitute for lemonade, it may be made with tartaric acid, in whole or in part; tartaric, I think, forms a syrup with more life and piquancy than the citric acid, and is equally if not more refreshing as a beverage.

REMARKS ON THE TESTING OF MUSTARD OIL.[*]

BY F. A. FLÜCKIGER.

The examination of a specimen of mustard oil, adulterated with bisulphide of carbon, which was performed at the request of Schimmel and Co. in Leipsic, led me to some observations, which may be connected with some communications of Hager (*Centralhalle*, 1879, No. 39), on the subject of the same oil.

The adulteration was to such an extent, that, by heating the oil for one day in a water-bath at a temperature not exceeding 80°, nearly one-fifth of the oil passed over, the distillate possessing very nearly the specific gravity of bisulphide of carbon, and, when warmed with alcohol and ammonia, furnished very quickly the sulphocyanide of ammonium, which gave with ferric chloride the characteristic deep red coloration.

Treated in the manner indicated in my 'Pharmaceutische Chemie,' p. 42, with alcohol, caustic potassa and ether, the distillate above mentioned furnished the ethylxanthogenate of potassium, which was recognized by the beautiful yellow copper salt.

The liquid extracted from the mustard oil was, therefore, to be considered as bisulphide of carbon, although it was necessary to conduct the distillation at a temperature above 47°, in order to obtain approximately the entire amount.

The great mobility of sulphur in mustard oil has been known for a very long time, as may be seen, *e.g.*, from the statements to be found in Gmelin's 'Handbuch der organischen Chemie,' ii., 1852, p. 216.

It suffices, indeed, to warm pure mustard oil with a little alcohol and ammonia, and to remove the excess of the latter by heating in the water-bath, in order to obtain the sulphocyanide of ammonium. It follows herefrom that the sulphocyanide of iron reaction cannot be employed for the purpose of detecting bisulphide of carbon in mustard oil.

In order to obtain from pure mustard oil a metallic sulphide, probably always accompanied by sulphocyanide, it is not necessary to apply potassa, soda or ammonia; baryta water or lime water, even without alcohol, when warmed with mustard oil, accomplish the formation of the metallic sulphide, which may be detected by means of the nitro-prusside of sodium. Even saturated solutions of carbonate of sodium are capable of extracting sulphur from mustard oil, forming therewith traces of sodium sulphide.

Mustard oil and ammonia combine to form thiosinammin, $SCNH(C_3H_5)NH_2$; 1 molecule of mustard oil = 99 gives 116 thiosinammin. 100 parts of mustard oil must therefore yield 117·7 parts of thiosinammin. I warmed 5 grams of the pure mustard oil, distilled by Schimmel and Co., with 2·5 grams of absolute alcohol, and 8·6 grams of ammonia water, sp. gr. 0·960, to about 60°, in a loosely stopped flask. After a quarter of an hour the mixture became clear, of a yellow colour, and, at the expiration of an hour, the odour of the mustard oil had disappeared. Evaporated on a watch glass upon the water-bath until no further considerable reduction in weight took place, the residue furnished upon cooling a white crystalline mass of thiosinammin, which, after drying completely over sulphuric acid, weighed 5·634 grams, or 11·2 per cent. of the applied mustard oil.

Other experiments, with slight deviation from this procedure, gave 11·1, 11·23, and 11·57 per cent. of thiosinammin.

Four grams of mustard oil, adulterated with bisulphide of carbon, furnished on the contrary only 3·6 per cent., *i.e.*, 90 per cent. of residue.

It is thus seen that the weighing of the thiosinammin, which can be obtained from a given specimen of mustard oil, is very well adapted for the determination of its value.

This very neat reaction is, however, accompanied by an unavoidable error. The action of the ammonia is, as one might expect, not confined to the formation of the thiosinammin, but the latter is always accompanied by some ammonium sulphocyanide. The amount of the latter is indeed very small, when a moderate heat and not much more ammonia is applied than is necessary according to the above formula. It still remains to be studied under what conditions the formation of the sulphocyanide is most limited; presumably, when the formation of the thiosinammin takes place in the cold, which in this case proceeds very slowly.

It would almost appear as if allyl sulphocyanide could be formed of itself in mustard oil which has been kept for a long time, for while pure and fresh mustard oil is not changed by alcoholic ferric chloride, I have occasionally observed with old mustard oil that a red coloration takes place upon the addition of ferric chloride. As is well known, allyl sulphocyanide boils at 161°, and passes by simple distillation into mustard oil. It was therefore sought whether by the action of a high temperature the reverse reaction did not take place, and the mustard oil assume the property of becoming coloured by ferric chloride. This was, however, by no means the case with a specimen of mustard oil which was heated in a sealed tube to 180°; the oil became darker, but mixed, as before, without change with ferric chloride. On the contrary, the oil when exposed in a sealed tube for three weeks to the action of sunlight, assumed a darker colour, showed on the tube a brown deposit, and was then coloured red by ferric chloride. It remains a peculiar fact, that the red coloured compound, which is formed by the action of ferric chloride on old mustard oil, or on that which has been changed by the action of sunlight, is insoluble in ether, which is not the case with the sulphocyanide of iron.

When the formation of the xanthogenate of potassium is employed as a means for the detection of bisulphide of carbon in mustard oil, the question arises, whether the latter itself does not also take part in the reaction. This is indeed the case, and with pure mustard oil, which has been shaken with an alcoholic potassa solution, a liquid is obtained which may lead to a deceptive conclusion, as it also contains some potassium sulphide.

Indeed the behaviour of the xanthogenate of potassium to copper salts is so characteristic that the smallest amounts of bisulphide of carbon can be thus recognized; but, if mustard oil be present at the same time, the decomposition products, proceeding from the latter, will also give darkly coloured precipitates with copper salts. Dr. Bertram, of Schimmel and Co., has found that very dilute potassa, shaken for a very short time with mustard oil, does not furnish these deceptive products of decomposition. Such a solution is obtained, according to him, by saturating absolute alcohol with caustic potassa, and diluting 20 drops of the solution with 10 c.c. of alcohol. Ten drops of mustard oil, adulterated with bisulphide of carbon, shaken with the above potassa solution for one minute, then supersaturated with acetic acid, furnishes a liquid, which with a solution of sulphate of copper produces a reddish-yellow precipitate. Pure mustard oil, treated in the same manner, shows always an undesirable turbidity, and after some time also a whitish deposit, which, however, cannot be confused with that produced by bisulphide of carbon, but which does not exclude with certainty all doubts.

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[*] From the *Pharmaceutical Post*, No. 17, 1880. Reprinted from the *American Journal of Pharmacy*, November, 1880.

It is consequently the most desirable, under all circumstances, to distill off the bisulphide of carbon, when the quantity present will admit, and particularly to determine its specific gravity and boiling point. In the case now before us, the adulterated oil had the sp. gr. 1·073 at 20°, while the same, after the above described process of distillation, approached the correct number, 1·021, and the specific gravity of the distillate was increased to over 1·20.

By the long preservation of the questionable adulterated oil by the side of a specimen of the pure oil, the remarkable fact was shown, that the former in the course of a few months, even in dispersed light, became coloured very dark brown, and the bottom and sides of the flask become covered with a dirty, brown red deposit, while the pure oil under the same circumstances underwent no change. In exposed sunlight, however, such a remarkable distinction is not manifest, as in this case the pure oil becomes also dark coloured very quickly.

THE SIEVE-TUBES OF DICOTYLEDONOUS PLANTS.

In a recent paper by Dr. K. Wilhelm of Strasburg, he gives a fuller account than any previous observer of the sieve-tubes of exogens. The plants examined were chiefly *Vitis vinifera*, *Cucurbita pepo*, and *Lagenaria vulgaris*, which may be taken as representatives of two different types of sieve-structure; the first belonging to a more complicated, the two others to a simpler type.

Those young bast-cells which are destined to the formation of a sieve-tube undergo, as a rule, a longitudinal division into unequal cells; the largest of these becomes an element in the sieve-tube; the one or more remaining ones, which are much smaller but themselves of nearly equal size, form the "companion cells" of the sieve-tube, which may undergo still further division. These companion cells are always much smaller than the cambiform cells; they are marked by containing abundant granular protoplasm with a large nucleus; and the walls which separate them from the sieve-tube always contain a number of pits, which is not the case with those that separate the sieve-tubes from the cambiform cells.

The callous nature of the sieve-plates is not, as previously supposed, the result of a secondary change; on the contrary, the transformation of a pit into a sieve-plate begins with the local change of cellulose into callus. The sieve-plates are formed where the pits in the callus are separated by a reticulation of unchanged cellulose. The callus is, however, not limited to the neighbourhood of the sieve-pores, but may spread itself over the whole plate; and this callus-skeleton, which may be isolated, forms an essential part of every completely differentiated sieve-plate. The volume of this callus-skeleton varies at different times, increasing with age and with the commencement of a period of rest. Under both these conditions the sieve-pores may become completely stopped; opening again when the period of active vitality recurs. This description applies both to the sieve-plates on the transverse and to those on the longitudinal walls of the sieve-tubes.

The chemical behaviour of the callus does not agree with that of any known group of substances. With acids and alkalies it swells quickly, and is rapidly dissolved if they are concentrated; it is only slightly attacked, or not at all, by ammoniacal copper oxide. It is not coloured by an alcoholic solution of iodine; while potassium iodide colours it yellow or brownish-yellow; on addition of Schultz's solution an intense red-brown colour is produced; this substance alone produces no change of colour, but a considerable swelling. In the polarizing apparatus it remains dark.

While the sieve-tube is in the process of formation, a characteristic change take place in its contents, in the formation of isolated drops or irregular masses of a colourless or yellowish shining mucilage apparently rich in nitrogen; these appear in the layer of protoplasm which lines the cavity of the young bast-cells, and their appearance is followed by the disappearance of the nucleus. These separate masses unite, as a rule, into a parietal band, which is usually many times narrower than the cell. This always remains distinct from the granular protoplasmic parietal layer of the cell itself, while the fluid contents is known as the "sieve-tube sap."

The author was unable to observe more exactly the origin of the sieve-pores and the commencement of the open communication between the separate cells. It probably takes place by the outgrowth of protuberances of the protoplasmic parietal envelope of the sieve-tube, which enter the sieve-pores from opposite sides where two sieve-plates lie opposite to one another, and unite to form connected strings.

The probable presence was determined, in *Lagenaria* and *Cucurbita*, but not in *Vitis*, of an interior tube within the parietal protoplasmic layer between the sieve plates, and also penetrating the sieve-pores, formed apparently from the substance of the mucilage. The actual perforation of the sieve-pores, doubtful in some cases, was proved in others by the connection between these protoplasmic envelopes of adjacent sieve-tubes.

The presence of starch grains in the sieve-tubes was established by the author in the case of *Vitis*. They are of considerable size, 1·5—2·5 mm. in diameter, and are present when the tubes are still closed, chiefly in the neighbourhood of the septa. Their size precludes the hypothesis that they pass through the sieve-pores.

In the vine sieve-tubes occur in the medullary rays, by means of which a connection is kept up between the elements of adjacent bast rays. They result from the transformation into sieve-tubes of a continuous row of cells of the medullary ray, which penetrate it usually in an oblique direction. Neither these nor the starch-grains were observed in *Lagenaria* or *Cucurbita*.

The author was not able satisfactorily to determine the function of the sieve-tubes, but inclines to the view that they serve for the transport of insoluble substances from one part of the plant to another.

CYPRIEN M. TESSIÉ DU MOTAY.[*]

BY AUGUSTE J. ROSSI.

By the death of Mr. Tessié du Motay, the American Chemical Society has to deplore not only the loss of one of its most distinguished members, but also that of a *savant*, who will leave by his numerous works, discoveries and researches in all branches of technology, a lasting impression on the history of industrial science of our century. He died suddenly, in New York, from apoplexy, at the age of 61 years.

Born in Brittany, France, in 1819, of an old and aristocratic family, Tessié du Motay received in his youth an academical but not technical education. His studies were directed by the famous Abbé Lamennais—a friend of his family, from whom, it must be supposed, he derived his very liberal ideas in politics and philosophy. Gifted with a brilliant and passionate imagination, of a distinguished and at the same time romantic turn of mind, as well as of a superior intelligence, he could not but take an active part in the conflict between the "Romantic" and "Classical" Schools, as the two parties were called, which divided the young generation of *literati* in the first years of the monarchy of Louis Phillippe. Brilliantly endowed as a literary man, his first essays opened to him the doors of the most renowned *salons* of this period, where French art, literature and science made their abiding place. Even the most exclusive of these opened its doors to one so well fitted to do honour to it, and in the *salon* of Madame Récamier, young Tessié du Motay met with great success in his efforts in the drama, poetry and music. Chateaubriand and Victor Hugo were the familiars of this "*Cénacle*," and there Tessié du Motay became acquainted with Alfred de Musset, Vigny, Scribe, Théophile Gauthier, Méry, Gérard de Nerval, and all this pleiad of young authors, who have since acquired a prominent place in different branches of literature.

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[*] From the *Journal of the American Chemical Society*, July, 1880.

But science had also its fascination upon him; the frequenting of the society of such eminent chemists as Chevreul, Dumas, Berthelot, decided his calling; more especially Chevreul, who was an intimate friend of his father; Chevreul who, at the age of eight years, held M. du Motay's father in his arms for baptism. Some early discoveries encouraged him to persevere, and finally, by continuous efforts in France and abroad, he conquered for himself a name well known and appreciated in the history of industrial chemistry. Ardent to the task, never sparing the means he had been able to acquire in his professional career as consulting chemist, there has not been a single important subject in technical science developed within the last twenty years, in which Tessié du Motay was not directly or indirectly concerned. Of a generous and open nature, he often gave to manufacturers who consulted him new processes in industry, or happy modifications of old ones, which were applied by them and of which the origin cannot be publicly traced to him.

An ardent and radical republican, brought up in the midst of the liberal agitation of those times, a warm advocate of free speech, free press and free education, he has, in politics, a record that the friends of liberty and liberalism cannot forget. He took, as might be expected, a leading part in all the exciting events of the last years of the Monarchy of July, 1830. He participated, at the side of Ledru-Rollin, in the political movement of 1848, and the subsequent agitation.

Exiled from France, after what is known there as the "Bourgés Trial," in 1849, he went successively to Belgium, England and Germany. In England, he renewed acquaintance with the prominent exiles, Ledru-Rollin, Louis Blanc, Caussidière, Madier de Montjau, all of whom have since become well known.

When abroad, he completed many of his most important discoveries. He returned to France in 1860, and applied himself from that time entirely to industrial chemistry, which secured for him two gold medals and one silver one at the different International Exhibitions in Paris, in 1865 and 1878, and finally, the cross of the Legion d'Honneur. During the siege of Paris he directed the service of the ambulances, and all those who had occasion to know him then, and to see him at work, can testify with what devotion, what cheerful humour and, at the same time, with what patriotism, he took his part in the national defence. He was on the staff of the Governor of Paris, and was present at the most important battles of the siege, that of Champigny, and others.

A literary man, a musician, a philosopher and a *savant*, Tessié du Motay was also one of the most honourable and sympathetic of men. Nobody, better than he, knew how to ally to the genial courtesy and affability of the man of good society, the dignity and the seriousness of a perfect gentleman. The interest and charm of his conversation, the amenity of his intercourse, made him the most fascinating of men, as he was also the truest of friends. Generous, kind hearted, always ready to help misfortune wherever met, during a stay of hardly eighteen months in the United States, he had succeeded in creating around him a circle of appreciative and devoted friends, who held him in the highest regard. Young and old were attracted to him, fascinated, as it were, by the magical charm of his conversation. Even in his later years he did not give up his literary pursuits. He had great fondness for Oriental literature and the mythology and theogony of India. We were fortunate enough to have the privilege to hear him read his translation, or rather adaptation, in French verse (with many original and happy additions inspired by the subject) of some of the songs of Brahma and Vishnu. The enthusiasm of his diction, the genuine animation of his gestures, could well make one believe himself to be transported. in reality, into the poetical fictions of Brahmanism and Buddhism. He also left a philosophical drama which he desired should not be published until after his death, which, under the name of the "Expiation of Faust," treats of an old subject in a novel and masterly manner.

Tessié du Motay's Scientific Work.

It was said of him that he made perhaps more inventions than any other man, for it often happened that when he was consulted about some scientific subject, he would give expression to views so original, and make suggestions so practical, that his consulters often utilized them at once, without his receiving the credit of the suggestion or invention. About eighteen months previous to his death, he had come to the United States as Consulting Chemist and Engineer of the Municipal Gas Light Company, to superintend the building of retorts and furnaces. and the preparation of machinery for the introduction of the carburetted water gas, practically and on a large scale, for the lighting of New York. Everybody knows what success he has met with. The gas obtained has a much greater illuminating power than the ordinary gas, and can be produced at such reduced rates as to have forced many of the other companies to adopt the process.

Metallurgy.—Metallurgy greatly interested him, and he was intimately connected for the last twenty years with the progress of this science. He patented in England a process for the treatment of arseniferous iron ores, and suggested or made several improvements in the manufacture of ferro-manganese. He was also the first to introduce and manufacture bricks of magnesia for metallurgical purposes. They were made for Mr. de Wendel, in Alsace, for the Siemens-Martins steel furnaces. The magnesia was brought from Eubœa, Greece, in the state of magnesite (magnesium carbonate). The earth was ground, worked in the shape of bricks, which were compressed by hydraulic pressure of 100 tons. They were then burnt in a kiln at a very intense temperature, so as to prevent the magnesia from changing to carbonate on contact with the air. The best Dinas fire bricks, used at Mr. de Wendel's, lasted generally from two to there weeks, whereas the magnesia fire bricks of Tessié du Motay lasted eighteen months. They were used by Mr. de Wendel in forty re-heating furnaces for steel and iron, with great success.

In the fall of 1879, Mr. du Motay was engaged by certain capitalists to make an examination of, and report on, the iron and copper pyrites deposits of Lake Superior and Canada. He was to have undertaken the direction of the reduction of these ores by a new process of his own invention, when death struck him.

Etching on glass.—In collaboration with Maréchal he invented and introduced a very excellent method for etching on glass. The use of hydrofluoric acid is always attended with danger, especially when it is in the gaseous state. But while the solutions of this acid produce on glass brilliant surfaces, it is only by the use of the gas that it is possible to obtain unpolished surfaces, much finer and better adapted for delicate effects in decoration. By his process, excellent results have been obtained, and the dangers of the gas avoided. The hydrofluoric acid is disengaged in the nascent state from a bath composed of fluorhydrate of fluoride of calcium, water, and diluted hydrochloric acid. He recommended also the use of saccharate of lime as a counter-agent against the burns produced by fluorhydric acid.

Photography.—In photography he improved several processes, and, at the same time as Poitevin and Nièpce, made several attempts for the production of coloured photographs. In connection with Maréchal he invented a special process for the production of transparent vitrified photographic proofs. A glass plate having been covered with a solution of india-rubber in benzine, and, when dried, with a coating of ioduretted collodion, an image (positive by transparency) is obtained from the negative. After proper treatment by means of cyanide of potassium, platinum and gold baths, to develop and obtain the proper shades of black, the plate is placed in a muffle, and the organic matters burnt. It is then covered with a flux of borax, and vitrified.

Electric light.—Tessié du Motay has been connected with the latest efforts made for the introduction of electric light, on an industrial scale, for illuminating cities. A professional friend of Jablochkoff, Moncel and Jamin, and other celebrated electricians, he, with Jablochkoff, was the first to suggest the use of carbon pencils coated with kaolin, to prevent their disintegration when burning.

Edison, in his latest electric lamps, realized this idea by using the carbon produced by the calcination of bristol boards; mistaking the true explanation of the case, he attributed to a fourth state of carbon, the peculiar properties of the carbon thus obtained.

Tessié du Motay (in an article which was published in the New York papers) explained that the qualities of durability of these new pencils were due to the presence of kaolin, used for sizing bristol paper, and that he and Jablochkoff had many years ago anticipated the idea.

Permanganates.—He gave his attention to the preparation of alkaline permanganates on a large scale, having found an industrial use for them in his new method of preparation of oxygen gas. In the ordinary preparation of the permanganate, peroxide of manganese, chlorate of potash and caustic potash are heated together in an iron retort. After proper manipulations the mass is treated with water, which transforms the manganate into permanganate. Tessié du Motay proposed first to produce the transformation of manganate of potassium into permanganate, by means of sulphate of magnesia. He also obtained the alkaline permanganates by a completely new process, by the action of the oxygen of the air on sesquioxide of manganese in presence of caustic soda or potash. The mixture, introduced into cast iron retorts, is heated to 400° C., and a current of air is passed through the mass.

Preparation of oxygen.—One of his most original, ingenious and successful inventions was that of the preparation of oxygen gas on an industrial scale. His method is based on the following reactions: When the permanganate of sodium or potassium is exposed to a temperature of 450° C., in a current of superheated steam, the salt loses its oxygen, producing caustic alkali and peroxide of manganese. If now this mixture of these two substances, at this same temperature of 450° C., is exposed to the action of a current of air, the primitive salt is regenerated by absorption of oxygen, and can then furnish oxygen anew by the action of superheated steam. In consequence of these successive decompositions and revivifications, a given quantity of permanganate can furnish an indefinite quantity of oxygen. The operation is effected in cast iron retorts. The steam carried away by the oxygen gas is condensed, and the air from which oxygen is to be borrowed for the regeneration of the permanganate is blown in the retorts after having been deprived of its carbonic acid. By this method one cubic metre of oxygen cost 0·40 francs.

Illuminating gas.—Having thus secured the means of obtaining oxygen cheaply and in great quantities, Tessié du Motay turned his attention to one of his favourite schemes, and one which has brought him a legitimate share of his fame—"a new method of illumination."

In the Drummond light, a mixture of oxygen and hydrogen gas, supplied by two different gasometers, is brought in contact with a cylinder of caustic lime, and lighted. A light, next in intensity to that of the sun or electric arc, is thus produced. Tessié du Motay and Maréchal have rendered this system applicable even to the lighting of cities, by the introduction of their industrial method for the preparation of oxygen gas. Tessié du Motay modified the process in preparing the hydrogen gas, by effecting the decomposition of hydroxide of calcium by carbon in iron retorts. A company, under the name of the New York Oxygen Co., has employed this system of illumination with success for large squares, public places, beacons, signals. It was very much used during the war of secession.

Guided by Caron, Tessié du Motay and Maréchal have since substituted for the calcium pencil a pencil of calcined magnesia, which withstands better the high temperatures which are reached. These pencils having sometimes the inconvenient property of breaking on cooling, they have substituted for them the "zirconia pencils" with much better results.

Tessié du Motay has also introduced a new system of illumination by using water gas (a mixture of hydrogen and carbonic oxide), which is burnt in the presence of a regular current of oxygen, obtained by his process. The flame is directed on cylinders of magnesia and zirconia. This system was tried in Paris, Place de l'Hotel de Ville, in 1868, with success.

In 1870, Tessié du Motay modified his methods in the following manner: He made his oxygen pass into the flame from a solution of naphthalene in petroleum ether. This liquid was called, in France, "carbolene." During the combustion, there are separated from the liquid substances of an intense lighting power. This kind of light is known in France as the "Oxy-carburetted light of Tessié du Motay." The combustion took place in lamps with a wick (Philipp's lamps), into the flame of which the oxygen gas penetrated horizontally.

After these experiments, Tessié du Motay still further modified his system, and gave it a very practical form, by directing a jet of oxygen gas on ordinary illuminating gas from coal, made very rich in carbon by proper carburation, the combustion taking place in a slit burner of steatite. This process was tried in Paris, in 1870, on the Boulevard de l'Opera, and at the Tuileries, under the auspices of Napoleon III., who was very enthusiastic on the subject. The light, it is said, was intense and really splendid. If it had not been for the complications which the war brought on, this system, bade fair at the time, to be thoroughly tested and employed in Paris. It was on this occasion that he received the cross of the Legion d'Honneur, he having refused it once before, on account of his political record, because it had been officially sent to him. The Emperor gave him an audience, and, having learned his reasons for refusal, took from his coat the cross he was wearing himself and attached it to the bosom of Tessié du Motay, adding that "science and politics had nothing to do together."

Though found objectionable on account of the double system of pipes required, this system of illuminating can be, and, in France, has been, applied in many cases. It has been applied to the lighting of mines, for photography, for sub-marine works, for lighting public places of meeting, theatres, etc. The industrial preparation of oxygen by the du Motay process constitutes certainly a progress very interesting and full of promise for the industry of illuminating gas.

Tessié du Motay still further modified the burner for his gas, by the introduction of his "differential burner." The ordinary illuminating gas, carburetted as before, arrives in two opposite directions by two tubes which are curved horizontally. The oxygen is supplied by a vertical tube reaching slightly below the level of the others, and placed between the two. This burner is formed of several jets of the same kind, placed in a ring. A vertical magnesia or zirconia pencil is slightly engaged at its base in the ring formed by the jets, and becomes incandescent.

Bleaching.—The name of Tessié du Motay is associated with several inventions for the bleaching of textile fabrics and fibres.

In 1874, Tessié du Motay proposed for the scouring of silk (to deprive it of the sericine) the use of a bath of hydrate of baryta (12 to 15 per cent. of the hydrate for 100 of the silk) heated to 80° C. The ordinary decolorizing agents having no action on what is called "grey silk," he proposed to use successively, to bleach these fibres, nascent oxygen gas and sulphur dioxide, sulphydric acid and sulphur dioxide.

The silk is dipped in a solution of permanganate of potassium, and then in a solution of sulphur dioxide, to eliminate the oxides of manganese. After repeated treatments in these solutions, the fibres are introduced into a solution of sulphydric acid, or of alkaline sulphides, washed, and again treated with sulphur dioxide solutions.

For bleaching flax, hemp, cotton, silk and wool, Tessié du Motay has introduced a new method based on the use of the alkaline permanganates. A solution of manganate of sodium is added to a solution of sulphate or chloride of magnesium, or chloride of calcium; by double decomposition, permanganate of sodium, sulphate of sodium, and hydrate of magnesium, or calcium, are produced. The fibres are dipped in the solution. 2 to 6 kilograms of manganate is said to be sufficient for 100 kilograms of cotton, flax or hemp. The fibres are then passed into an alkaline solution, in case of silk or wool in a solution of soap, and afterwards into a solution of sulphur dioxide, to dissolve the oxides of manganese.

The results obtained on a large scale at Comines, France, at the manufactory of Verlay, in 1867, showed that by Tessié du Motay's process it is possible to bleach completely in a day the fibres of flax and hemp, and that but three days were required for tissues of flax and hemp, and it was claimed that the fibres were no more injured than by the other processes in use, which, moreover, necessitate a much longer time. For 100 m. of linen the cost was stated at six francs. The manganate of sodium could be obtained at one franc per kilogram.

He has also introduced a new method for bleaching wax and feathers, which is at present carried on in France, by Messrs. Viol and Duflot. It is based on the use of oxygenated oil of turpentine.

Industry of sugar (baryta).—In the ordinary process of the treatment of sugar solutions, the sugar is separated from the impurities by the addition of lime and other substances, capable of forming with these impurities insoluble compounds, the sugar remaining in the solution. Dubrunfaut and de Massy have introduced in France a new method of treatment, which is the reverse of the preceding. It consists in separating the sugar from the impurities it contains, by forming with the sugar an insoluble compound, while the impurities remain in the solution. The substance employed is hydrate of baryta, which forms with cane and beet sugar, even at the temperature of ebullition, insoluble saccharate of baryta.

To render this method practicable, hydrate of baryta had to be obtained at a sufficiently low price, and on a large scale. Dubrunfaut and Liplay prepared it by the decomposition of witherite (barium carbonate) by coal. But this decomposition to be complete, requires the highest temperature, which the kilns used were not able to stand.

Tessié du Motay, in connection with others, has contributed his part to the solution of the problem, and to the introduction of another and much more economical process. This process has been successfully carried on in France, at Comines (Nord), at Asnières lès Paris, at Courriére (Pas de Calais), at Menu Tylloy Delaune. It is based on the decomposition of natural barium sulphate (barytes), by coke, and subsequent treatment with zinc oxide.

The mineral is ground, mixed with 20 per cent. of coke or soft-coal, and calcined in a Siemens-Martin furnace. Barium sulphide is thus formed. This sulphide is suspended in water, steam is admitted and the mass is thoroughly agitated. It is then allowed to settle. The supernatant liquid and the concentrated washings of the residue, are received in proper vessels. This liquid is of a complex composition; it contains diluted hydrate of baryta, barium proto and bisulphide, and baryta sulphydrate. The sulphur is eliminated by boiling the liquid, after an addition of zinc oxide (200 kilograms zinc oxide for 35 hectolitres of sulphurous liquid, at 25° B.), the mass being thoroughly agitated all the time. Insoluble zinc sulphide is formed, and baryta hydrate remains in solution. The solutions are concentrated, allowed to crystallize, and the crystals are dried in the "centrifuge." The product is hydrate of baryta with nine equivalents of water. The zinc sulphide is washed, roasted in ovens, and the zinc oxide is thus regenerated for another operation.

Binoxide of barium.—Tessié du Motay, starting from the baryta, has also modified and improved the ordinary process of preparation of binoxide of barium from this base.

Artificial ice.—In 1880, Tessié du Motay and A. J. Rossi patented two new processes for the artificial production of ice and cold, based on the power of absorption, which they find certain ethers and alcoholic radicals to possess, for gaseous sulphur dioxide and ammonia.

In one of them, a mechanical power is used to produce the volatilization of both constituents of the binary liquid, the vapours of which are compressed under very small pressure in a condenser, where the ether liquefies easily, absorbing the vapours of sulphur dioxide, reconstituting the original liquid, and thus avoiding the high pressures necessary to liquefy the sulphur dioxide by mechanical compression.

In the other, advantage is taken of the higher point of ebullition or less volatility of the absorbing ether. No mechanical power is required. The sulphur dioxide is disengaged by the action of heat (a water-bath), from the absorbent contained in a boiler, and condensed to the liquid state, by proper cooling and the pressure the gas exerts on its own molecules.

The fire being removed from the boiler, and the latter cooled in its turn, the liquid dioxide evaporates under the partial vacuum thus produced, generating an intense cold, its vapours being absorbed as fast as they are formed by the absorbent in the boiler, working much in the same manner as the Carré ammonia solution machines, but with much less pressure, and with a water-bath instead of a furnace.

In 1879, Tessié du Motay, in collaboration with L. F. Beckwith, took out in the United States several patents of a mechanical character, for small rotary motors, for mechanical devices, for the application of the cold produced by refrigerating machines to the ventilation and cooling of mines, for improvements in steam condensers used on board of steamers, by using a very volatile liquid, such as sulphur dioxide, for condensing steam, instead of water, the volatile liquid being thereby volatilized under high pressures, the mechanical action of which could be utilized on a piston so as to restitute part of the mechanical power otherwise lost in the condensing water. He also took a patent with L. F. Beckwith, for the joint use in the same ice machine, of sulphur dioxide and chloride of methyl, with the idea of using the former as an extinguisher of the latter.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 11, 1880.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE PROSECUTION UNDER THE WEIGHTS AND MEASURES ACT.

The adjourned hearing of the summons against Mr. Whittle for having in his possession glass measures that were inaccurate has resulted in a conviction, and as will be seen from our report of the case at page 483, the attempt to defend him against the charge proved entirely futile. After the remarks we have already made on this case it will be obvious that the result now arrived at is to be regarded as an indication of possible serious danger and detriment to any and every member of the trade —danger that is not to be provided against by such precautions as in the way of trade might be deemed sufficient, and detriment that cannot be averted by appeal to competent authority. So far as this case illustrates the position of affairs it is not sufficient to purchase one's measures from a well accredited source and to procure them bearing the stamp of verification authorized by one or other of the local authorities throughout the country, which, according to the Act, is to render a weight or measure legal throughout the United Kingdom. Mr. Whittle had done that, and nevertheless he now stands convicted of a breach of the 25th section of the Act. This is the danger that threatens every individual member of the trade at the present time, and if we refer to the 45th section of the Act it will be seen that this is so, because there is a certain limitation of the value to be attached to a stamp of verification, leaving room for raising the question whether a weight or measure is actually correct. The inspector of each district under the Act has thus placed in his hands the power of negativing the value of a stamp of verification if he arrives at the conclusion that a particular weight or measure is incorrect. This is what has been done in Mr. Whittle's case, for the Marylebone inspector alleges that the four graduated measures are incorrect, notwithstanding their having the official stamp of verification adopted by the local authorities of York.

When the case comes before the Court empowered to deal with offences under the Act it becomes evident that a chemist and druggist is, to a very great extent, at the mercy of an inspector, so far as a conviction is concerned, and although under the 60th section any person who feels himself aggrieved by a conviction or order of a Court of Summary Jurisdiction may appeal therefrom in the usual way, there seems to be a total absence of any provision for obviating conviction when the charge of inaccuracy of weights and measures is unfounded. There is no provision in the Act for referring the data of inspectors to competent authorities prior to conviction.

The case now referred to, in which Mr. Whittle has been the sufferer, affords an illustration of this defect, and the course adopted by the magistrates seems to show clearly that too much power is placed in the hands of inspectors under the Act, especially as regards the verification of weights and measures involving some considerable manipulative skill.

The Marylebone inspector alleged that Mr. Whittle's measures were deficient, and therefore incorrect or unjust, and he summoned him for breach of the Weights and Measures Act. At the hearing the magistrates unreservedly avowed that they felt themselves incompetent to go into the question whether the measures complained of were incorrect or not. They expressed their willingness to hear any evidence that would prove the measures to be correct, and admitted they would be bound to listen to such evidence, but in the absence of it they had only the opinion of their own official —the inspector—to guide them, and as there was nothing which would justify them in going against the opinion of their own official, the only possible result was a conviction. Virtually, therefore, this result was brought about by the inspector's dictum, and the really important question, whether or not the measures were incorrect, could not be touched.

We have already expressed our opinion that the discrepancies alleged to obtain in the graduated measures complained of by the Marylebone inspector in this case are not such as should render a person using them liable to prosecution for infringing the Act by having in his possession unjust measures. Assuming the statements of the Marylebone inspector to be strictly accurate, they would not justify in any degree the suspicion of fraudulent intent in regard to the measures in question; but at the same time it can scarcely be expected that a bench of magistrates would enter into considerations as to the degree of latitude to be admitted for the graduations. If the inspector's data were correct the measures were deficient, and in the strict eye of the law they were unjust. This narrow view of the case, based upon the evidence of the inspector, was indeed all that was possible for the magistrates to take.

The acknowledgment, on the part of the magistrates, of incompetence to deal with what we consider the really important questions as to the accuracy of the inspector's data, and as to the significance of the alleged deficiencies in certain of the graduations, as well as the decided expression of their sympathy with Mr. Whittle, seem to point to the want of some suitable provision for controlling the action of inspectors under the Weights and Measures Act in regard to such weights and measures as those under consideration. We are disposed to think that if this case could have been referred to a competent authority, with the object of ascertaining whether it was one calling for prosecution under the Weights and Measures Act, Mr. **Whittle** would not have had the unpleasant experience of appearing in court as a misdemeanant.

As it is, he has been convicted of an offence under the Act, and he will still have to go through the ordeal of an appeal before he can hope to remove in any degree the stigma attaching to such a conviction. The only consolation that seems attainable by him is that of having proved the want of some such check on the action of inspectors as we have suggested.

SPIRITUS AMMONIÆ AROMATICUS.

At the recent Pharmaceutical Conference in Swansea, Mr. **Thresh** again drew attention to the great variation in the amount of ammonia in spiritus ammon. arom., even when it was represented to be prepared according to the British Pharmacopœia process. Among nineteen samples analysed the amount of free ammonia varied from 0·601 to nearly three times that quantity, while the carbonate of ammonia varied from 0·248 to 3·995, or in other words, one sample of this preparation contained more than sixteen times as much carbonate of ammonia as another one, while the relative proportions of free ammonia to carbonate of ammonia varied almost to the same extent.

This subject has frequently been noticed in this Journal, and it is one which seems to call for some attempt to ensure greater uniformity. Naturally the idea suggests itself that a more uniform preparation could be made by merely mixing the several ingredients, rather than by the distillation of a mixture of such volatile materials. In regard to this point, Mr. **Symons**, of Barnstaple, reminds us that in another analogous case a high authority has remarked that mixing certain ingredients in a retort and distilling something out of it is not exactly a process which modern chemistry can recognize as a proper one if a definite product be desired. Under such circumstances the product will vary, even if the proportions of the ingredients be kept exact, according to the quantities operated upon, the temperature at which the distillation is carried on, and even the shape and kind of apparatus employed.

But probably, as Mr. **Symons** suggests, a proposal to dispense altogether with distillation in preparing spiritus ammon. arom., and to adopt such a formula as that recommended by Mr. **Miller** in 1867, or the formula of the United States Pharmacopœia, would meet with strong opposition, as it did in 1867. There is no doubt much ground for what Professor **Redwood** then said as to distillation removing resinous substance from the essential oils which is disagreeable to the taste; but, as Mr. **Symons** suggests, this resinous substance is probably inert and equally removable by deposition or filtering.

Considering the probable object of the prescriber in ordering spiritus ammon. arom. to be that of administering definite quantities of caustic ammonia and of carbonate of ammonia, and at the same time the desirability of having the preparation as agreeable as possible to the taste, Mr. **Symons** suggests that without dispensing with distillation entirely and without sacrificing medicinal efficacy and uniformity altogether for the sake of pleasant flavour, it might be useful to adopt a middle course and to distil the spirit together with the essential oils in the first instance and afterwards to add an aqueous solution of ammonia and carbonate of ammonia in suitable proportion.

This suggestion is one that deserves consideration now that the time for the preparation of a new edition of our Pharmacopœia may be regarded as approaching, and as there are many other subjects of a like character that might be usefully discussed in these pages we trust that the beginning made in this direction by Mr. **Symons** may serve as an inducement to others.

BENEVOLENT FUND.—ELECTION OF ANNUITANTS.

The official notice and the applications from candidates would have made it almost superfluous to call attention to the Election of Four Annuitants on the Benevolent Fund on Friday next, were it not that the provisions for the delivery of voting papers by post, which tend perhaps to the convenience of the voters, are not altogether compatible with the necessities of the election which require the personal attendance of some of them. The examination of the voting papers entails a considerable amount of work, which falls heavily upon the Scrutineers when they are few in number. It is hoped, therefore, that the attendance, at twelve o'clock, of persons entitled to vote, will be large enough to furnish a sufficient number who are able and willing to fulfil the duties of Scrutineers.

PHARMACEUTICAL LEGISLATION IN GREECE.

We are glad to learn from our respected correspondent Professor **Landerer**, of Athens, that a Pharmaceutical Society has just been formed in Greece. One of the main objects of this Society is to restrict the establishment of new pharmacies to such an extent that there may not be more than one for a population of four thousand. A law is to be passed to this effect, and besides the restriction in the number of pharmaceutical establishments, properly so-called, druggists and general retailers are to be prohibited from selling medicines in small doses or according to prescriptions, under pain of liability to fine and imprisonment. We learn that the nomarchs and other local authorities throughout Greece have declared themselves in favour of the strict enforcement of this law.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association will be held on Thursday, December 16, at 8.30 p.m., when a paper will be read by Mr. C. **Walker**, on "British Ferns and their Allies." A Report on Botany will be made by Mr. D. **Hooper**,—"Parasites and Saprophites."

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

December 1, 1880.

Present—Professor Tichborne, President; Dr. Aquilla Smith, Vice-President; Sir G. B. Owens, Messrs. Allen, Bennett, Brunker, Collins, Draper, Grindley, Hayes, Holmes, Hodson, Oldham, Pring and Simpson.

The minutes of the meeting held November 3, and also those of the special meeting held November 17, were read and signed.

A letter was read from the family of the late Mr. Goodwin thanking the Council for the resolution passed at the Special Council Meeting.

Letters were read from Edmund W. Davy, M.D.; J. W. Moore, M.D.; and George F. Duffy, M.D., thanking the Council for having elected them as Examiners.

The Registrar then read a letter from Messrs. Ennis and Son, the Solicitors to the Society, informing the Council that the writ *in re* Brownrigg had been returned, and that the magistrate had issued a warrant committing him to prison for one month.

The President directed Mr. Fennell to read a letter which he had received from Mr. Brownrigg stating that he would abstain from dispensing in future, should his imprisonment be prevented, or would pay the fine by instalments.

Mr. Hayes said Mr. Brownrigg had called upon him and stated that he was unable to discharge the fine and that imprisonment would be utter ruin to him, and promised if the Council would prevent his committal that he would not offend again. He (Mr. Hayes) suggested they should deal mercifully with him, they having vindicated their rights.

Mr. Hodgson agreed that the Council should act mercifully, but objected that the letter was an alternative one, and suggested that a document should be drawn out by their Solicitors to be signed by Mr. Brownrigg.

The President doubted whether it would be correct to condone the offence and more particularly as the Society had been at pecuniary expense of about £24 by the prosecution.

Mr. Draper, F.C.S., asked if the remittance of the fine depended upon the will of the Council.

Mr. Brunker said the Council had no voice now. The case having been disposed of by the magistrate it was out of their hands. He suggested that Mr. Brownrigg should make application to the magistrate, stating that he was willing to pay the fine by instalments.

The President also thought the Council could not now interfere.

On the motion of Mr. Brunker, seconded by Mr. Hayes, it was resolved, in reply to the letter of Mr. Brownrigg—

> "That Mr. Fennell be directed to refer him to the Solicitors of the Society, and Dr. Collins was requested to call upon Messrs. Ennis and Son to inform them that should the magistrate permit they would not oppose an arrangement of payment by instalments."

A letter was read from W. S. B. Kaye, Esq., Clerk to the Privy Council, acknowledging receipt of the Registrar's letters, and promising to lay them before the Council at its next meeting.

A letter from Mr. John Moyle, asking permission to be examined in January, was ordered to be replied to in the negative.

A Member called attention to an infringement of clause 30 of the Pharmacy Act, Ireland. A resolution was proposed, seconded and passed—

> "That Mr. Fennell should communicate with the gentleman mentioned, and inform him that he was illegally using the title Pharmaceutical Chemist, and request him to register or cease using the title."

The Law Committee reported upon the case referred to them on November 3, and advised that legal proceedings should be instituted. It was proposed that a letter should be addressed to the offender informing him that he was acting illegally. After some discussion the resolution was lost upon a division, and the recommendation of the Law Committee that the Society's Solicitors be instructed to proceed with the case was adopted.

A vote of thanks to the Pharmaceutical Society of Great Britain for three books presented was proposed by Dr. Collins, and seconded by Mr. Draper, and passed.

Accounts from Gunn and Cameron for advertisements, and Browne and Nolan for stationery, were presented, and cheques signed for payment.

Robert Montgomery, M.R.C.S.E., ex-Examiner in Practical Pharmacy, was proposed for membership by Professor Tichborne, seconded by Mr. Brunker.

The Registrar was directed to prepare the lists for the Calendar for 1881.

Mr. Allen asked when the evening meetings would be resumed.

The President said he hoped the next meeting would be held in January.

The meeting then adjourned.

Licentiates of the Society who may have changed their addresses are requested to inform the Registrar of such change, for the purpose of correcting the list for the Calendar.

Notice has been received of the ratification by the Lord Lieutenant of Ireland and the Privy Council of the appointments as Examiners made by the Council at its meeting on the 5th of November.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The second meeting of the session was held in the Manager's Library, Anderson's College, 204, George Street, on Wednesday December 1, Robert McAdam, Esq. (Glasgow Apothecaries Co.) in the chair. After the Secretary, Mr. John C. Hunter, had read the minutes of the previous meeting, which were approved of by the members, the President called upon the late President, Mr. Alexander Kinninmont, to read the following paper:—

SUGGESTIONS FOR THE AMENDMENT OF THE PHARMACY ACT.

BY A. KINNINMONT.

The recent decision in the House of Lords in the case of the Pharmaceutical Society *v.* the London and Provincial Supply Association, Limited, and the appointment by the Council of the Pharmaceutical Society of a Committee empowered to draft a Bill to amend the Pharmacy Act, 1868, seem to make the present occasion a fitting one for offering a few suggestions as to what amendments we should ask or have a likelihood of obtaining.

As to the decision in question, it can only be characterized as one more instance of the delight that lawyers take in making the law of no effect by subtile distinctions. The strange affirmation that what is illegal for individuals to do singly is yet lawful for them corporately, and that to a corporation everything is permitted which is not expressly forbidden to corporations in an Act of Parliament, is a matter that concerns other interests more than our own, and I can only express a hope that the Irish Land League may take advantage of this decision and by acting boldly upon it bring its reversal within the range of practical politics.

The alarm occasioned in our ranks by the decision seems to me altogether without foundation. It has really brought about no change in our position with regard to co-operative stores, etc., as it was always within the power of an enterprising grocer or store keeper to let off a portion of the premises to a qualified chemist and to carry on the drug business by means of a qualified partnership without actually infringing the Pharmacy Act.

Now in approaching the Legislature with the view of asking certain amendments to an Act which has wrought beneficially for the public interest during more than twelve years, we must bear in mind the smallness of our numbers and the peacefulness of our habits. We cannot influence elections by our votes, nor throng the approaches to the House of Commons as a clamorous mob, modes of action which have proved ere now successful means of preventing threatened attacks on trade interests. Our only strength lies in the justice and reasonableness of our demands, and although a great historian has told us that persuasion is the resource of the feeble, and the feeble can seldom persuade, yet there is room to hope that our requests, if fairly stated and legitimately pressed, may command the attention of the Government.

We must also shun the use of the word "protection" as one likely to prejudice our cause in the minds of statesmen who profess to be guided by Liberal principles. Our standpoint must be the opening words of the present Pharmacy Act, "Whereas it is expedient for the safety of the public," and our success in obtaining the modifications we propose will be in proportion to our ability to prove that they are likely to be conducive in greater degree to public safety than the regulations at present in force.

The amendments which seem to me necessary are few in number, and are as follows:—

1. The quasi-legislative power given to the annual general meeting should be abolished; the Council being elected by the members of the Society, and having its decisions made subject to the assent of the Privy Council, we have thus quite sufficient guarantees against any wrong or mistaken regulations acquiring the force of law.

2. Provision should be made to enable a business to be carried on in behalf of a widow.

3. It should be clearly declared that all persons, surgeons or others, keeping open shop are bound to observe the regulations as to sale of poisons. At present this is not distinctly understood or observed.

4. Every shop should be under the care of a qualified person, either as proprietor or assistant, as at present a chemist may have a hundred shops in as many different towns, while the law does not require the presence of a qualified man in any one of them.

This would prevent an unscrupulous chemist from lending his name to an unqualified man, and so would exclude from the business those who have no right to be in it at all.

5. The most important change of all, and one upon which I would most insist, is this, that the carrying out of prosecutions for infringements of any of the provisions of the Pharmacy Act should be placed in the hands of the public prosecutor.

The public safety should be the public care. We have done our part in expending time and money in qualifying ourselves to carry on our business with due regard to the safety of the public, and having done so, we are entitled to call on the Legislature to fulfil its part of the implied contract between us, and to prevent by means of its own executive all contraventions of the law.

Why should the Pharmaceutical Society be compelled to expend its funds, which are so much required for educational and benevolent purposes, in expensive prosecutions for the benefit of the public? I consider that the whole duty of the Society in cases of violation of the law should be limited to the single point of giving evidence as to registration.

If you wish to see how this change would operate, I would ask you to contrast a case of prosecution under the Adulteration Act with one under the Pharmacy Act. In the former case the accused comes into court with a strong prejudice against him, his appearance there being considered to show that there are strong reasons for thinking him guilty, and the trial being a matter in which the public authorities are the prosecutors, no sympathy is felt for him. In the latter case strong sympathy is excited on behalf of the accused as being the victim of a powerful corporation whose jealousy has been awakened by the attempt of a humble individual to break down their monopoly.

If you glance over the late trial you will find this idea running through the whole proceedings. That the whole action was brought on in order to defend a monopoly, and to this notion considerable colour is lent from the Pharmaceutical Society being compelled to assume the part of prosecutor.

This feeling of commiseration would not exist were action taken by the public prosecutor.

Let us consider a subject of a different nature, where qualification is required before permission can be obtained to perform certain functions.

According to the Merchant Shipping Act, no ship is allowed to sail unless captain and officers have the necessary certificates, but no corporation of sea-captains is called upon to prosecute offenders.

Even in the case of the spirit trade it is the duty of the police to look after shebeens, but the Wine, Beer and Spirit Association is not called upon to provide funds to put them down.

I am convinced, therefore, gentlemen, that what is necessary for us at the present time is, that whilst the business of examination and general supervision of the interests of the trade should be left in the hands of the Pharmaceutical Society, the duty of punishing offenders against the Pharmacy Act should be in the hands of the police.

From a fear of occupying too much of your time, many illustrations and details have been omitted, but these, I think, your own experience can easily supply.

Should the idea of making the public prosecutor take action in offences against the Act not find favour in the eyes of our English brethren, I hope our Scotch representatives will succeed in getting the usual clause inserted into any amended Act, so that we at least may have the opportunity of trying the experiment in Scotland.

After the reading of the paper, a varied discussion took place.

Mr. J. A. Clarke spoke about the sale of poisons, *e.g.*, oxalic acid, sugar of lead, etc., by persons not qualified: and he commented strongly upon the law allowing small hucksters to sell "paregoric so called," without its chief ingredient, viz., the opium. The parties who bought that spurious stuff might go at some future time to a chemist and druggist and get paregoric of full strength, and on giving the same quantity of it to any young person might do injury to the same. He also strongly condemned the sale of patent medicines containing poisons by unregistered persons. He was in favour of that part of Mr. Kinninmont's proposed Amended Pharmacy Act which would allow a widow to carry on business with a qualified assistant if she wished to do so.

Mr. Robert Brodie, Vice-President, said that it was most singular that before the passing of the present Act no restrictions were placed upon chemists and druggists in business from selling poisons "with the exception of arsenic;" but after the passing of the Act, and although chemists were then getting better qualified by their examination, it was deemed necessary to restrict so many articles of everyday use from being sold without the usual entry in the poison book by proper qualified chemists. Yet some of these articles were sold without the name poison attached to them by unqualified persons. He also thought that the law did not punish severely enough some of those persons who, as was from time to time recorded in the papers, give carbolic acid, etc., without properly looking at the label, whereas if a chemist and druggist makes a mistake, which does not happen often, the judge is generally too severe in his decision.

Mr. J. C. Steele would not like to do away with the poison schedule, as he thought the regulations gave no great difficulty in carrying them out. He quite agreed with that part of Mr. Kinninmont's proposed amendment with reference to surgeons keeping qualified assistants to manage their drug business, in the same way as the law should insist on chemists doing so in any branch businesses which they might possess, but not necessarily to attend personally to them themselves. He also thought that the quality of drugs supplied to ships should be examined by a person qualified to do so, for at present there was no check upon the supply of inferior drugs being sent to meet a demand for articles that are quoted cheap, but which cannot be genuine.

Mr. Simpson was quite satisfied that the proposed alterations of the present Act, as suggested by Mr. Kinninmont, would be beneficial to the trade.

Mr. John Hunter thought there was nothing unreasonable in Mr. Kinninmont's proposed Amended Pharmacy Act, but he thought the Council should consider the desirability of trying to adopt some means of preventing the ever increasing supply of worthless nostrums which are sold by chemists to the public, the majority of whom believe that there is some patent right held by the maker. Even some members of Parliament seemed to imagine that there is some patent involved in the making of a cure-all pill, the same as in some invention in the chemical or engineering arts.

Mr. J. A. Clarke then moved that the meeting approve of Mr. Kinninmont's proposed amendments to the Pharmacy Act. This was seconded by Mr. Robert Brodie, Vice-President. The motion was carried unanimously.

The President thereupon asked for a hearty vote of thanks, which was duly given to Mr. Kinninmont for his valuable suggestions, which it was believed would help to mould the thoughts of chemists throughout the country on the necessity of getting an Amended Pharmacy Act soon.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The second monthly meeting of this Association was held on Tuesday evening, November 30, at the Flying Horse Hotel. The chair was occupied by Mr. Fitzhugh, F.C.S., President, and there was a large meeting of members and friends. Eight new associates were proposed and admitted, and a vote of thanks was accorded to the Pharmaceutical Society for its donation to the library of Bell and Redwood's 'Progress of Pharmacy.'

During the evening Mr. H. Major, B.A., gave an interesting and amusing lecture; entitled "Wit and Humour." Commencing his remarks by defining wit, he proceeded to view it from different standpoints, as it presented itself to the various phases of human nature. He remarked that wit was subtle and often difficult to be appreciated, and quoted Sydney Smith in its being nearly allied to folly, that it can and needs to be studied as any science; it should be pleasant not painful, yet beneath its pleasantry lies a piercing sting and the sting of wit generally lies in its tail. He carefully defined the difference between wit and humour, the former dry, caustic, and biting in its character, the latter rollicking, jovial, like a "full tankard of foaming ale," although the one very frequently was merged into the other, and it was difficult to determine between the two. The lecturer then treated of national wit as applying to different countries and nationalities, confining himself to English, Irish, Scotch and American styles. During the evening Mr. Major gave numerous mirth-provoking illustrations of the different kinds of wit and humour, which kept the company in a continuous state of laughter.

At the conclusion the usual vote of thanks was accorded to the lecturer.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, December 2, Dr. Gilbert, Vice-President, in the chair.

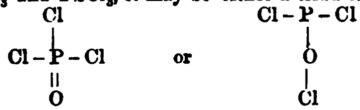
The following certificates were read for the first time:—W. E. Benton, A. H. Coffin, M. O. Gosset, A. J. King, E. Luck, W. J. Stavert, R. W. Walker, G. J. Wishart. During the evening the following gentlemen were balloted and declared duly elected Fellows of the Society:—J. O. Arnold, A. E. Barclay, J. K. Crow, A. G. Chamberlain, A. C. Cockburn, P. H. Cathcart, P. F. Frankland, T. Farrington, A. E. Garrod, A. E. Hawkes, R. Holliday, A. Jessoman, W. B. Mason, J. A. Macfarlane, H. A. Mott, R. T. Plimpton, C. H. Sharples, F. M. Sexton, B. H. Thwaite, J. H. Tompson, J. M. Wyborn. Professor Dewar and Dr. Sprengel were elected scrutineers of the ballot.

The Chairman called upon Dr. Ramsay to read a paper—

On the Volumes of Sodium and Bromine at their Boiling Points, also a joint paper *On the Volume of Phosphorus at its Boiling Point.* By D. B. Masson and W. Ramsay.—The method already described in *Chem. Soc. Journ.*, 1879, p. 471, was used in the experiments on sodium with but slight modifications, an iron vessel being substituted for one of glass. The sp. gr. of sodium at its boiling point was found to be 0·7414, its sp. volume (the reciprocal of the sp. gr.) = 1·349. The atomic volume (sp. vol. × at *w*) = 31·0. In a similar way the mean sp. gr. of bromine at its boiling point was found to be 2·9483, sp. vol., 0·3392; at. vol., 27·135. With phosphorus the following numbers were obtained:—Sp. gr., 1·485; sp. vol., 0·6734; at. vol., 20·91, with a probable error of $\pm 0{\cdot}3987$. The authors then compare the atomic volumes of the above elements in the free and combined conditions:—

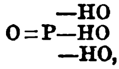
Br	free	27·135	combined	28·1
S	„	21·60	„	22·6 and 28·6
P	„	20·91	„	25·3
Na	„	31·00	„	not determined.

The atomic volumes of bromine are identical. The at. vol. of sulphur in the free state is nearly identical with its lowest value when combined. As nitrogen is known to have at least three atomic volumes, we should expect phosphorus to have more than one. In the following compounds its atomic volume is doubtless about 25. PCl_3, PBr_3, PCl_2 (C_2H_3O), but in $POCl_3$, $PSCl_3$ and $POBrCl_2$, the authors question the correctness of the calculations. The oxygen and sulphur may have the values of 12·6 and 28·6, instead of 7·8 and 22·6, if so, the atomic volume of phosphorus will become in $POCl_3$ 21·1 (molecule volume of $POCl_3 = 101{\cdot}4 - (O\ 12{\cdot}2 + Cl_3\ 68{\cdot}2))$, in $PSCl_3$, 19·4; in $POBrCl_2$, 21·7; the mean being 20·7, which fairly coincides with its value in the free state (29·91). Now P in PCl_3 is undoubtedly a triad. In $POCl_3$ and $PSCl_3$, it may be either a triad or pentad.



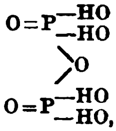
$$\begin{array}{c} Cl \\ | \\ Cl-P-Cl \\ \| \\ O \end{array} \quad \text{or} \quad \begin{array}{c} Cl-P-Cl \\ | \\ O \\ | \\ Cl \end{array}$$

As the pentachloride of phosphorus furnishes $POCl_3$ by a simple and direct reaction, it is probable that the correct formula is $O=PCl_3$, and therefore we might expect the pentad phosphorus to have in this compound a different atomic volume to the triad phosphorus in PCl_3. Moreover, bromine in the free state has the same value as in combination, and sulphur has in the free state the lowest of the two values which it has in the combined state. It is therefore necessary to ascribe two atomic volumes to phosphorus, viz., 20·8 in compounds, in which it acts as a pentad and when free, and 25·3 in its triad capacity. As orthophosphoric acid is obtainable directly from the oxychloride by the action of water, the formulæ of the phosphoric acids must be ortho-

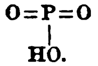


$$O{=}P\begin{matrix}-HO\\-HO\\-HO,\end{matrix}$$

pyro-



and meta-



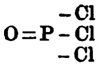
$$O{=}\underset{\substack{|\\HO.}}{P}{=}O$$

In conclusion, the author states that from the facts mentioned in the preceding paper, the theory of "steres" as applied by Schröder to boiling liquid compounds is untenable.

The Secretary then read a paper—

On the Specific Volume of Chloral. By LAURA MAUDE PASSAVANT.—Great care was taken to dehydrate the chloral used, and to avoid the format on of free hydrochloric acid, which appears to have a marked influence in polymerizing the substance. The chloral used in these experiments has maintained its limpidity for a considerable time, and has apparently not formed any metachloral. It was obtained by treating commercial re-crystallized chloral with strong oil of vitriol, and afterwards distilling it twice over lime. Its vapour density was found to be 72·21; its boiling point 97°·73. Its specific gravity at 0° compared to water at 4° was 1·54179 and 1·54170 in two observations. Its rate of expansion was also determined. The numbers obtained agree well with those of Thorpe, but differ from those of Kopp. As calculated from the observations of the authoress of the present paper, the relative volume of chloral at its boiling point (97°·73) is 1·12602; its sp. gr. at that temperature $\frac{1\cdot54179}{1\cdot12602}=1\cdot3692$ compared with water at 4°, and its specific volume is therefore $\frac{147\cdot01}{1\cdot3692}=107\cdot37$. This number agrees well with that calculated by Thorpe, 107·1, and shows, that the oxygen atom in chloral has precisely the same value as in aldehyde.

Dr. Armstrong said that from the observations of Dr. Ramsay there was no doubt that the formula of oxytrichloride of phosphorus was—



$$O{=}P\begin{matrix}-Cl\\-Cl\\-Cl\end{matrix}$$

He should like to raise the question as to whether the atomic volume was a constant. To take Thorpe's paper, the atomic volume of chlorine varied between 21·6 and 23·2, the mean being 22·7. These differences seemed to him very large and outside the limits of experimental error. Although it had been shown that there was undoubtedly a great difference in this respect between an element in the triad and pentad condition, he did not think we were justified in assuming that we had determined the atomic volume of an element.

Professor Dewar said that from the method of calculating the atomic volumes very small differences in experimental results would lead to large differences in the numbers obtained; he thought that the coincidences already obtained between the atomic volumes of an element in the free and combined state were at all events very striking facts.

Mr. Neison pointed out that there might be a systematic as well as an experimental error; the former could not be got rid of by increasing the number of experiments.

Dr. Ramsay, in reply, said that there were two reasons which might account for the variations in the experimental numbers: the difficulty of obtaining the various substances in a pure state, and secondly, that the atomic volumes were all determined at the particular pressure of the atmosphere. Perhaps at some other pressure the atomic volumes might agree more closely. He hoped to present a paper which would answer the question, whether the atomic volumes do or do not have the same ratios at varying pressures.

Note on the Formation of Carbon Tetrabromide in the Manufacture of Bromine. By J. C. HAMILTON.—A quantity of a white crystalline substance was obtained as a residue after distilling a quantity of commercial bromine. It melted at 90°·1. It was decomposed by boiling with an alcoholic solution of soda, yielding a white precipitate of NaBr; this, on precipitation with silver nitrate, indicated 97·1 per cent. of bromine in the original deposit. Carbon tetrabromide has 96·4 per cent. This substance is probably derived from the action of bromine on the organic matter in the sea-weed.

Mr. Howard said that he had seen the same deposit from Scotch and American bromine. German bromine had never yielded a similar substance.

Researches on the Relation between the Molecular Structure of Carbon Compounds and their Absorption Spectra. By W. N. HARTLEY.—A preliminary notice of the work in this paper was read at a meeting of the Society in June last. Part I. contains general conclusions as to the nature of the actinic absorption exerted by various carbon compounds. Part II. contains an account of experiments which prove the generally diactinic character of substances constructed on an open chain of carbon compounds. Part III. discusses the nature of the actinic absorption exerted by various closed chains of carbon atoms. Facts are adduced to show that the formulæ which have been proposed for camphor and camphoric acid and for the terpenes are correct, as far as the carbon nucleus is concerned only, when, in the case of the first two bodies, the nucleus is represented by a closed chain of singly linked atoms, and, in the case of the terpenes, when the closed chain contains two pairs of doubly linked carbon atoms. Benzene hexachloride shows no absorption band. The following conclusion has been established: no molecular arrangement of carbon atoms causes selective absorption unless each carbon is itself united to other than carbon atoms, as in the case of benzene. Part IV. *On the Absorption Spectra of Condensed Benzene Spectra.*—The extraordinary degrees of dilution which substances like naphthalene and anthracene are capable of withstanding before all actinic absorption disappears (which were previously mentioned) have been verified. Attention is drawn to the occurrence of a series of absorption bands in naphthalene and anthracene spectra similar to those seen in the spectra transmitted by benzene. V. *On the Cause of Absorption Bands in the Spectra transmitted by Benzene and its Derivatives.*—Theoretical considerations lead to the conclusion that general actinic absorption is due to the vibrations of molecules as a whole, but that selective absorption is caused by a series of secondary vibrations.

The Society then adjourned to December 16, when Dr. Carnelly will give a demonstration on his recent "Researches as to the Effect of Pressure on the Melting Point of Ice," and the following papers will be read:—"The Estimation of Nitrogen by Combustion, including Nitro-Compounds," by J. Ruffle; "On some Naphthalene Derivatives," by Dr. Armstrong and Mr. Graham; "On some Hydrocarbons present in Resin Spirit," by Dr. Armstrong.

Errata.—In the report of the meeting of the Chemical Society on November 18, which appeared in the *Pharmaceutical Journal* for the 27th, on p. 442, col. ii., line 8 from bottom, and p. 443, col. i., line 10 from top, *for* "toluene, C_7H_6O," *read*, in both places, "toluene, or C_7H_6O."

Parliamentary and Law Proceedings.

PROSECUTION UNDER THE WEIGHTS AND MEASURES ACT.

On Monday, December 6, at the Marylebone Court House, the adjourned summons against Mr. E. C. Whittle, for having four glass measures in his possession which were incorrect, again came before the bench. There were present Mr. Thomson Hankey, in the chair, Mr. Galsworthy, Major Ross and Mr. Barnard. On this occasion Mr. Glaisyer, Solicitor to the Chemists and Druggists' Trade Association, appeared on behalf of the defendant.

The Chairman asked Mr. Glaisyer under what circumstances he appeared, and did he propose to bring any witnesses?

Mr. Glaisyer said, Yes, I have witnesses from York and from London.

The Chairman: What are you able to prove? What do you propose to prove? That the weights and measures are correct?

Mr. Glaisyer: We have not had an opportunity of testing these identical measures; but I desire in the first instance, with your permission, to cross-examine the inspector as to the mode in which he tested them. The inspector from York is here, who has passed these measures, and he will swear to their accuracy.

The Chairman: You are aware that we adjourned the case in order that we might communicate with the Board of Trade. We have an answer from the Board of Trade, and certainly the measures are not correct.

Mr. Glaisyer: That depends in these small measures on the way in which they are tested. Perhaps I may be allowed to observe that since this case was before you on the last occasion, a communication has been made to the various inspectors throughout the country telling them what part of the meniscus which is formed by the surface of the liquid in the tube should be taken in testing these measures. Before that, there was no general instruction on the point, and some took the top of the meniscus and some took the bottom.

Mr. F. W. Tibbey, the inspector, was then sworn and cross-examined as follows by Mr. Glaisyer:—

How long since had you your standard, Mr. Tibbey?—It can be ascertained from the indenture. I could not say exactly.

Last summer?—In April, I think; I could not say positively.

The Chairman: Last year, or this year?—This year; I think it was April. I could not say from memory, but I have the indenture which would prove the date.

Mr. Glaisyer: These measures all bear the mark of the York inspector, do they not?—They all bear the "YK," but it is very difficult for us to say whose stamp it was. If it had been a numbered stamp under the Board of Trade, we could have referred to the number and found out which stamp it was in a moment.

Still, there is nothing, as far as you are aware, to prevent that being a proper stamp?—I should not think it was a proper stamp.

That is only your impression?—That is only my impression.

How did you test these measures?—I tested them by the standards which are issued by the Board of Trade for our use in testing measures.

You complained of measure No. 1 that the line at 5 minim is 1 minim short, how did you test that?—I tested that by the pipette tube.

What water did you take?—Distilled water.

At what temperature?—62°, or as nearly as possible; it might be 62½°; one degree in temperature makes very little difference.

Where did the line come?—It has been tested from the bottom of the meniscus.

From the bottom of the meniscus throughout?—All that I have summoned on.

Had you instructions with regard to that?—I had.

When?—I had instructions from the Board of Trade, but prior to any instructions from the Board of Trade I had made inquiries on my own account.

When did you have the instructions from the Board of Trade?—About three weeks ago, I should think as near as possible.

When about were the instructions received?—About three weeks ago.

Since this case was first heard?—Yes.

Before that time you had no official instructions as to how you were to test the measures?—I had not.

Whether to take the bottom or the top of the meniscus, or to make an allowance from the bottom?—No, the Board of Trade had no authority to issue instructions to the inspectors; they take their instructions from the local authority which appoints them.

Had you any instructions?—No, merely the usage of the trade, that is what we have gone upon principally.

Have you not any authority for making an allowance on these measures?—Not below 30 minims.

Is not an allowance below 30 minims as necessary as above?—We have nothing to do with that.

As a matter of practice?—As a matter of practice no appreciable error is to be allowed below 30 minims.

As a matter of fact, is it not as necessary below as above, that is to say, can you measure accurately?—You can measure to a tenth.

To a tenth of a minim?—Yes.

How long have you been an inspector?—I should think about three years.

How long have you had practice in testing these conical glass tubes?—From the time of the Order in Council first being passed, when I obtained these standards.

That is about last April at the earliest?—Yes; I have had a great deal of practice.

From your practice you say it is possible to test these tubes to a tenth of a minim?—I should think so, that is to say, if you take a correct line of sight.

And that two inspectors would agree to a tenth of a minim?—On several matters where two inspectors have tried them to check each other they have agreed pretty well within a tenth.

At all events there must be some allowance; even then you do not absolutely agree?—Perhaps not.

Do you know Professor Redwood by name?—I do.

Do you consider him a good authority on this subject?—I decline to give an expression of opinion as to Professor Redwood. I do not know him, and, therefore, I am not in a position to say whether he is a good authority or not.

Mr. Glaisyer: I see in the report of the case that almost as much was made of the fact of the mark on the measures as the fact of their being said to be inaccurate.

Mr. Greenwell (clerk to magistrates): What mark?

Mr. Glaisyer: The official mark,—is that given up? There is no summons on it.

The Witness: No.

Mr. Glaisyer: Is that to form any part of the case?

The Chairman: We have no summons on that.

Mr. Glaisyer: Then that may be assumed to be correctly marked.

The Chairman: That is an entire assumption.

Mr. Glaisyer: They are not charged with being incorrectly marked, therefore, for the purpose of my case we must assume the mark to be correct.

Mr. Greenwell: There is no evidence one way or the other.

Mr. Glaisyer: Except that the matter was much discussed at the last hearing.

You ascertained these lower graduations by the pipette, you say?—Yes.

When you had dropped in the 5 minim—5 is the smallest, I think—did you drop in another to see how far up the tube they came?—I did not. I tested them in this way. I placed the fluid in the pipette, or rather drew in the pipette, and lowered it to the proper meniscus, then poured it into the glass until it reached the line in proper sight, and what remained in the pipette is the deficiency.

Then if the inspector had taken the horns of the meniscus, so to speak, instead of the base, would he have been correct?—I do not think he would. He would have made the matter worse still.

You always take the base?—We have not always taken the base. We have always taken the centre of the meniscus, which is always the usage of the trade.

Now, you are running back from what you have said. —You are speaking of these particular measures, not of the mode of testing in the metropolis. If you want to know the particular mode of testing in the metropolis——

Mr. Galsworthy: You had better answer the questions only; do not give us a lecture every time.

Mr. Glaisyer: In testing these measures you took the base?—I did.

Have you always used the base in testing similar measures?—No, I have not.

Therefore, some of your measures may be complained of?—On that particular ground.

That would be so?—It would, no doubt.

Would the extent of correction be 1 minim?—It would not make the difference of 1 minim. I do not think it would; in fact, I am sure it would not in some measures; it all depends on the formation.

If I tell you that some of your measures, bearing your mark, have been tested, and have been found to be more than 1 minim short——?—I should be very much surprised.

The Chairman: Have you any proof as to these measures? What have we to do with other measures?

Mr. Glaisyer: What I am trying to make out in this case is, that it is absolutely impossible to test these measures to the extent which the inspector has endeavoured to do in this case. It is absolutely impossible to test these measures to one drop, and in many cases to one and a half or two drops.

The Chairman: We have not to consider that case at all. I think these measures are of greater variation than that.

Mr. Glaisyer: One and a half and two, two being the most.

The Chairman: Any part would make the measure incorrect.

Mr. Glaisyer: But my point is, that they cannot be tested so accurately—that two inspectors testing the same measure differ to that extent.

Mr. Galsworthy: Your point is that they may differ, and you cannot test up to one drop?

Mr. Glaisyer: Up to one, one and a half, or two, I should contend.

Mr. Galsworthy: You said one just now.

Mr. Glaisyer: Up to one, one a half, or two. The point I was making before was that even measures which this inspector has tested had, since the instructions received from the Board of Trade, been tested and found to be deficient.

(Mr. Glaisyer then produced several measures, two or three of which the witness said bore his mark, as having been tested, and asked him if he would test those.)

Mr. Galsworthy: We cannot sit here all day to see these measures tested; it has nothing to do with your case.

Mr. Glaisyer: I think it has, because he has passed these as correct, and I want to show the amount of difference.

The Witness: These are not subdivided to minims.

The Chairman: All we have to do is to say whether the measures specially referred to us are correct or not.

Mr. Glaisyer: Or as near correct as it is possible to get them. My whole case is that they cannot be accurately tested, or that two inspectors, or even the same inspector, may differ at two different times.

The Chairman: Certainly; we cannot go into these other measures.

Mr. Glaisyer: Will you let him take one?

The Chairman: No, I think not. All we want to know is whether you can prove that these measures which our inspector says are incorrect are correct.

Mr. Glaisyer: I must ask you to allow me to test them. I have not had an opportunity of testing these identical measures. I have taken the case upon the statement of the witness on a former occasion that he has found these deficiencies. and the point I am instructed to argue is that these measures cannot be tested to such a nicety as he has endeavoured to do.

The Chairman: If you are prepared to prove that he is incorrect in these measures——

Mr. Glaisyer: I cannot, because I have not tested them. I have had no opportunity.

The Chairman: All we can do is to adjourn the case if it is so. If you are prepared to go to the expense of bringing witnesses before us that our inspector is incorrect, and has made an incorrect statement, we are bound to listen to that; but we must have some proof before us that that is the case.

Mr. Glaisyer: Then I must ask for an adjournment on that ground, and for leave to test these measures by further witnesses; but further than that, I think I was entitled to go so far as to ask the witness to test these measures which he has tested on previous occasions, in order to show the credibility of his testimony.

Mr. Galsworthy: Are you prepared to test it now?

Mr. Glaisyer: I do not know that I can.

The Chairman: We have the evidence before us that the Board of Trade have pronounced these measures deficient, and that is sufficient according to our opinion to guide us, and we have the opinion of our own officer, which agrees with the opinion of the Board of Trade. Therefore, I think, the only course for us is to act upon the evidence of the Board of Trade and our own officer, and to allow you to appeal.

Mr. Glaisyer: Very well, sir; I will take it in that way, if you wish it.

Mr. Greenwell: You are prepared to test the matter to the extremity. Possibly there may be no penalty inflicted.

Mr. Glaisyer: I would rather appeal, and have the whole question tried, if that meets your view.

The Chairman: If the magistrates confirm the opinion of their own officer, are you prepared to appeal?

Mr. Glaisyer: Yes, sir.

Mr. Galsworthy: You want, in fact, to show that all these measures are as correct as they can be?

Mr. Glaisyer: Yes, sir; as correct as they can be.

Major Ross: You want to make it a test case?

Mr. Glaisyer: It concerns not only the present defendant, but every chemist and druggist throughout the kingdom.

Mr. Barnard: Not only chemists and druggists, but the glass trade.

Mr. Glaisyer: Yes, very considerably.

Mr. Barnard: You are for the glass trade?

Mr. Glaisyer: No, sir; I am for the chemists and druggists.

Major Ross: You wish a decision to carry to a higher court?

Mr. Glaisyer: If you are prepared to give a decision in favour of my client, I do not want to carry it further; but if you do not, I intimate most clearly that I mean to appeal.

The Chairman: Would you consider that if we discharged the summons and retained the measures that would be sufficient to justify you in appealing?

Mr. Glaisyer: The case would not be dismissed in that event. I think I am bound to see the matter through.

Mr. Greenwell: You will understand that the sympathy of the magistrates is with the defendant.

Mr. Glaisyer: I quite understand that, sir.

The Chairman: There is nothing which would justify them in going against the opinion of their own officer.

Mr. Galsworthy: The magistrates have no desire to convict in this case, but we feel in this position, that we ought and must retain these measures.

The Chairman: We cannot part with the measures, clearly.

Mr. Glaisyer: Suppose I were to call Professor Redwood, who has had more experience in this matter than any man in the United Kingdom, and were to give evidence that it is absolutely impossible to test these measures to such a nicety as the present inspector has endeavoured to do, would that satisfy you?

The Chairman: I think not. I do not think we are competent to judge of that.

Mr. Glaisyer: Then I must press for a decision and appeal from it.

The Chairman: Then we had better take Mr. Blyth's evidence.

Mr. Winter Blyth, Medical Officer and Analyst to Marylebone, was then sworn.

The Chairman: Are you prepared to advise the magistrates that in your opinion these measures are not correct?—I can only speak to certain measures which I examined which were called Nos. 1, 2 and No. 4. With regard to those three which I examined they certainly were not correct.

Did you not examine No. 3?—I have only examined those I have mentioned, 1, 2 and 4.

Mr. Galsworthy: Would Mr. Glaisyer like to ask Mr. Blyth anything?

Mr. Glaisyer: If I am going to appeal I think it is hardly necessary to occupy the time of the court. May I ask what communication you have received from the Board of Trade?

The Chairman: No, I do not think that is necessary at all.

Mr. Greenwell: I may say that the opinion of the Board of Trade is that the measures are not correct.

Mr. Glaisyer: May I ask whether it makes any reference to the allowance.

The Chairman: I do not know that the word "allowance" has been used.

Mr. Glaisyer: You will observe that by the Act they allow errors in certain of the standards; perhaps it is the word "errors" instead of "allowance."

Mr. Galsworthy: Perhaps it would be better for you to accept on behalf of your client the opinion of the bench; no one says that the differences are enormous, but if you carry the case through, they may be proved to be more incorrect.

Mr. Glaisyer: Then it will work a revolution in the trade; 15,000 of these measures are in use somewhere or other.

The Chairman: It is an important question—we are quite aware of that; only we do not feel ourselves competent to go into a question of the scientific nicety which undoubtedly your inquiry would lead to.

Mr. Blyth was then examined by Mr. Glaisyer, and in the first place gave the various deficiencies in the graduations as follows, stating that he tested them by weight entirely:—

		Error.
No. 1.	5 min. . .	·36 gr.
	10 „ . .	·31 „
	15 „ . .	·67 „
	20 „ . .	·93 „
	25 „ . .	1·79 „
	34 „ . .	·35 „
No. 2.	10 min. . .	·01 gr.
	20 „ . .	·91 „
	30 „ . .	1·19 „
No. 4.	5 min. . .	·74 gr.
	10 „ . .	·29 „
	15 „ . .	·43 „

Will you turn those weights into minims, please, and tell me what those deficiences would be?—That is a calculation which would take a little time; I cannot do it in my head, but it could be done easily.

On No. 2 the lowest mark is 5 minims?—I did not test it at 5 minims.

The Chairman: We do not require to go beyond one; if one is wrong, the measure is wrong.

Mr. Glaisyer: I should prefer to go through it all, because, after all, the credibility and competency of the other witness are at stake.

You did not adopt the mode which is recommended or directed to inspectors throughout the country in testing these tubes?—I do not know how they test them. I tested them by weighing.

At all events, yours is a much more accurate way of testing than by the pipette?—Most decidedly, you can always test more minutely by weighing than by measure.

No doubt. You did not try them by the pipette process?—I did not.

Did you try them more than once?—One of them I tried twice and it agreed to the second decimal figure, I think.

What is your opinion with regard to testing by the pipette, is it not possible at one time for the result to vary from that at another time by the same process?

Mr. Galsworthy: That is hardly a fair question. He has not referred to the pipette test.

Mr. Glaisyer: No; but he knows the process probably, and as he is here as a scientific witness, I think I am entitled to ask him what his opinion is.

The Witness: I think that with a properly constructed pipette you would get it very accurately by each test.

Absolute accuracy each time?—No, not absolute accuracy; certainly not.

You would not get it absolutely accurate each test?—You would get it sufficiently accurate for technical purposes.

But by weighing you get it much more accurate?—Quite so.

Therefore, two testings by weight must to all intents and purposes agree, whereas by the pipette they need not necessarily agree?—Just so.

The Chairman: You will understand that this Bench has no other object whatever but a desire to have the thing settled accurately; they only decline to go further into the matter because they feel they are incompetent to decide in any way on the question as to whether their own officer has tested these measures in the most scientific manner possible. Therefore they think, in justice to all parties, the better way will be to convict the defendant with a penalty of 6*d*., and to forfeit the measures.

Mr. Glaisyer: I presume, sir, you will allow me to have access to the measures for the purpose of testing them for the appeal.

The Chairman: Oh, yes, we shall be quite ready to give you every facility.

Mr. Greenwell: You will not take them away?

Mr. Glaisyer: No, we will have them tested here.

Mr. Greenwell: Nothing is said about costs. It is not the practice to give costs here at all.

SUICIDE BY AN ASSISTANT.

An inquest was held at Salisbury, on November 30, before Mr. George Smith, on the body of Mr. Alfred Stephen Harding, assistant to Mr. Atkins, chemist, who appeared to have taken prussic acid in his bedroom soon after retiring to rest on the previous night. The deceased was only twenty-three years of age. No motive could be assigned for the deed; but it was stated that he had a cousin in the Wilts Lunatic Asylum, and Dr. Blackmore gave it as his opinion that he must have acted under some sudden impulse.

The jury returned a verdict of "Temporary insanity."

Mr. Atkins said the deceased was a highly moral young man, and in every respect a most trustworthy assistant.—*Portsmouth Times*.

Review.

THE POWER OF MOVEMENT IN PLANTS. By CHARLES DARWIN, LL.D., F.R.S., assisted by FRANCIS DARWIN. London: J. Murray. 1880.

In his work on 'Climbing Plants,' Mr. Darwin has already given us the main facts regarding the interesting phenomena connected with climbing stems, tendrils, etc. In the present volume he collects together these, the phenomena of sensitiveness, as exhibited by *Mimosa*, many leguminosæ, and other plants, of heliotropism and geotropism, and attempts to associate them together as manifestations of a single law.

The law is that of "revolving nutation," as it was termed by Sachs, of "circumnutation," as Darwin prefers to call it, and is thus stated:—"All the parts or organs in every plant, whilst they continue to grow, and some parts which are provided with pulvini after they cease to grow, are continually circumnutating. This movement commences even before the young seedling has broken through the ground." The explanation of this phenomenon in the more marked cases where it has long been known was, until recently, the increased growth of the side which becomes for a time convex; but, although undoubtedly true, Darwin believes this not to be the cause, but only a result of the primary cause, itself inexplicable, viz., the greater turgescence of the cells and extensibility of the cell walls alternately on the one and the other side of the organ in question. To this cause are due, not only the phenomena of climbing stems and tendrils, but those of positive and negative heliotropism, and of positive and negative geotropism—or, to adopt the phraseology in the present volume, of heliotropism, apheliotropism, geotropism and apogeotropism—all of which are but modifications of circumnutation.

Probably the series of observations which will present the greatest novelty to most readers is that which demonstrates that these movements of nutation are as universal in the roots and other underground parts of plants as in the ordinary aerial stems. "Even the stems of seedlings before they have broken through the ground, as well as their buried radicles, circumnutate as far as the pressure of the surrounding earth permits." The tip of the radicle is sensitive to contact or irritation, and this sensitiveness causes movements in the adjoining parts. This peculiarity is confined to the tip of the radicle for a length of from 1 to 1·5 mm.; and when that part is irritated by contact with any object, by caustic, or by a thin slice being cut off, the upper adjoining part of the radicle, for a length of from 6 to 7 or even 12 mm., is excited to bend away from the side which has been irritated; and the curvature thus caused is generally symmetrical. Although this movement can aid the primary and secondary rootlets but little in enabling them to penetrate the soil, it is of material service to them in greatly enlarging the area from which they and their root hairs draw their nourishment.

If the circumnutation of growing organs were quite regular, their apex would describe a circle, or rather, "as the stem is always growing upwards, a circular spiral. But it generally describes irregular elliptical or oval figures. . . In the case of leaves the ellipses are generally narrow. Whilst describing such figures the apex often travels in a zigzag line, or makes small subordinate loops or triangles." We have in the volume a large number of reproductions of these zigzag lines, drawn on an ingenious plan contrived by the authors.

After describing the very remarkable phenomena connected with the circumnutating movements and growth of seedling plants, and the sensitiveness of the apex of the radicle to contact and other irritants, the authors proceed to discuss in like manner the circumnutating movements in mature plants—a very curious instance of which occurs in the oscillatory movements of the leaves of *Dionœa*;—the modified circumnutation exhibited in the phenomena of climbing plants, the sleep or "nyctitropic" movements of leaves and other organs, and in the movements excited by light, together with the general phenomena of sensitiveness to light and to gravitation. It is needless to add that this latest volume by Mr. Darwin forms no exception to the characteristic accuracy and minuteness of observation with which we are so familiar in his other researches. Like his previous works, it sums up the whole of our previous knowledge of the subject, adds vastly to it, and must form the necessary starting point for all future investigations.

Obituary.

Notice has been received of the death of the following:—

On the 15th of November, 1880, Mr. John Hamilton, Chemist and Druggist, Church Street, Haslingden. Aged 48 years.

On the 23rd of November, 1880, Mr. George Dutton, Pharmaceutical Chemist, Town Hall Square, Bolton. Aged 72 years. Mr. Dutton was one of the Founders of the Pharmaceutical Society, and was at the time of his death Local Secretary for Bolton.

On the 26th of November, 1880, at Liverpool, Mr. Leonard Flintoff Brown, Chemist and Druggist, late of Horbury, Yorkshire. Aged 62 years.

On the 26th of November, 1880, Mr. Joseph Linington Rastrick, Pharmaceutical Chemist, Southsea. Aged 64 years. Mr. Rastrick had been a Member of the Pharmaceutical Society since 1842, and for many years and up to the time of his death served it as Local Secretary for the Portsmouth district.

On the 27th of November, 1880, Mr. Charles William Frampton, Chemist and Druggist, Smethwick. Aged 66 years.

On the 27th of November, 1880, Mr. Joseph Knowles, Chemist and Druggist, Market Place, Knaresborough. Aged 31 years.

On the 2nd of December, 1880, Mr. Isaac Ashburner, Chemist and Druggist, Broughton-in-Furness. Aged 25 years. Mr. Ashburner had been an Associate in Business of the Society since 1876.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[451]. I am another who is of opinion that hyd. chlor. when written is intended for calomel and not for corrosive sublimate, and I do not think there is much of a knotty point at all in the question. I should think nearly all dispensers of experience would disagree with Mr. Henry Brown, and would dispense calomel when hyd. chlor. was written.

York. E. B. KENDALL.

[465]. "John" was perfectly right in labelling "shake the bottle." Chlorate of potash is soluble in cold water 1:17, in boiling water 1:3; surely the prescriber did not mean that the mixture should be heated each time it was used.

The chlorate of potash will crystallize out of the mixture as it gets cold. It is, therefore, necessary to use powdered chlorate and cold water.

H. W. Langbeck.

[463]. I diluted the liquor Fowleri with 4 ounces of distilled water and the ferrum dialysatum with the remainder of the water; the two liquids mixed remained perfectly clear, and even an addition of 6 drops of liquor potassæ caused no precipitate.

The ferrum dialysatum was of my own make.

Sp. gr. 1·046 = 5 per cent. peroxide of iron.

H. W. Langbeck.

[469]. Hypodermic Solution of Ergotine—
℞ Ergotini dialysati partes duo (extracti ergotæ dialysati spissi),
Glycerini,
Aquæ destillatæ āā partes quindecim.

H. W. Langbeck.

[470]. This preparation cannot present a uniform clear liquid, for the burnt alum will deprive the liquor opii of part of its water and change into common alum, insoluble in an alcoholic medium. Liquor opii is not miscible with chloroform.

H. W. Langbeck.

[471]. I believe Mr. Dartmoor would be justified in refusing to make up the liniment, although teriodide of nitrogen is believed to be explosive when dry only.

H. W. Langbeck.

[472]. F. S. M. should either use the water obtained in distilling oil of cloves, or mix oil of cloves with French chalk and exhaust it with distilled water.

H. W. Langbeck.

[472]. Aqua caryophylli is not much in request. I prepare it extempore by rubbing down 2 drachms of the oil with magnesia and water to a paste, throw in a filter and wash it to fill a Winchester.

The 2 lbs. of cloves to 8 lbs. of water is too much.

Putney. J. G.

[473]. Granulated sulphate of iron should be used.

H. W. Langbeck.

[473]. With regard to the remarks of Mr. Filtness, I disagree *in toto*. As an assistant, I would consider the substitution of the dried iron an interference with the prescription.

Bute.

[473]. I should think the "usual custom" in England is, or ought to be, to dispense what is written, and if sulphate of iron be ordered, to use it, and if the physician wants dried sulphate or granulated sulphate of iron used, let him order so.

I think there would be less discrepancy in dispensing if prescriptions were dispensed as written, and not according to the fancies of different dispensers. What business has "Euonymin" to seek after an ingredient not ordered?

York. Edward B. Kendall.

[475]. This can only be sent out so as to remain inseparable by making an emulsion of bals. copaib. either with mucilage or the yolk of an egg and sugar.

"374."

[475]. This cannot be dispensed so as to form a presentable emulsion.

Tunbridge Wells. C. Filtness.

[477]. I should make up to ℥iss with a mixture of syrup and water.

Tunbridge Wells. C. Filtness.

[477]. This prescription I would dispense as written, *i.e.*, up to ℥iss; one medical man here frequently prescribes a mixture ending thus:—

Syr. Zingib. et Aqua Font. . . ana ad ℥iv.

Bute.

[477]. Most probably the prescriber intended equal parts of syrup and water to be added, so as to make the mixture up to ℥iss. If ℥iss of each were added the mixture would last twenty-eight days, and it is unlikely that the prescriber should wish it to last that length of time.

"374."

[477]. B. should, if possible, obtain the prescriber's meaning, if any doubt existed in his mind about his mixture. Failing that, he would be justified, I think, in dispensing it as ℥iss mixture, using equal proportions of syrup and water, the dose of tr. nucis vom. in that case being the minimum dose of the Pharmacopœia.

N. R.

[478]. Triturate the iodine and tinct. opii together in a mortar until thoroughly incorporated, transfer to the bottle, and add ol. tereb. "Shake."

Tunbridge Wells. C. Filtness.

[478]. In reply to "Assistant," a good liniment can be prepared, without the least danger of explosion, in the following manner:—

Rub the iodine in a mortar with q.s. of s. v. r. to form a thin paste, then cautiously add little by little (stirring well) the ol. terebinth., and finally the tinct. opii. By this process the iodine is thoroughly subdivided. It soon separates, and must therefore be labelled "shake the bottle."

G. S. Illingworth.

[479]. The following prescription was dispensed by me, and in the course of a few days the patient informed me, "That it produced a stain on the skin. Such was not the result when dispensed by a London chemist." Can any of your readers inform me how to dispense it in order to produce a colourless preparation as that dispensed in London?—

℞	Liq. Ammon. Fort.	ʒj.
	Lin. Iodi	ʒij.
	Spt. Æther. Rect.	ʒvj.

To be painted behind the ear every night.

Cymro.

[480]. Would some reader kindly state if I did right in communicating with the prescriber before dispensing the following mixture of croton chloral hydrat., which I have just had presented, and also what is the usual maximum dose?—

℞	Croton Chloral Hydrat.	ʒj.
	Tinct. Aurant.	ʒij.
	Aquæ	℥iv.

M.

Two tablespoonfuls immediately, afterwards one tablespoonful every two hours until the pain ceases.

H. K.

[481]. I have had the following prescription to dispense some time ago:—

℞	Liq. Morph. Mur.	ʒj.
	Aquæ Laurocerasi	ʒj.
	Aquæ Camph. . . . . ad	℥viij.

M. ft. mist. C. ℥j ter die.

M. ——, M.D.

The B.P. dose of aqua laurocerasi is 5 ♏ to 30 ♏, and as the preparation contains hydrocyanic acid, and is not of reliable strength; would a dispenser be justified in reducing the dose in the above prescription, even to the maximum dose of the B.P. (*i.e.*, ʒss), or should it be dispensed according to the prescription? I may say that I was able to communicate with the prescriber. I should thankful for the opinion of some of your readers in the "Dispensing Memoranda."

D. SPENSER.

[482]. I had the following prescription given me to dispense the other day. Can anyone inform me how to make a presentable mixture?—

℞ Quinæ Sulph. . . . . ʒss.
Ac. Sulph. Arom. . . . . ʒiss.
Pot. Chlor.,
Sodæ Bibor. . . . . āā ʒss.
Aquæ Chlorof. . . . . ad ℥vj.

A LUBBERLY LOUT.

[483]. A few days ago I had the following prescription to dispense, viz.:—

℞ Magnesiæ,
Bismuth. . . . . ana ʒj.
Syr. Zingib. . . . . ʒvj.
Mucil. Acac. . . . . ʒiv.
Aq. Cinnam. . . . . ad ℥vj.
M. cap. ℥ss ter die.

I used magnes. carb. pond. and bismuthi carb. Was I right in doing so?

BUTE.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE AMENDED PHARMACY ACT.

Sir,—I am reported in last week's Journal as having said "I had not agreed to any of the proposed amendments" on the Pharmacy Act. This is quite true; but the opposite would have been as true. I do anticipate having to oppose some of the amendments, but my present position is merely this:—I took no part in the discussion on the proposed Act, considering that I, for one, had not had sufficient time given me for the due consideration of so very momentous a question.

Glasgow. DANIEL FRAZER.

THE PRESCRIBING OF SPECIAL PREPARATIONS.

Sir,—"One who has passed the Minor" complains of a very old grievance, and one that seems to increase in inverse ratio to the need of it.

The following are a few of "the specials" which have come under my notice lately:—

Blank and Co.'s Ferri Pyrophosph. Pulv.
Blank and Co.'s Red Gum Lozenges.
Blank and Co.'s Syrup. Ferri Phosph. Co.
Blank and Co.'s Calcium Sulphide Pills gr. ¼.
Blank and Co.'s Cod Liver Oil.
Blank and Co.'s Confection Senna.
Blank and Co.'s Calamine.
Blank and Co.'s Ext. Aloes.
Blank and Co.'s Ext. Colocynth.
Blank and Co.'s Syrup of Chloral.

and patent medicines from the neighbourhood of Bond Street innumerable. For most of these preparations the conscientious suburban chemist has to keep his customers waiting some extra two hours, is frequently out of pocket through the fares, and in return receives an article charged a ridiculously high price and often inferior to the preparation he himself would send out.

A short time ago a lady handed me a prescription containing, amongst other ingredients, two common drugs marked with the obnoxious "Blank and Co." I told her that the doctor had ordered drugs kept by a special retailer, and that I would obtain them for her; she said she had been told to go to Blank and Co. for it, but she quite understood what that meant, and I might send the drugs from my own stock if I thought them as good! I can hardly believe that my customer was right in supposing that the doctor received a percentage for recommending a particular firm, and yet that seems the only explanation of such conduct.

ONE WHO HAS PASSED THE MAJOR.

COPIES OF PRESCRIPTIONS.

Sir,—In reply to "Acacia" I think no dispensing chemist is justified in charging for a copy of a prescription that was entrusted to him.

H. W. LANGBECK.

Sir,—My opinion is the same as entertained by "Acacia" that he ought to demand his guinea for the copy of prescription, and I hope others will do likewise or refuse to supply it. We know what is intended. If the parties themselves are well disposed it is lent to a friend who will have no scruple in going to the stores for a future supply.

Putney. J. F.

BORURETTED HYDROGEN.

Sir,—In your report of a lecture by Mr. Edward Davies, in last week's issue, you represent him as saying, "All attempts to make boruretted hydrogen have failed." In December, 1878, I attended one of the evening meetings of the Chemical Society, at which Mr. Francis Jones, F.R.S.E., prepared, from magnesium boride and a mineral acid, a gas burning with a green flame, which he described as the body in question. His preliminary note on the subject, of which this was the illustration, appeared in the January number of the Society's Journal for 1879. Has his work been since confuted or has Mr. Davies overlooked it? In the latter case, both he and your readers will probably be glad to have their attention drawn to the paper.

THOS. P. BLUNT.

SAFFRON.

Sir,—I read with much interest the paper on the "History of Saffron," read by Mr. Allen at the Evening Meeting of the Society on Wednesday last. I fully endorse his opinions, and as I have served an apprenticeship of six years in the best market town in West Cornwall, I have retailed a very large quantity, especially at Christmas and the feast days of the old parishes, which anniversaries are still kept up. I have often wondered why saffron should be used so extensively, as there is very little flavour or aroma about it. Apparently it is solely on account of its colour, just as cochineal is used in colouring blanc-mange, custards, etc. Perhaps Mr. Allen is not aware that "turmeric" is largely used for the same purpose. It is known among the poorer classes as "dough stain."

Redruth. CORNUBIA.

"*Inquirer.*"—We know of no rule that is sufficient for the settlement of the point, or that would affect the construction usually put upon agreements between employers and employed.

W. W. Towle.—We know of nothing to prevent you from either advertising your recipes or having them made up if you wish to do so.

H. J.—Try olive oil in which gamboge has been digested.

C. P.—The recipe for composition powder has been already published several times in the present series. See vol. vii., p. 308; vol. viii., p. 498.

"*The Griffin.*"—The question should be submitted to a solicitor.

A. E. Lomax.—Asa Gray's 'Manual of the Botany of the Northern United States.'

Mr. Beck is thanked for his communication.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Jones, Glover, Symons, Allen, Holmes, Bell, Tanner, Lomax, Ointment, Juvenis, Austral, Iodine, Veritas, T. S. H., J. P. I., W. G. T., A. R., R. W.

STAR-ANISE.

BY E. M. HOLMES, F.L.S.,

Curator of the Museum of the Pharmaceutical Society.

During the last few years there has appeared on several occasions at the drug sales in London a variety of star-anise, which was supposed by those who observed it to be the ordinary kind deprived before importation of its essential oil by distillation or other means, a supposition to which its more wrinkled or warty appearance gave some show of truth. A specimen of this drug was placed in the Museum about a year ago, and my attention having been called to it by the recent papers in this Journal on *Illicium religiosum*, I have compared it with the specimens in our great national herbaria at the British Museum and at Kew, and the examination has convinced me that the drug recently imported is identical with the fruit of the Japanese tree.

A comparison of a series of specimens of the fruits of different species of *Illicium* seems to show that there is so great a similarity in the leaves and fruits of different species that it is not at all surprising that Linnæus should have confounded the Japanese and Chinese plants; and that, moreover, the taste of the fruits, and the number of carpels of which they are composed, form the best guide to distinguish the species.

Although only the Chinese and Japanese star-anise have occurred in English commerce, there are two other kinds which appear to be articles of trade in the East and which, as there is the possibility of their being exported at some future time to this country as substitutes for the true article, it may be worth while to describe at the present time.

In De Candolle's 'Prodromus,' vol. i., p. 77, only three species are described, viz., *Illicium floridanum*, Ellis, *I. anisatum*, L., and *I. parviflorum*, Mich. Of these, the *I. anisatum* includes, as Siebold has shown, the Japanese *I. religiosum*, which is evidently a distinct species.

Two other species are described in Hooker's 'Flora of British India,' vol. i., p. 40, viz., *I. Griffithii* and *I. majus*.

As all of these are more or less interesting from a commercial point of view, and the fruits have not been described by De Candolle, the details which are given below may be interesting to some of the readers of this Journal.

1. *Illicium anisatum*, Loureiro.—Chinese star-anise or badiane.—The plant described by Loureiro in his 'Flora Cochin-Chinensis,' vol. i., p. 432, is a native of the high mountains of Yunnan, in south-western China and to the west of Canton. According to his account it differs from the Japanese star-anise in being only about 8 feet high, in its smaller leaves rounded at both extremities, and by the stamens being about thirty in number. The carpels are eight in number, and although each is furnished with a beak when growing, in the commercial article these are almost invariably broken off. The character quoted from Geerts, on p. 454, as distinguishing the Chinese drug, viz., that the apex of the carpel is pressed in or extended horizontally is not a distinctive feature. In the young state of the fruit all the carpels are erect, but spread outwards as they arrive at maturity; hence, the position of the beak will differ according to the degree of ripeness of the fruit when gathered; in many specimens of the Chinese drug it will be found pointing upwards. The notch or depression close to the beak just at the end of the upper or ventral edge of the carpel is more shallow (see fig. 1) in the Chinese drug, and the fruit is generally larger and has more of the carpels developed to their full size than the Japanese fruit.

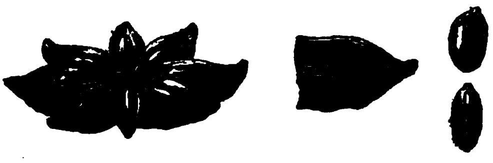


Fig. 1. *Illicium anisatum*, Lour.

It may be remarked here—in confirmation of Siebold's statement that Thunberg augmented the misunderstanding of this species—that among the specimens contributed by Thunberg to the Banksian collection, now in the Herbarium of the British Museum, and labelled *Illicium anisatum*, both *I. religiosum* and *I. anisatum* occur on the same sheet, as evidenced by the fact that the fruits are present, and that one tastes of anise and the other does not, and by the difference in the under surface of the leaf, that of *I. religiosum* being paler and more glaucous.

2. *Illicium religiosum* (Sieb. et Zucc., 'Fl. Jap.,' vol. i., tab. 1).—This plant, first pointed out as a distinct species by Siebold, has been included by most previous and succeeding botanists under *I. anisatum*, but differs from it in being from 25 to 30 feet high, *i.e.*, twice or three times the height of *I. anisatum*, in having leaves rather broader above the middle, with a more glaucous or paler under-surface (so far as can be judged from herbarium specimens), and flowers with only 18 or 20 stamens. It flowers in April. The petals, which are yellowish and tinged with red here and there at the margins, appear to be also less in number than in *I. anisatum*. The tree is not a native of Japan, but was introduced from China or the Corea in ancient times by the Buddhist priests, and planted around the Japanese temples, being used when in blossom for adorning the altars and tombs. The yellowish bark has an aromatic taste, and is used by the Buddhists as an ingredient in their pastilles, which are made to burn a certain length of time, and thus serve as a sort of chronometer. The leaves are considered to be poisonous; but Siebold's statement that they are an antidote to the poisonous fish *Tetraodon hispidus* seems to arise from a mistaken interpretation of Kœmpfer's remarks, which rather indicate that the addition of the leaves to the water in which the poisonous fish has been boiled rendered that liquid much more poisonous. The passage alluded to is as follows:—

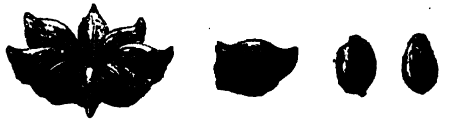


Fig. 2. *Illicium religiosum*, Sieb et Zucc. A specimen with all the carpels developed.

> "Notabile est, ramulum additum decoctioni piscis venenosi de opblaſer Belgis dicti (si a veneno repurgetur piscium delicatissimi) venenum multis gradibus exasperare, quod citiori morte docent *αὐτόχειρες*."—Kœmpfer, 'Fasc.,' iv., p. 883.

The fruit is not used as a spice in Japan, nor for any other purpose, so far as is known, and it is difficult to understand why it should have been sent to this country, except through the ignorance of foreign merchants residing in Japan. In Japan *I. religiosum* is known as "skimi," according to Siebold, or "somo," "skimi" or "fanna skimi," according to Kœmpfer, and in China under the name of "ao-woo-soo," the fruit of *I. anisatum* being known as hwai hiang.[*] The fruit of *I. religiosum*, as it has appeared in English commerce, is about one-third less in diameter than the Chinese drug, and a few only of the carpels are generally developed to maturity. The curve or depression on the ventral suture near the apex is deeper and shorter, and hence the very short beak appears more erect than in the Chinese drug, see fig. 2. Neither the pericarp nor the seed has any taste of anise, but possesses a very faint taste and odour like the oil of *Laurus nobilis*, or distantly resembling the odour of cubebs. The number of carpels is eight, as in the Chinese anise. The seeds vary in thickness according to the degree of ripeness, as in the other species.

3. *Illicium parviflorum*, Mich.—This species is a native of the hilly regions of Georgia and Carolina, in North America, and is distinguished by its small flowers, with only nine to twelve, yellowish, ovate or subrotund petals. Like the Chinese and Japanese species, the fruit has only eight shortly-beaked carpels; the taste resembles sassafras.

4. *Illicium floridanum*, Ellis, a native of the coast of Florida, differs from the above in having twenty-seven to thirty dark red petals and a fruit consisting of thirteen carpels, which resemble those of the badiane, or Chinese star-anise, in flavour. The fruits of this and the preceding species are not met with in commerce. In Alabama the leaves of *I. floridanum* are reputed to be poisonous, and the plant has hence acquired the name of the Poison Bay.[†]

5. *Illicium Griffithii*, Hook. f. and Thomson ('Fl. Brit. Ind.,' vol. i., p. 40).—A fruit resembling star-anise in shape, but having thirteen instead of eight carpels, and without any taste of anise, was presented to the Museum of the Pharmaceutical Society by Dr. Dymock, in 1878, as a kind of false star-anise met with in Bombay. In the present year, among other specimens presented by the Kew Department from the India Museum Collection, there was a specimen of star-anise fruits identical with Dr. Dymock's specimens, and labelled, *Illicium Griffithii*, and partly for this reason, and partly because a specimen of the fruit of that plant in the Kew Herbarium is devoid of the taste of anise, I refer these fruits to *I. Griffithii.* These fruits resemble those of star-anise in colour, except at the ventral and dorsal sutures, where they are rather darker, but have thirteen carpels. When a carpel is chewed, at first no taste is observed, but shortly a bitter taste, with some acridity and a flavour between that of cubebs and bay leaves, becomes perceptible, the bitterness and acridity being the most marked features. They also appear from the scars on their sides to have been pressed together in the earlier stages of growth through a greater proportion of their length, probably from the carpels being more numerous and therefore more crowded. The beak is short and incurved and the terminal depression well marked. *Illicium Griffithii* is a native of East Bengal, growing on the Bhotan and Khasia hills, at an altitude of 4000 to 5000 feet. It is a shrub, with angular, glabrous branches and leaves larger than those of *I. anisatum*, being 2 to 4 inches long and 1 to 2 inches broad and acute at both ends. The sepals are six and orbicular, and the petals eighteen, the outer being oval and the inner smaller and narrower. The carpels have a thin fleshy epicarp and a short subulate incurved beak. The slender portion of the beak is usually broken off in the drug, but its incurved direction remains noticeable. The fruit is described by Hooker and Thomson as not having, "either when fresh or dried, at all the smell of anise," but "a faint agreeable odour like that of the leaves and wood."[*] In the Museum of the Pharmaceutical Society the seeds are nearly all unripe in the specimens of this species and *I. majus.*

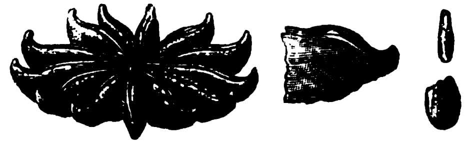


Fig. 3. *Illicium Griffithii*, Hook. f. et Thomson.

6. *Illicium majus* (Hook. f. and Thomson, 'Fl. Brit. Ind.," vol. i., p. 40).—In the collection of drugs brought by Mr. J. Collins from Singapore, and purchased by the Council of this Society, there was found a parcel of star-anise fruits remarkable for their dark brown or almost black colour and for having from 11 to 13 carpels, which, as in those of *I. Griffithii*, are very equally developed. The depression near the end of the ventral suture is longer and shallower, so that the short beak appears less incurved. The taste has a strong resemblance to mace, but lacks the bitterness so manifest in the fruit of *I. Griffithii.* Mr. J. Collins informs me that this kind of star-anise is called "bunga lawang" at Singapore, where it is sold in the bazaars, and that it is used to make a drink for fevers, etc.

I. majus is a shrub about 30 feet high with leaves from 4 to 6 inches long and 1½ to 2 inches broad, the leaves being widest above the middle and evidently acuminate at the apex. The flowers are pink, with about 16 segments, the sepals and petals orbicular, the inner petals being broad and oval, and the filaments broader than the oblong anthers. It is a native of the Thoung Gain range in Tenasserim, at an altitude of 5500 feet.

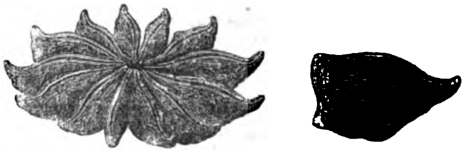


Fig. 4. *Illicium majus*, Hook. f. et Thomson.

The fruit of *I. majus* does not occur in the Herbaria of either the British Museum or Kew, and the identification is therefore founded only on the difference in taste of the fruit and the fact that *I. majus* is the only species of which the fruit is not known.

The following arrangement may be found useful for pharmacognostic purposes:—

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[*] Porter Smith, 'Mat. Med. China,' p. 116.

[†] 'Treas. Bot.,' p. 619.

[*] 'Flor. Ind.' vol. i., p. 74.

Carpels 8 .	*Illicium*	*anisatum*	Taste, resembling aniseed.
„ .	„	*religiosum*	Taste, faint, like bay leaves.
„ .	„	*parviflorum*	Taste, like sassafras.
Carpels 13 .	*Illicium*	*floridanum*	Taste, like anise.
„ .	„	*Griffithii*	Taste bitter, like bay leaves and cubebs.
„ .	„	*majus*	Taste, like mace.

It may be observed that the fruit of the Japanese anise when wetted and laid on a piece of blue paper reddens it immediately and strongly, while the Chinese star-anise causes only a very faint red coloration. The fruits of *I. Griffithii* and *I. majus* produce no such reaction.

In conclusion it may be remarked that several cases of the Japanese star-anise were sold in London at rather less than half the price of the Chinese drug, and although most of it has been shipped again, it is not improbable that it will return to this country *mixed with the true star-anise.*

STUDIES OF THE GENUS STRYCHNOS.[*]

BY G. PLANCHON,

Professor in the Ecole Supérieure de Pharmacie, Paris, and Honorary Member of the Pharmaceutical Society of Great Britain.

(*Continued from page* 471).

II. PLANTS THAT ENTER INTO THE COMPOSITION OF CURARE.

It is the case with curare, the arrow poison which in one portion of South America is of so great importance to the natives, as with cinchona, ipecacuanha and a large number of substances of great value; they were known for a long time as medicines, whilst there was complete ignorance as to the plants which furnished them.

Curare, in fact, made its appearance in Europe in the year 1595, when Walter Raleigh[†] brought it to the knowledge of the old world; afterwards it was mentioned in the narratives of various travels, and in 1639 in those of the Fathers d'Acunija and d'Artieda. The abbé Salvatore Gilij[‡] speaks of it in detail in his 'History of America.' In 1745, La Condamine, the able astronomer to whom natural science owes the discovery and description of the first *Cinchona*, made known the "poison of the Ticunas,"[§] and he brought back from his travels poisoned arrows, which served for the experiments of Muschenbroch, d'Albinius and Van Swieten. Bancroft gives some details upon the preparation of this poison. But down to the travels of Humboldt and Bonpland in the new world (1800) there existed no very clear idea as to the essential elements that enter into the American poison.

These two illustrious travellers saw curare prepared[||] upon the banks of the Orinoco, at Esmeralda, Mandavaca and Vasiva, and they state that the principal ingredient was the juice or the cold decoction of a liana, or climbing plant, known in the country under the name "bejuco de mavacure," and which they referred to a species of *Strychnos*. The concentrated liquid had a syrupy consistence, and to it was added a viscous juice named "kiracaguero," which gave still greater consistence to the product. Such was the first information upon the true origin of curare, and all which follows shows how strongly rooted is the idea that it is to a species of *Strychnos* that the principal activity of the poison is due. As to the species indicated by Humboldt and Bonpland it is difficult to say what it is. Kunth places it near the *Rouhamon* of Aublet; but in the absence of sufficient materials for determination, judgment can hardly be pronounced upon this delicate point.[*]

In 1813, Waterton[†] made a long and difficult exploration in the interior of British Guiana to see for himself the preparation of the curare of the Macusis, and he reports that there also the basis is a climbing plant named "wourali" or "ourari," associated with some other less important species. But it was Richard Schomburgk[‡] who, in 1840—41, gave the true composition of the curare of this region. About 3° 10″ N. latitude, in the granitic mountains of Canuku or Conocon, which bound the savannahs of the river Rupununi, was ascertained one of the most important points of the preparation of this composition of this curare, of which the following is the formula:—

Bark and Wood of "Urari" (*Strychnos toxifera*, Schomb.)	2 lbs.
Bark and Wood of "Yakki" (*S. Schomburgkii*, Klot.).	¼ lb.
Bark and Wood of "Arimaru" (*S. cogens*, Benth.)	¼ lb.
Bark and Wood of "Vokamiro"	¼ lb.
Root of "Tarireng"	½ oz.
Root of "Tararemu	¼ oz.
Fleshy Root of "Maramu" (*Cissampelos*) sp.?	
Four small pieces of "Manica."	

This last substance belongs to a ligneous species of the Zanthoxylaceæ, the wood and bark of which are antisyphilitics.

The formula, it will be seen, is very complex, and several of its constituents remain undetermined; but the important fact is the predominance of species of *Strychnos*, of which specimens have been sent to Europe and described by botanists.

The same fact becomes again evident in the investigations made on the bank of the Amazon by M. de Castlenau in 1847. "It was," says this traveller, "with great pleasure that I found in a house (among the Oregones) several Indians occupied in preparing the poison which they use in the chase. They did not appear to make any mystery of their occupation. They had boiled during twenty-four hours in a large boiler the fragments of a climbing weed; then, in our presence, they added a substance having the appearance of a lather, but which we knew had come from another creeper that had been rasped. This mixture requires to be further boiled until it takes the consistence of glue."[§]

Subsequently,[||] M. de Castlenau explains that the first of these climbers is the "bobongo" of the

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[*] From the *Journal de Pharmacie*, [5], vol. i., p. 193.

[†] Calay's 'Life of Raleigh,' vol. i., p. 13; Ap. p. 8.

[‡] 'Saggio di Gloria americana descritta' (Rome, 1781), vol. ii., p. 353.

[§] 'Mémoires de l'Académie des Sciences' (1745), p. 490.

[||] 'Voyages aux Région Equinoxiales,' vol. ii., p. 548.

[*] Rob. Schomburgk, 'Annals of Nat. Hist.', [1], vol. vii., p. 411.

[†] 'Wanderings in South America.'

[‡] Richard Schomburgk, 'Reisen in British Guiana in 1840 41,' p. 450.

[§] De Castlenau, 'Expédition dans les Parties centrales de l'Amérique du Sud: Histoire du Voyage, v., p. 14.

[||] *Loc. cit.*, pp. 17 and 22.

Oregones and the "pani" of the Yaguas; the second, of which the rasped bark is used, is the "tacato" of the Oregones and the "ramou" of the Yaguas. M. Weddell has studied these two plants. The "pani" is a Menisperm, which he has named *Cocculus toxicoferus.* The "ramou" is a species of *Strychnos*, which he has dedicated to M. de Castlenau; it is the *Strychnos Castelnæana.* This latter is freely distributed throughout the whole region of the Upper Amazon, in the districts of the Indians mentioned above and in those of the Ticunas and the Pebas. The curare of this country is evidently the same as has been described by La Condamine in the 'Mémoires de l'Académie des Sciences' under the name of the "poison of the Ticunas."

Since then, sufficiently numerous indications have been given to complete the foregoing and to illustrate besides the preparation of the curare in other countries.

First, we have the information furnished to M. Gubler by M. Thirion, consul-general in Venezuela. It refers to a poison which is prepared throughout the district of the Upper Orinoco, by the Maquiritaras and Piaroas, and in the regions situated between that river and the Rio Negro. According to an official report the bark of a plant bearing small white flowers and growing in high lands having a blackish soil, is first rasped. "The rasped bark is then boiled during several hours, until it becomes a kind of paste, which is afterwards strained in a very fine filter; it [the filtrate] is then submitted anew to a slow fire until it has acquired the consistence of a syrup, which indicates that the poison has arrived at its full strength." A portion of stem, roots and leaves accompanied the report transmitted to M. Thirion. These same specimens were exhibited in the Champ de Mars in 1878, in the Venezuelan section, together with calabashes of curare. I have been enabled, through M. Gubler, who kindly entrusted them to me, and by the courtesy of the commissioners of the South American exposition, to study these organs. The venation of the leaves, and the structure of the barks and woods, both of the roots and the stems, left me no doubt as to the generic determination of the plant. It was a *Strychnos*, and as it did not answer to any known species, I have given to it the name of *Strychnos Gubleri*, to recall the last work undertaken by our regretted collaborateur.[*]

In the second place should be mentioned the plants sent or brought from Brazil by M. Jobert,[†] and especially those which have been communicated to me by Dr. Jules Crévaux, the intrepid explorer of French Guiana and the Upper Amazon.

These plants come from two distinct regions, one already explored by M. de Castlenau, *i.e.*, the district of the *Strychnos Castelnæana*, Wedd. M. Jobert and M. Crévaux saw there the same plants as M. Weddell, the "pani" and the "ramou," besides a series of various plants, Aroideæ, Piperaceæ, Aristolochiaceæ, etc.

The other region, recently explored by M. Crévaux through many difficulties and perils, is in quite an opposite direction. It is the country of the Upper Parou, one of the affluents of the Amazon in the south of French Guiana. It is there that the Roucouyennes and Trios prepare curare with a plant to which they have given the characteristic name of "urari" or "ourari," but which is perfectly distinct from that which bears the same designations in other districts. The specimens, with flowers, that M. Crévaux kindly intrusted to me upon his arrival in Europe, have enabled me, in fact, to ascertain that it does not agree either with the *Strychnos toxifera*, of Schomburgk, which is the "urari" of British Guiana, or with the other species of *Strychnos* that have been indicated as ingredients in curari; namely, *S. Schomburgkii*, Klotzsch, of which I have seen a specimen in the herbarium at the British Museum, and *S. cogens*, Benth., the description of which does not accord with our plant. It is not a *Rouhamon*, although at first it seems to resemble Aublet's plant. By its flowers it is a true species of *Strychnos*, unknown hitherto, and in order to associate it with the traveller who brought it to Europe I have named it *Strychnos Crevauxii*.[*]

If we review the foregoing information it will be seen that in all the curares which have been mentioned species of *Strychnos* play the principal part, the other plants mixed with them are evidently accessories. This has, moreover, been demonstrated by physiological experiments undertaken recently with the bark of American species of *Strychnos*, which show that the characteristic action of the poison can be referred to them alone. The *Paullinia Cururu*, of the family Sapindaceæ, of which Claude Bernard in 1865 found a fruit in a fragment of curare, and the action of which recalls that of the American poison, has not been mentioned as an element in this poison by any of the travellers who have themselves been present during its preparation.

In the actual state of our knowledge we can indicate pretty clearly four regions where curare is prepared, and for each of them mention a species of *Strychnos* which is used as a basis for its preparation. These are, passing from east to west:—

(1) The region of the Upper Amazon or of the *Strychnos Castelnæana*, Wedd. It is the most extensive of the four, and includes the Solimoes, the Yavari, the Iça, and the Yapoura. It yields the curare of the Ticunas, Pebas, Yaguas and Oregones.

(2) The region of the Upper Orinoco, extending towards the Rio Negro. It is there that the *Strychnos Gubleri* is met with, which yields the curare of the Moquiritaras and Piaroas. It corresponds with the district visted by Humboldt in 1800.

(3) The region of British Guiana or of the *Strychnos toxifera*, Schomb., associated with the *Strychnos Schomburgkii*, Kl., and *Strychnos cogens*, Benth., from whence comes the curare of the Macusis, Orecunas and Wapisianas.

(4) The region of Upper French Guiana (Upper Parou) or of the *Strychnos Crevauxii*, whence comes the curare of the Trios and Roucouyennes.

We shall study successively the principal elements which enter into the various kinds of curare.

(*To be continued.*)

THE SPONGE TRADE IN THE BAHAMAS AND THE PROPAGATION OF SPONGES.

In a report to the Secretary of State for the Colonies from the Governor of the Bahamas it is stated that "various causes combined to make the past year a most favourable one to those engaged in this branch of business.

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[*] G. Planchon, *Comptes Rendus*, January 19, 1880.

[†] Jobert, *Comptes Rendus*, Jan. 14, 1878.

[*] Planchon, *Comptes Rendus*, Dec. 23, 1878, and Jan. 19, 1880.

A larger number of buyers than usual appeared in the market, and there was no period when it could be said that prices had a downward tendency. The very high prices offered at the beginning of the year were fully sustained to its end. This strong competition served to stimulate those actually employed in the fisheries to greater exertion, and induced a great many others to enter the business. Absence of heavy gales, and the mild weather that generally prevailed, contributed in a great measure to favour the efforts of the fishermen to meet this increased demand. The successful results of last year's fishery are also somewhat owing to the rest the sponge beds had whilst the privilege of fishing on the coast of Cuba was accorded to the Bahamian spongers. Licences to fish on this coast were again issued in 1879 to several vessels, but shortly after their arrival at the sponging grounds they were boarded by Spanish gunboats and ordered to leave; some of them returned to port with insufficient sponge to pay the cost of their outfits."

Governor Robinson then refers to the statements that have been made by German naturalists as to the possibility of the artificial propagation of sponges, and asks that definite information should be obtained upon the subject and supplied to him. In compliance with this request the Secretary of State appears to have consulted Dr. E. Ray Lankester, who has supplied the following report, which is printed in the blue book:—

"In accordance with your request that I should report to Her Majesty's Secretary of State for the Colonies upon the subject of the artificial cultivation of sponges for commercial purposes, I have made inquires (as I expressed my intention of doing in my reply to your letter dated April 26, 1880) relative to the experiments inaugurated by the Austrian Government.

"I have received communications on the subject from Professor Oscar Schmidt (now of Strassburg), who initiated the experiments in the Adriatic, and also from Professor Eilhardt Schulze (of Gratz), at present Director of the Zoological Observatory erected by the Austrian Imperial Government at Trieste. I have also carefully studied a report by Dr. Emil von Marenzeller, published in the *Verhandlungen der k. k. zoologisch-botanischen Gesellschaft in Wien*, vol. xxviii., 1879, p. 687, which is based upon official documents prepared by the Austrian Minister of Agriculture, and upon special information supplied by Professor Oscar Schmidt.

"The experiments in the Adriatic were carrried out under the auspices of the Government during the years 1863—72, and were finally abandoned in November 1872 on account of the difficulties which were encountered.

"It appears that the method of cutting a sponge into small pieces, affixing these pieces to movable supports, and sinking the supports in the water where the sponges naturally occur, was found to be perfectly successful. The "cuttings" of sponge attached themselves to the support and proceeded to grow each into a well shaped sponge like that from which the cutting was taken. Details are given in Dr. Von Marenzeller's report as to the best mode of taking the cuttings, and as to the best material for supports, also as to the time of year in which to operate, and other important conditions.

"It appears that from a small cutting (26 cubic millimetres in bulk) a sponge of marketable size would be produced in about seven years' growth.

"Whilst the experiments of the Austrian Government demonstrated the soundness of Professor Oscar Schmidt's suggestion, in consequence of which the cultivation was attempted, yet two difficulties sufficed to put a stop to the undertaking.

"Firstly, the native population, more especially the fishermen, had a great objection to these experiments, fearing that they might lead to the injury of the sponge trade, and consequently they persistently disturbed and robbed the experimental sponge bed. It was necessary that the sponge cuttings on their supports should be placed in an open unprotected bay in order to secure the requisite condition of the sea water and natural food of the sponge, and at the same time the expense of protecting the bay during a long series of years against the depredations of the fishermen would have been very great and incommensurate with the profit to be obtained by the sale of the sponges when full grown. The hostility of the population of the Adriatic coast was then the chief cause of the abandonment of the experiments. But, further, the slow growth of the sponges (first established as a fact by these experiments), and the expense of obtaining the cuttings, and of making and sinking the supports, seemed to show with considerable clearness that the profit to be obtained by such a system of cultivation would be extremely small.

"It appears that the actual weight of sponge produced in a given time is not increased by the plan of dividing a live sponge into many separate pieces; the undivided sponge would have increased by the same amount as that by which the whole series of separate pieces have increased *in the same time*, and inasmuch as a *large* sponge is more valuable commercially than an equal weight of *small* sponges, the utility of the operation of taking cuttings is very doubtful. It could only be of service for the purpose of diffusing sponges over a wider area of the sea bottom than that over which they would *naturally* spread; if such a diffusion could be effected, the sponge might be introduced to new and *unoccupied* ground, and thus obtain increased facilities for nutrition, and a better chance of falling upon one of those favourable situations which cause the sponge to grow a good size; but the situations suitable to the healthy growth of sponges appear to be (so far as our knowledge goes) *already* fully tenanted by sponges which multiply and diffuse themselves naturally by means of eggs which give rise to minute swimming germs, these germs after a time fixing themselves, and developing by slow growth into sponges like those which produced the eggs.

"It *may* be possible by means of the system of sponge cutting, proposed by Professor Oscar Schmidt, to introduce sponges into new situations previously unoccupied; and experiments in this direction, though requiring great skill and knowledge of the conditions favourable to sponge growth, would be worth trying.

"Excepting with this object the method of sponge cutting does not seem to be one of any promise.

"In relation merely to the management of an existing sponge fishery, I am of opinion that all that can be done by official control is to prevent the contamination or unnatural disturbance of the waters and bottom where the sponges grow; and, secondly, *to strictly enforce a limitation of size* in regard to those sponges which are fished and sold. Only large sponge should be moved from the sea bottom for the market, and all smaller and incompletely grown specimens should be returned to the waters by the fishermen *immediately* when taken. Further, the ground on which the sponges grow should not be too often dredged, but only at certain intervals in the year. In making these recommendations I am supported by the opinion of Professor Schulze, who has during the last six years devoted himself to the study of the life history of the Adriatic sponges, and has added many most important facts to our knowledge of these animals.

"Whilst these are the counsels which our present knowledge of the subject justifies, it must be distinctly understood that further experiment in the matter is to be desired, and might be crowned with a practical success. It *may* be possible to construct artificial basins (of large size, some hundreds of yards in area,) in which the water shall be of proper depth, temperature, and purity for the growth of the commercial sponge, and such basins might be stocked with sponges, by the use of the 'method of cuttings.' No experiments with artificial basins have as yet been carried out."

GROUND-NUTS.*

In the natural order Leguminosæ, which contains such a large number of species, and plants of such varied characters, two genera are remarkable for having individuals with a peculiar habit, namely, that of ripening their seeds underground.

The first of these plants, commonly known as the ground-nut (*Arachis hypogæa*), is a trailing, straggling annual, growing about 2 feet high, with a thick angular, pale green, hairy stem, and spreading branches. It bears yellow papilionaceous flowers, the calyx of which has a very long and slender tube, expanding at the top into two deeply cut lips. In general appearance this calyx tube has a strong resemblance to a flower-stalk, and being of a green colour it is the more easily mistaken; it was, indeed, for a long time so mistaken. The yellow petals are inserted in the throat of the calyx. The stamens are ten in number, frequently, however, one is abortive. The filaments are united into a tube for nearly their entire length, the anthers alternately rounded and oval. The ovary at first is very small, and is seated at the bottom of the calyx-tube. The style is very long and slender, projecting a short distance beyond the staminal tube. After the flower has withered or fallen off the ovary remains very small for some time, at the end of the long stalk, which, as it grows, curves downwards, pushing the ovary into the ground, and when sufficiently deep it begins to enlarge, perfecting itself in this position beneath the surface of the soil. So necessary is this burying process that, if anything occurs to prevent it neither the ovary is increased nor are the seeds formed. When fully grown the fruits are about 1 inch or 1½ inch long, of a dusky-yellowish colour, and with a netted or reticulated surface; each pod contains usually two brownish-red seeds, sometimes, however, three are found, but very rarely.

So largely is this plant cultivated at the present time in most tropical countries for the sake of the oil contained in the seeds, that it is difficult to fix upon its native country. It is, however, considered by some authors to have probably originally come from Brazil, the other species of the genus being natives of that country. Though, as we have already said, the plant is largely cultivated in nearly all tropical regions, it is in western tropical Africa that it is most extensively grown.

It is described by Mr. Monteiro, in his 'Angola and the River Congo,' as perhaps the most important plant in native tropical African agriculture. Many thousand tons are grown on the west coast, large quantities being sent to Europe, principally to France. The author of the interesting work above referred to considers that the Arachis is destined to become one of the most important oil seeds of the future. The plant, which is known as the Mpinda or Ginguba, is cultivated in the greatest abundance a few miles inland from the coast, where the soil and climate are both better than in the arid country near the sea. Requiring as it does a rich soil for its profitable cultivation, it is consequently chiefly grown in the bottoms of the valleys or in marshes, or in the vicinity of rivers. The cultivation is very simple. After the ground is cleared the weeds and grass are left to dry, and are then burnt off, after which the ground is dug only to the depth of a few inches by women with little hoes, which, indeed, are the only agricultural implements used. The seeds are then dropped into the ground and covered up. These operations are carried on in October and November, and the first crop of seeds which are gathered for eating in a green state are ready about April. It is, however, not till July or August that they become thoroughly ripe and fit for harvesting for commercial purposes. Several thousand tons of these seeds are annually produced in this part of Africa, the bulk of which is grown in the Mbamba country, lying parallel with the coast, at a distance of from 30 to 80 miles inland. The population of this comparatively small district is said to be very large, as may be gathered from the fact that the large produce of ground-nuts are shelled by hand, and brought down to the coast on the heads of the natives.

It is found by the natives to be more profitable to sell the seeds than to express the oil themselves, therefore but little oil beyond that required for their own use is prepared by them. Formerly it was obtained in a very rude manner by first pounding the seeds into a uniform mass in a wooden mortar. A lump was then taken from the mortar, hot water poured upon it, and the whole squeezed in the hands, the oil and water running from it, which was afterwards separated. The oil is very largely used in Angola for culinary purposes. The seeds, simply reduced to a paste, by being ground on a stone, are used to thicken stews and similar dishes. Mr. Monteiro describes a large plantation of ground-nuts as a very beautiful sight—"a rich expanse of the most luxuriant foliage of the brightest green, every leaf studded with diamond-like drops glittering in the early sun." The ground-nut is an important part of the food of the natives, and more so in the country from Ambriz to the River Congo than south at Loanda and Benguella. It is seldom eaten raw, but roasted, and when young and green, and roasted in the husks, is really delicious eating. It is excessively oily when fully ripe, and the natives then generally eat it with bananas, and either the raw mandioca root, or some preparation of it, experience showing them the necessity of the admixture of a farinaceous substance with an excessively oily food.

From India also large quantities of Arachis or ground-nut oil are exported. In some of the Southern States of America the plant is now largely grown. Marseilles is the principal centre of the trade in this oil, but enormous quantities are brought to London as well as to the chief towns of Holland and Germany. So largely is the oil developed in the seeds that it is easily obtained by simple expression either with or without heat, that produced by the cold process being of course the most valuable. The oil is of a very light colour, with a bland taste, so much resembling olive oil that it is said to be largely used for adulterating that oil. For pharmaceutical purposes ground-nut oil is now almost exclusively used in India instead of olive oil, and in this country its chief use is in soap-making as well as in the preparation of cold cream and other toilet adjuncts. The residue of the seeds is made into cake for feeding cattle, and has been strongly recommended on account of the oil contained in it, its sweet taste, digestibility, and its richness in flesh-formers. As food for man the seeds are used in different parts of the world, either cooked or raw. In England they are frequently seen in small shops, being eaten chiefly by children, who call them monkey-nuts. In America a sweetmeat is prepared from them, by parching them and treating them with sugar: simply roasted, they are said to form a good substitute for coffee, and when finely beaten up into a pulp and formed into cakes are sold in America for use as chocolate. In Loanda the traffic in ground-nuts is very extensive, and a source of great wealth to the country. In Ambacca, one of the most populous districts of the interior, thousands of tons were, until recently, sold annually; at the present time this trade is said to have almost entirely ceased. In consequence of the decrease in the price of ground-nuts—from £20 to £14 per ton—there has been but little inducement for the natives to cultivate the plant except for their own consumption.

The second plant, of which we spoke at the commencement as having a similar habit to that of the Arachis, of ripening the seeds beneath the earth, is known as the Bambarra Ground-nut (*Voandzeia subterranea*). Like Arachis it belongs to the section Papilionaceæ. It is the only species of the genus, and is described as being a native of Africa, over which continent it is widely distributed by cultivation; it also occurs abundantly under the same conditions in Brazil and other parts of South America. Besides the name of Bambarra Groundnut, by which the plant is known in Africa, it is called by the natives in Natal Igiuhluba, and in Brazil Mandubi d'Angola. The plant is annual, creeping. The leaves are borne on long stalks, and are composed of three leaflets each, the central one itself being stalked. The flowers are yellow, papilionaceous, or similar in form to those of the last described plant. The calyx is bell-shaped, and the ovary, which bears two ovules, is surmounted by a short style and a hooked stigma. The flowers are both unisexual and perfect. After the period of flowering the flower-stalks bend over and push the young fruits into the ground, where, like the Arachis, they ripen their seeds. The pods, when fully grown, are about ¾ inch long, somewhat oval in shape, in colour resembling the pod of Arachis, and also marked with a network of ribs, but coarser and not so well defined as in the ground-nut. Each pod contains but one seed, which is shining black marked by a small white hilum. These seeds are eaten in countries where the plant grows, either in an unripe state and boiled like peas, or in their raw state when fully ripe.

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* Reprinted from the *Gardeners' Chronicle.*

POISONOUS PRINCIPLE OF GLORIOSA SUPERBA: A CHEMICO-PHYSIOLOGICAL RESEARCH.[*]

Preliminary Notice.

BY SURGEON C. J. H. WARDEN,

Professor of Chemistry, Calcutta Medical College.

Gloriosa superba is a climbing plant belonging to the natural order Liliaceæ, and is found in low jungles, and in the beds of ravines and edges of rivers throughout India.

Burman,[†] Roxburgh,[‡] and others describe the root as being violently poisonous, but give no details of a case in which its effects have been observed. Norman Chevers includes the root in his list of poisons procurable in Indian bazars; and in his 'Manual of Indian Medical Jurisprudence,' gives notes of the *post-mortem* appearances in two cases of poisoning by *Gloriosa superba.* A belief in its poisonous properties is also common amongst the natives of all parts of India.

In Hindu works on materia medica, the root of *Gloriosa superba* is classed as one of the seven minor poisons. The minor poisons being opium, seeds of *Abrus precatorius, Datura,* roots of *Nerium odoratum,* roots of *Gloriosa superba,* milky juice of *Calotropis gigantica,* and *Euphorbia neriifolia.*[§] The properties are thus described. "It is applied in blood diseases, swellings, wounds, abscesses and pains. It is acrid in taste, but is a mild poison, and brings on abortion when eaten."

Moodeen Sheriff states that the root is not poisonous in twelve grain doses, and ascribes to it alterative, tonic, and antiperiodic properties.[||] "In Travancore a remedy held in esteem in the treatment of gonorrhœa is a white farinaceous powder obtained from the root by bruising and repeated washings and maceration."[¶]

Moodeen Sheriff also states that the root is considered by native practitioners and druggists in Southern India to possess nearly the same properties as the root of *Aconitum ferox,* and hence its names, "Nát-ká-bachhnág," country aconite, and 'Adavi-nábhi,' wild aconite: and this probably accounts for the statement made by Dr. George Bidie to the Editor of the Indian Pharmacopœia, that he had found the roots of *Aconitum ferox* sold in Mysore largely adulterated with *Gloriosa superba.*

In the vernacular the plant has apparently several synonyms, "Kurreearee," "Cariari," "Bish languli," "Nâtka-bachhnâg," "Adavi-nábhi," "Hurreeana or Hurinah," and "Nungninlicah Nunguinleeah" or "Esha langula." The last name being derived from the resemblance which the root bears to a native plough.

The botanical characters of *Gloriosa superba* are as follows:—Calyx none; corolla six-petalled and reflex; germ superior, thin celled; cells many seeded; attachment central; style oblique; flowers yellow and crimson, mixed; flowers during the rains; capsule thin celled and three valved, varying in length from one to three inches; seeds several; embryo double and furnished with a perisperm; root tuberous, cylindrical, bent at a right angle near one end, knotty at the angle, and occasionally much pointed at both ends, varying in length from two to eight inches, generally about the size of a finger or thumb, but sometimes thicker. The knot bears a mark of the stem on the upper surface, and gives attachment to many thin rootlets by the lower. The roots are also found bulbous. The fresh roots are plump and juicy, and surrounded by a brownish epidermis, beneath which is a tegumentary layer of a waxy yellowish hue, in which spots of a deep yellow colour are frequently visible. If the root be dug up before flowering the epidermic covering is white, and is easily separable into layers, and gives marked indications of the presence of tannic acid. On section the root substance is of a white colour and consists of cells containing starch granules. The juice is strongly acid in reaction, and slightly bitter without being acrid. The old roots are shrivelled in appearance and rather sweet to taste; on section, the cells under the microscope are found to be apparently enlarged, with a diminution of the starch granules. The roots, when dried by exposure to air, break with a starchy fracture; but if dried in a hot water oven at 100°, the fracture is glassy. The stem is climbing and herbaceous; leaves, lanceolate and ending in a tendril.[*] Lindon and Mason's account of the flowers is perhaps worthy of quoting. "One of the most curious flowers in the Tenasserim country is the *Gloriosa superba*; '*Gloriosa*' on account of the glorious colours of its flowers, and the elegance of their form. The flowers are as large as a lily, and hang down; the petals, stamens, and style, all turn, and grow up like a flower turned inside out, and then to complete the oddity the leaves prolong their extremities into tendrils, and the plant walks on its toes."

The toxic effects of the drug on human beings have been recorded in nine instances. The notes of the two cases recorded by Dr. Norman Chevers, and to which reference has before been made, are to the following effect:—

Case I.—"Mr. R. D. Logg, Civil Surgeon of Pertabgurh, sent down portions of the fresh root, stalk, and leaves of a creeping plant, bearing a seed, and called by the natives 'Kuryaree,' together with the contents of the stomach of a woman who destroyed herself by swallowing a m—— (masha[†]-32 grains) of the same. The notes of the *post-mortem* examination are considered to show that the action of kurreearee is that of a narcotico-irritant poison."

Case II.—"Dr. Chandra, in civil medical charge of Deoghur (Santhal Pergunnahs), sent in from Mr. J. T. Blumhardt, Assistant Commissioner of Godda, the roots and seed-vessels of the *Gloriosa superba* (under the name 'Kareeam;' Bengali, 'Ognishikha'). About two tolahs weight of the root was administered with some salt and red lead to the deceased Deba Pahariah."

Dr. Robert Harvey, in a report in the medico-legal returns received from civil surgeons in Bengal from

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[*] From the *Indian Medical Gazette,* October, 1880.

[†] 'Flor. Indica,' p. 82.

[‡] 'Flor. Indica,' vol. ii. p. 143.

[§] *Calcutta Medical News,* No. 7.

[||] 'Supplement, Indian Pharm.'

[¶] 'Waring. Indian Pharm.'

[*] Modified from Roxburgh and Moodeen Sheriff.

[†] Or Massa, gold weight,

1870 to 1872, states, "the returns give six cases, all fatal; all suicidal; all but one in males, and all from Oudh."

In 1876 a partial analysis of the root was made with specimens collected in June, before flowering. The sample weighed about 10lbs., it is carefully freed from sand, etc. The tubers cut into thin slices were dried by exposure to air, and the desiccation completed in a water oven at 100° C.; and the residue reduced to fine powder.

While the slices of the root were drying in the open air, some of the sections assumed a yellow colour. And this colour in many instances could be produced by moistening a slice with an alkaline solution; the colour being again destroyed by an excess of acid. The tegumentary layer of the roots, in which yellow spots were observed, also developed a yellow hue on adding a solution of an alkali; while the yellow spots under similar treatment assumed a rich reddish yellow colour.

The fresh roots contained 81·06 per cent. of moisture, and yielded on ignition 4·583 per cent. of mineral matter,* of which 1·538 per cent was insoluble in water. The ash was strongly alkaline in reaction, effervesced with acids, and contained a considerable amount of potash.

On treating the dry powdered roots with cold water, a dark reddish solution was obtained, strongly acid to litmus paper, and slightly bitter to the taste. It readily reduced Fehling's copper solution. Caustic alkalies darkened the colour of the solution: ferric chloride indicated the presence of a trace of tannic acid.

The percentage of aqueous extractive matter was determined in two experiments, cold water being used, the mean being 23·986, calculated on the root dried at 100° C. The aqueous extractive matter yielded on ignition 2·995 per cent. of ash, also calculated on the dry root; showing a difference of ·05 per cent. when compared with the direct estimation of the soluble constituents of the ash.

On digesting the powdered root with alcohol of sp. gr. 8116, 13·015 per cent. of extractive matter was obtained. This extract was strongly acid in reaction, and had a balsamic pleasant smell.

In old roots collected late in the season, and some time after flowering, the amount of extractive matter is diminished—

	New.	Old.
Alcholic extractive . . .	13·01	6·05
Aqueous	23·98	19·41
Ash	4·58	4·47

But the amount of extractives may vary considerably beyond the limits assigned above. On evaporating a tincture of the root until it ceases to smell of alcohol, the resulting extract roughly separates into two portions. On allowing an alcoholic extract from which the whole of the spirit has not been expelled to stand for some time in a stoppered bottle, yellow nodules, about the size of pins' heads, are slowly deposited.

The alcoholic extract is entirely soluble in caustic alkaline solutions: the resulting solution being of a dark red colour. On neutralization, an abundant precipitate occurs. This precipitate consists of resinous matter, and can be separated into a dark and light coloured resin, which I propose calling respectively α superbine and β superbine resins. α superbine resin when purified forms a dark chocolate coloured powder, with acid properties, and solid at ordinary temperatures. β resin is of a yellow colour and of the consistence of butter; on standing for some time it becomes indistinctly crystalline.

The alcoholic extractive matter is best separated into fractions for experimental purposes by adopting the following plan. A concentrated tincture is slowly poured into a large bulk of water acidulated with acetic acid, with constant agitation. The precipitate which occurs, should be filtered off and washed with cold water. It consists of the two resins to which reference has before been made. The filtrate is exactly neutralized with carbonate of soda, which causes a turbidity, from the precipitation of a small quantity of resin dissolved by the acid: after filtration, the solution is very faintly acidulated with a few drops of dilute sulphuric acid, and a solution of tannic acid added, this causes a bulky curdy precipitate. The precipitate should be collected, washed with cold water, and while still moist mixed with an equal bulk of lime and a small amount of water and the mixture evaporated to dryness. The dried mass is then reduced to fine powder and treated with boiling alcohol. On allowing the alcoholic solution to evaporate a bitter residue is left. This residue contains a bitter principle, contaminated with resinous matter. Its toxic effects, however, are very marked, ·047 gm. injected into the stomach being sufficient to kill a full grown cat. This bitter extract probably contains the active principle which I have provisionally termed superbine.

The separation of the two resins may be effected by one of the following methods. By the action of benzole, in which β resin is soluble and α comparatively insoluble, the trace of dark resin dissolved may be removed by evaporating the solution until it ceases to smell of benzole, and then placing the soft residue in a stoppered bottle with ether; a solution of carbonate of soda is next added and the bottle well shaken. The ether dissolves the yellow resin and leaves the dark resin apparently in combination with the sodic carbonate. The ether holding the yellow resin in solution is evaporated to dryness, and the residue washed with acidulated water. The α resin is then in a sufficiently pure condition for ultimate analysis.

The dark resin left after the action of benzole on the mixed resins is dissolved in a solution of caustic potash and precipitated by a dilute acid. The treatment must be adopted two or three times before the resin is obtained sufficiently pure for analysis.

Caustic lime may also be employed for the preparation of the resins, and this may be done by either of the following plans. The powdered root may be mixed with lime, and then digested with alcohol; the resulting tincture contains only the yellow resin in solution. Or the mixed resins may be dissolved in alcohol, and mixed with an equal bulk of cream of lime; after evaporation to dryness the residue is boiled with alcohol, which dissolves the yellow resin only, the dark resin forming apparently a compound with lime, from which it may be moved by the addition of dilute hydrochloric acid, which forms a soluble salt with lime, and leaves the resin as a brown powder.

The organic acid in the root is obtained in the usual way, and when purified presents the characters of tartaric acid.

By working in the manner sketched out above, the alcoholic extract was divided into four fractions—

1. α resin.
2. β resin.
3. Bitter principle—superbine.
4. Filtrate from tannic acid precipitate.

The two resins have been obtained in a pure state, and ultimate analyses have been made: but extreme difficulty has been experienced in purifying the bitter principle. The chemical properties and physiological action of these various fractions will form the subject of a second communication.

In conclusion, I would remark, that bearing in mind that *Gloriosa superba* belongs to the same natural order as squills, and comparing the physiological action of the two drugs, it may be assumed that the active principle of *Gloriosa superba* is closely allied to, if not identical with, that of the *Scilla maritima*.

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* Calculated on the root dried at 100° C.

The Pharmaceutical Journal.

SATURDAY, DECEMBER 18, 1880.

PHARMACY ACT AMENDMENT.

The amendment of pharmaceutical legislation, which now engages the attention of the body representing the drug trade of this country, is an undertaking which will probably furnish opportunity for recognizing the very wide differences of opinion that exist concerning the present desiderata of this business and the means by which its future may be improved. The letters that have appeared during the past few months upon the future of pharmacy and upon some of the difficulties with which those engaged in the business now have to contend have in some degree foreshadowed the absence of unanimity which we fear is to be anticipated. On the one hand there are those who look upon the Pharmacy Act as a measure designed for the protection of the trade interests of a class; who would endeavour to restrict the sale of all kinds of drugs and medicinal preparations to that particular class, and in many cases would hope by such means alone to improve the present position of the legally qualified dealer in drugs, as well as to open up for him a better future. On the other hand, there are some who look upon legislative restriction of trade with so much aversion that they would rather seek the entire repeal of the Pharmacy Act than its amendment in any particular.

Between these two extremes are to be found all shades of opinion, the most rational, perhaps, being that which regards the provisions of the Pharmacy Act that operate to the advantage of the pharmacist as being only incidentally protective of the class to which he belongs, and in the main directed to secure an object of more paramount importance in the eye of the Legislature, viz., the benefit of the public.

One of the points referred to in the letter of a correspondent this week will serve to illustrate the discordance of opinion that prevails as to what really are the interests which members of the trade should seek to defend. Widows, as our readers are aware, have been a source of trouble in pharmaceutical affairs, as they sometimes are in other relations, and the fact that the question as to the extent to which their claims to constitute an exception to the first section of the Pharmacy Act should be allowed has given rise to more animated controversy than any other part of the Act may be taken as warranting in no small degree the advice of Mr. Weller, senior, to beware of widows. Our correspondent, Mr. Tucker, in referring to this matter, naturally declares in a general way his sympathy with the unfortunate position of a widow, pharmaceutical or otherwise, but in reference to the suggestion that the widow of a registered chemist and druggist should be still more definitely made an exception to the provision of the first clause of the Pharmacy Act, he adds his opinion that this suggestion cannot be followed with any show of reason by those who demand that no other kind of unregistered person shall be permitted to carry on the business.

As a mere matter of logic it appears undeniable that if the benefit and safety of the public, which constitute the real object of the Pharmacy Act, be in the case of a chemist and druggist's widow sufficiently guarded by her employing a qualified assistant to conduct her business, it would be impossible to contend that it was not equally guarded in the case of any other person whose business was conducted by a qualified assistant. There is great force, therefore, in the prediction of our correspondent that if these two opposite views were to be embodied in the proposed Bill for amendment of the Pharmacy Act they would prove a serious obstacle to its acceptance by the Legislature.

Another subject upon which great diversity of opinion prevails amongst members of the trade is patent medicines. With some these preparations rank as perfectly legitimate items of pharmaceutical business, and this is probably the more general view concerning them. Long continued usage is to some degree a reason for it, but that ought not to prevent some consideration of the fact that the use of patent medicines necessarily implies the loss of pharmaceutical business, as well as of the exercise of medical skill by the medical practitioner. According to a recent statement the amount of revenue accruing to the State from stamps on patent medicines and licences to sell them approximates to two hundred thousand pounds a year, and the sum paid for these articles must be very considerably greater. It cannot be inferred that this is an exact measure of the normal medical and pharmaceutical functions superseded by the use of patent medicines, but it serves at least to show that patent medicines are, as some members of the trade consider, antagonistic to the interests of pharmacy as well as of medicine.

In considering this matter, moreover, we must not, at the present time, overlook the circumstance that the sale of patent medicines is now conducted in such a way as to put the pharmacist altogether on one side, the trade competition of stores, grocers and other traders being such as he cannot take part in. There is, we think, little prospect of altering this state of things so as to retain the trade in the hands of chemists and druggists, nor do we think that they have really much reason to complain that this portion of their business is passing away from them, since it must be remembered that originally it was carried on largely, if not chiefly, by booksellers and others who did not lay claim to those qualifications by which the pharmacist must seek to attain preferential consideration from the public.

These are but a few of the points on which discrepancy of opinions may be expected to induce dissimilar appreciation of the merits of an Amended Pharmacy Bill. The task of drafting a Bill will therefore be one of considerable difficulty, and, as may be judged from the time it has already occupied in the preliminary stage, one not to be proceeded with so precipitately as some may imagine to be possible.

CASSIA LIGNEA.

Her Majesty's Consul at Canton, reporting on the trade at that port during the year 1879, states that there has been a remarkable increase, amounting to more than 28,000 cwts., in the quantity of cassia lignea exported. The cassia is of three kinds, deriving their distinctive names from the districts in which they are produced, of which Loting and Luehpo are in the province of Kwangtung and Taiwoo is in Kwangsi. It is said to be largely used by tanners and carpenters, but it is in special request for the preparation of perfumery and medicine. The export is chiefly to America and this country; small shipments are also made to India and the continent of Europe. The cost at the places of production is estimated at 6 taels (about 35*s.*) per picul (133⅓ lbs), but before it can be shipped it has to pay accumulated taxes amounting to 50 per cent. of its original price, or 42½ per cent. in excess of the dues and duties authorized by the tariff.

STRANGE POISONING MISADVENTURE.

A recent number of the *Presse Médicale Belge* reports the death at Tournai of four persons immediately after taking some sulphate of magnesia that had been purchased from a pharmacien. This led to an examination of the stock, when eight out of forty packets of sulphate of magnesia were found to be contaminated with considerable quantities of strychnia. Strychnia was also found adhering to the sides of the bottle from whence the sulphate had been taken. No explanation is forthcoming as to the source of the poison.

THE ROYAL INSTITUTION.

The arrangements for the Friday Evening Meetings at the Royal Institution include discourses on the following subjects:—January 21, "The Phenomena of the Electric Discharge with 14,400 Chloride of Silver Cells," by Dr. Warren De La Rue; January 28, "The Origin of Colonial Organisms," by Dr. Andrew Wilson; February 4, "The Teachings of Modern Spectroscopy," by Dr. A. Schuster; February 11, "The Distances of the Stars" by Dr. R. S. Ball; February 18, "Fruits and Seeds," by Sir J. Lubbock; February 25, "Excitability in Plants and Animals," by Dr. J. S. Burdon-Sanderson; March 4, "Elasticity viewed as Possibly a Mode of Motion," by Sir W. Thomson; March 18, "Musical Pitch and its Determination," by Dr. W. H. Stone; and March 25, "The Weather and Health of London," by Mr. Alexander Buchan. Another evening will be occupied by Professor Tyndall, but the subject is not yet announced.

Transactions of the Pharmaceutical Society.

SPECIAL MEETING OF THE COUNCIL.

Tuesday, December 14, 1880.

MR. THOMAS GREENISH, PRESIDENT,

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present—Messrs. Andrews, Bottle, Butt, Churchill, Frazer, Gostling, Hampson, Hills, Radley, Robbins, Sandford, Savage, Squire, Symes, Williams and Woolley.

The Solicitor submitted the draft Pharmacy Bill, as revised by him, in accordance with instructions he had received from the Council at its last meeting.

The Council went through the preamble and the clauses of the Draft Bill *seriatim*, and made certain alterations. Additional clauses were also discussed, and the Draft Bill was again referred to the Solicitor to make the alterations determined on.

It was resolved:—

> "That the Pharmacy Bill as now agreed to be submitted to counsel to determine the exact wording of the Bill, which is again to be considered by this Council.

EXAMINATIONS IN LONDON.

December 8, 1880.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, Linford, Martindale, Plowman, Southall and Taylor.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Seven candidates were examined. *Five* failed. The following *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Knight, Thomas ....Nottingham.
Morgan, William ....St. Clears.

MINOR EXAMINATION.

Nineteen candidates were examined. *Twelve* failed. The following *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Baker, Charles Frederick ......Hitchin.
Barber, Edward Anderson ......York.
Bevis, Walter ....Newport, I. W.
Bilson, Frederick Eastall.........Newark.
Broad, Henry James ....Stourbridge.
Cracknell, Herbert .... London.
Dawson, William Hewson ......Horncastle.

MODIFIED EXAMINATION.

The undermentioned was examined, and was declared qualified to be registered as a Chemist and Druggist:—

Adams, Joseph Henry............London.

December 9, 1880.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, Linford, Martindale, Plowman, Southall and Taylor.

Dr. Greenhow was present on behalf of the Privy Council.

MINOR EXAMINATION.

Twenty-eight candidates were examined. *Sixteen* failed. The following *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Edwards, James John ....Coventry.
Evans, Thomas ....Llandyssul.
Fielder, Arthur Buckley ....Winchester.
Fry, Edwin Sargood...............Buckhurst Hill.

Garland, Thomas William	Acock's Green.
George, Alfred Walter	Great Yarmouth.
Goldby, Frank	Abingdon.
Haines, William Edward	Hereford.
Hartley, Thomas	Haslingden.
Hill, Richard Mainprise	Scarborough.
Hornby, Alfred	London.
James, Joseph	Plymouth.

PRELIMINARY EXAMINATION.

The undermentioned certificate was received in lieu of the Society's Examination:—

Certificate of the University of Cambridge.

Haynes, Joseph Henry	London.

December 15, 1880.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

MAJOR EXAMINATION.

Seven candidates were examined. *Three* failed. The following *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Knight, William Tomkinson	Nottingham.
Slater, William Martin	Ipswich.
Wood, Robert	Loughborough.
Wright, Alfred	Stowmarket.

MINOR EXAMINATION.

Twenty-two candidates were examined. *Nine* failed. The following *thirteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Johns, John	Llandilo.
Kemp, Herbert William	Horncastle.
Lawrence, George Richard	Boston.
Leithead, Robert	Sunderland.
Lester, Samuel	Cheltenham.
Llewellyn, Lewis Herbert	Shrewsbury.
Maitland, John	Aberdeen.
Matthews, Herbert Rouse	London.
Maxey, William Henry	Boston.
Nettle, William Robert Pett	Plymouth.
Patterson, Thomas	Preston.
Power, William	Greenwich.
Willet, John Algernon	London.

December 16, 1880.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

Twenty-seven candidates were examined. *Sixteen* failed. The following *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Richardson, George	Lancaster.
Roberts, George	Dalston.
Robinson, Herbert Edwin Joseph	London.
Rogers, Stephen	Manningtree.
Suart, George	Lancaster.
Surfleet, Walter	Louth.
Thompson, Arthur	Buxton.
Walgate, Septimus	Hull.
Whigham, Robert Laing	Cardigan.
Wynter, Ernest Charles	Seaford.
Yeates, Alfred	Kington.

PRELIMINAR EXAMINATION.

The undermentioned certificates were received in lieu of the Society's Examination:—

Certificates of the University of Cambridge.

Kent, John Collison	Wakefield.
Smith, Frederick	Shorncliffe.

Certificates of the College of Preceptors.

Haines, George Richard	London.
Rowsell, Philip Foale	Teignmouth.
Sellers, Arthur Edward	Huddersfield.
Williams, John Thomas	Dowlais.

Certificates of the Royal College of Surgeons of England.

Cox, Frank	London.
Lang, Alfred Graham	Greenwich.

Certificates of the University of Oxford.

Hurst, Samuel John	Boston.
Munkman, Robert Allen	Boston.

NORTH BRITISH BRANCH.

The second meeting of the twenty-seventh session was held in the Society's Rooms, 119A, George Street, Edinburgh, on Tuesday, December 7. Mr. J. B. Stephenson, President of the Branch, in the chair.

The minutes of the former meeting were read and confirmed.

The Honorary Secretary announced the following donations:—

To the Museum:—A Series of Dissections illustrating 26 of the more important Natural Orders. A Series of Diagrams illustrative of Flower Arrangement, from R. Stenhouse, Chemist, Edinburgh.

To the Library:—The *Canadian Pharmaceutical Journal*, for November, from the Ontario College of Pharmacy.

The 'Chemists and Druggists' Diary' for 1881, from the Publishers.

The following papers were afterwards read:—

THE NECESSITY FOR THE BETTER TRAINING AND EDUCATION OF MEDICAL OFFICERS OF HEALTH.

BY H. AUBREY HUSBAND, M.B., F.R.C.S.E.,

Lecturer on Medical Jurisprudence and Public Health, Medical School, Edinburgh.

Mr. President and Gentlemen,—I felt not a little difficulty, when honoured by a request from your Secretary to read a paper before you, as to the selection of a subject. Leaving the discussion of special subjects more or less intimately connected with your profession to those who have devoted their time and energy to their consideration, I came to the conclusion that I might not altogether unprofitably take up your time if I brought before you some subject, the importance of which is now generally admitted and which, as citizens, must be of interest to you. I have, therefore, selected for your consideration the important question as to the necessity for some special training in the education of Medical Officers of Health. All of you are doubtless aware that these important officers have been called into existence by recent Sanitary or Public Health Acts, notably by the Public Health Act of 1875, which only, however, applies to England, as previous attempts to amalgamate English and Scotch sanitary laws proved a failure owing to the difference between Scotch and English legal procedures. Hence special Sanitary Acts have been passed for each of the three divisions of the kingdom. These Acts, although creating a distinct body of medical practitioners with new and important functions to perform, yet have nowhere defined their duties, nor has provision been made for the proper education of this class of practitioners. True, the Acts require that the candidate for the post of a medical officer of health should possess a double qualification, in medicine and in surgery, but owing to the peculiarities of our law, which enables nineteen competing corporations to grant qualifications enabling the holder to practise in this country and the colonies, the diplomas so granted may mean anything or nothing. Besides, with, I think, but four exceptions, no special knowledge demanded of the medical officer of health forms a part of any of the examinations held by the above-mentioned competing bodies. In the cases to which I refer, the knowledge required is of a very elementary character, and is no more than any ordinary medical man ought to possess. But if the demand for special knowledge in matters of hygiene and public health be conspicuous in its absence from the examinations of our licensing boards, the means of acquiring such knowledge are still more marked by an almost total neglect. In London, lectures on some of the subjects included under hygiene are delivered at most of the medical schools, but as attendance on them is purely optional they are but indifferently patronized by students. Still, the instruction offered in the domain included under the term preventive medicine is not of that systematic character which is so marked when we consider the advantages held out to the student of curative medicine. An explanation, and perhaps an excuse, for this defect may be found in the fact that the field of curative medicine holds out at present far greater attractions and incentives for its cultivation than does that of preventive medicine. The latter also is to a great extent the product of civilization and of the tendency to congregate large bodies of human beings in towns. Man in his primitive state, disseminated over large tracts of country, alone needed the attention of the physician to his individual wants, and it was only when he began to join himself with his fellow man, either for the purpose of protection, conquest or the accumulation of wealth that he created the very evils which now call for the services of the sanitarian and preventive physician. Hence curative medicine is the elder sister of preventive medicine, which, though the younger in time of birth, I believe is destined sooner or later to supersede her sister. For have we not the old adage that "prevention is better than cure?" Another reason for this neglect of the study of preventive medicine may also be found in the fact that the student's time is already fully taken up in acquiring a grasp of the fundamental principles of curative medicine, and I may here remark that although rapid progress has been made in medical art and in the collateral sciences which all lend their aid in the elucidation of difficult questions connected with practical medicine, yet the period of study remains about the same as in the days when all the knowledge required by the English College of Surgeons was contained in ninety-two pages of a book, 2 inches by 3. Of the remedy for this I will speak presently.*

Again, the pecuniary advantages held out to the student are not such as to tempt him from the more lucrative walks of general practice. The pernicious rule by which small districts are required to elect medical officers of health at salaries too small to tempt competent men must sooner or later be abolished, and larger districts formed capable of paying a fair remuneration to properly qualified medical practitioners for their individual attention to the important duties of their office. Leaving this and other important questions more or less connected with it, allow me to return to the discussion of the subject with which I commenced this paper,—the absence of special training for medical officers of health. Since the passing of the Acts before mentioned the University of Dublin first and then those of Cambridge and Edinburgh, and, I believe, London proposed to grant degrees in state medicine or public health. The College of Physicians of Edinburgh has also instituted a licence in Public Health. Some years ago, but immediately after the University of Dublin issued its rules for its degree in state medicines, I wrote to Professor Maclagan suggesting that some agitation in favour of the institution of a like degree in my Alma Mater might be of use. I never received a reply to that letter, perhaps it did not need one, but in the next issue of the 'University Calendar' I found the regulations for the present degree in Public Health laid down. Now, although these Universities and the College of Physicians grant degrees and certificates in sanitary science, no well defined course of study is laid down and candidates are left to pick up the special information required from books or in any other way that chance may determine. The University of Dublin, for instance, requires a competent knowledge in law, engineering, pathology, vital and sanitary statistics, chemistry, meteorology and medical jurisprudence. By law is meant sanitary law, a knowledge, in fact, of the Acts of Parliament passed in the interest of the public health, and when I tell you that of these there have been passed between fifty and sixty, if not more, the knowledge required is somewhat extended. Besides by a happy, though not altogether wise or lucid method of procedure, Acts of Parliament are continually being passed amending, correcting or amplifying former Acts, so that to get any knowledge of the law several Acts have to be read together, parts of sections being even altered by subsequent enactments. From this you will see that instruction in sanitary law is needed, yet nowhere, as far as I know, has any attempt been made to assist the student. The same may be said of the other branches of knowledge required, even the book on meteorology recommended is out of print and old copies are obtained with difficulty. In the University the only instruction to be obtained by the student is contained in a course of lectures delivered by the Professor of Medical Jurisprudence as part of his three months' course on the latter subject, extending over, I believe, about a fortnight of the session, time scarcely sufficient to mention even briefly the titles of the Sanitary Acts. Thus we have the anomaly of a University granting a degree, demanding a knowledge of certain special branches of medical education, yet making no provision or offering any facility for the acquirement of the required information. To make up for this deficiency I prepared a course of lectures embracing the subjects demanded by the examining bodies and proposed to deliver them during the winter session, but, owing to the fact that these bodies, as they make no effort to supply the want, do not require attendances on lectures devoted to sanitary medicine, and to other causes, chiefly among which may be mentioned the non-requirement of special sanitary knowledge for public health appointments, I have not met with the success that I had anticipated. To remedy the evils to which I have directed attention I would suggest that all medical officers should be required to undergo a course of instruction in sanitary matters and that their fitness for the post of medical officers of health should be carefully tested by a thorough theoretical and practical examination, conducted by the Government or other competent authority. Admitting, as I have before done, that the time of the student is now fully occupied, I would require that the courses of sanitary instruction be taken out after the candidate has obtained his diplomas to practise medicine and surgery. But nothing can be done till the Government is prevailed upon to demand a special education and training for our medical officers of health; hence it becomes the duty of every true sanitarian to use his utmost efforts to bring about this desirable object.

I would also draw attention to the want of a museum of sanitary appliances which would enable the student to become familiar with the means used for the removal of sewage, the disinfection and ventilation of buildings, etc., etc. I have suggested the foundation of such a museum, on the lines of the Parke's Museum in London and I can find no name under whose ægis such a collection could be made than that of the late George Combe. To me Combe appears to be the greatest pioneer in sanitary science this country has produced and his unwearying devotion in the promulgation of the necessary laws of health could not be more fittingly rewarded than by the foundation of an institution such as I propose. I do not expect that my suggestion will meet, at present at least, with any tangible support; questions affecting the general weal do not meet with that ready acceptance or encouragement which characterize those that touch the interest of the individual. The necessity for precautions against the spread of epidemics only strikes the individual when he sees the wave of disease approaching him and likely to affect his individuality. He puts off till to-morrow what ought to have been done to-day and when the morrow comes, dark and dreary, mourns over the lost hours. I fear, gentlemen, that I have taken up your time to little purpose and that much that I have said has little if anything to do with your special calling in life, I must therefore reiterate the excuse I made at the beginning, when I elected to talk on the question of the special training of medical men in sanitary matters,—that we are all citizens in one great republic.

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* Winslow's 'Pocket Guide to the College of Surgeons,' 1837.

The next paper read was on—

ACETIC AND ALLIED ACIDS.

BY DANIEL GORRIE,

Pharmaceutical Chemist.

The subject I have chosen is an interesting one, and I hope your kind indulgence will not be too resolutely attacked when I inform you that this short paper is not altogether the result of practical experiment, but a few fragmentary observations, which I hope may be not altogether without some interest to those present. Acetic acid and its chemistry are intimately wound up in a certain group of bodies, sugars, starch, dextrine, alcohol and aldehyde, to treat on all of which substances separately would occupy too much of your time. By means of a certain organism we find alcohol produced; another kind of organism propagates and we discover acetic acid has been produced; the lactic ferment gives us lactic acid; another one generates butyric acid: all of which organic growths are eminently characteristic. The alcohol plant, *Torula cerevisiæ*, under favourable circumstances, very soon asserts its claim to membership in the vegetable kingdom—assuredly a plant in miniature. The torula, when once propagated, grows, fructifies and enumerates with amazing rapidity; it, however, cannot feed on starch. By the process of germination that body is converted into the more soluble but less stable grape sugar, which by the action of the *Torula cerevisiæ* or yeast plant is split up into alcohol and carbonic acid. The above is a familiar instance of the result of an organism. At this stage, however, the whole of the alcohol may be converted into vinegar by the introduction of the germ (*Mycoderma aceti*) which produces it, showing most conclusively that the old theory of fermentation is a mere myth, and that it is not a mere question of absorbing oxygen from the atmosphere, but a product due to the exclusive agency of a little plant when placed in conditions favourable to its growth.

That we could not possibly have alcohol without the budding and sprouting torula, nor yet acetic acid without the agency of the microscopic fungus, *Mycoderma aceti*, requires but one moment's reflection to be repudiated; perhaps I might be allowed to illustrate to what I refer in order to convey to the mind some light on the matter.

If we subject wood to dry distillation we have in the distillate among a variety of empyreumatic products, acetic acid, and it is scarcely necessary for me to mention that we have in this case the veritable production of acetic acid without the remotest aid of the mycoderma or vinegar plant. Unfortunately for our supply of alcoholic liquids, at least in the present position of science, we depend practically on the work which its peculiar fungus does, as I am afraid I shall require to resort to the process of synthesis for the production of ethylic alcohol, at least I am not aware of any analogous process for its production. Ordinary olefiant gas and sulphuric acid have a great affinity for each other. The resulting compound is ethyl sulphuric acid, $C_2H_6SO_4$, in which half the hydrogen is replaced by ethyl, C_2H_5; if water is added to this body ethyl alcohol is obtained on distilling, and that in this instance there is no connection with the torula I need scarcely mention.

In the process of synthesis we are reminded there are more difficulties to encounter than in analysis. We can reduce alcohol to aldehyde by means of an oxidizing agent, which is not a very stable body, being easily reduced to acetic acid. This is a case of simple reduction, the carbon atoms remaining the same in one molecule of each of the three bodies. The portions of the molecule where the disturbance takes place are the hydrogen and oxygen atoms. One atom of oxygen is absorbed from the air, which splits up the hydrated ethyl into aldehyde and water; in other words, hydrogen is displaced by oxygen. The exactly same thing is performed a second time, which gives the acetic acid. It is interesting to note at this point that in the production of the above bodies the ethyl radical is quite broken up, but in the production of ether from alcohol it is not broken up at all, but is simply converted from the hydrate of ethyl to the oxide. To show the consummate ability with which man handles the products of nature, I may state that he not only can convert alcohol into acetic acid, but he can pervert acetic acid into alcohol. Linneman has obtained ethyl alcohol by acting on acetic anhydride with sodium amalgam.

I intended dilating on several acids whose origin is due to an alcohol, but none of the others are of sufficient pharmaceutical importance to merit their discussion, with the exception of lactic acid, which, however, differs from the others in the very important particular in not being derived from an alcohol at all. The point of similarity in this case is that it resembles acetic acid in owing its origin to a ferment called the lactic ferment. If milk be boiled so as to destroy the organisms and kept in a vessel carefully sealed against exposure, there can be no fermentation; but from the moment exposure occurs, fermentation will ensue, because that organism, like the others, is everywhere. Singularly enough, it can also be obtained by acting on sugar with putrid cheese which is the ordinary source. There is, however, some danger of a portion of the sugar becoming transformed into alcohol, which tendency militates against its use as compared with the sugar of milk.

If the lactic fermentation is permitted to go on too far, the second stage of transmutation commences, hydrogen and carbonic acid gas are both evolved, and the butyric fermentation, by which oily acids are formed, is established. I have attempted by experiment to determine the quantity of lactic acid obtainable from a known weight of sugar by mixing moist cheese, sugar and chalk with water; in course of time carbonic acid gas is freely disengaged and continues frequently for some weeks. The result I cannot with confidence lay before you, as I have my doubts as to the success of the experiment. I do not exactly know which was to blame, the sugar, the cheese, the chalk or myself. Possibly all four put together, but judging from the never ending escape of gas, and the exceedingly meagre supply of lime salt, combined with the offensive odour, I am inclined to pronounce it a butyrate. Perhaps I am wrong; at all events, I consider my encouragement such as to dissuade me from pursuing the investigation further.

Advantage has been taken of its power in dissolving a considerable quantity of phosphate of lime in the preparation of a remedy known as syrup of lacto-phosphate of lime. Unlike the acids derived from an alcohol, it is not volatile; however, if it be heated in a retort to 266° F. a small portion distils over and the residue, on cooling, converts into a yellowish, solid, fusible mass, very bitter and nearly insoluble in water. This is lactic acid which has lost one equivalent of its basic water.

The acid of methylic alcohol, as we know, is formic acid which is distinguished from acetic by its reducing action on silver salts; singularly enough although there is this distinctive peculiarity between acetic and formic acid, and others in addition between methylic alcohol and ethyl, the action of an alkali and chlorine converts them both into one and the same thing, viz., chloroform. Properly speaking, however, chloroform is now regarded as a derivative of methyl. This is rather interesting as well as singular, especially when the atomic constitution of their molecules is considered, the formula of the methyl radical is CH_4O and the ethyl radical C_2H_5. On comparing the two formulas, one can scarcely be led to the conclusion that they are related to one another. The methyl hydrate forms corresponding compounds to the ethyl hydrate, with the exception of its aldehyde, and among the many analogies which these bodies present I may mention that they exhibit about the same specific gravity when mixed with equal quantities of water at 60° F.; and, not only so, the above analogies are increased when it is found that these two bodies, the one equally with the other, show a maximum of contraction which always occurs when one part of spirit is mixed with three of water. Acetone, methyl acetate, dimethyl acetate and the empyreumatic oils, being in variable proportion in wood naphtha, cause its density to vary considerably.

There is this peculiarity about methyl alcohol and its acid: while the formic acid can be prepared by a variety of methods and obtained from a number of sources, its alcohol is almost exclusively a product of the destructive distillation of wood, although it has been obtained synthetically by acting with marsh gas on chlorine, and afterwards decomposing the chloride thus formed with aqueous potash; however, this experiment depends on the production by synthesis of marsh gas. In synthesis a great deal could be done and no doubt will be accomplished in course of time; it is a comparatively easy matter tearing a body to pieces by analysis, but when an attempt is made to build up that body again there are difficulties not so easily surmounted. I was reading the other day of the production of citric acid from glycerine by synthesis, which almost rivals the feat of converting a little soot into one of the favoured few things of earth that do not fade, viz., a diamond. Who knows but that some day, in order to procure a delicate feast, we may find it only necessary to refer to some coal and sand?

There is a property which alcohol possesses and which I have not yet referred to, and that is it sometimes unites with a base to form an alcoholate, thus playing the part which an acid is usually understood to do. The chemistry of alcohol and acetic acid is so much bound up together that it is almost impossible to speak of the one without referring to the other; in fact what I have hitherto referred to has been as much about alcohol as acetic acid. I have already stated that alcohol sometimes plays the part of an acid; it is not alone in this respect, as glycerine, though not itself an acid, sometimes plays a similar part by dissolving some of the metallic oxides. An example of an alcoholate may be taken, as for instance, heating acetic ether with a caustic alkali—as baryta—the ether splits up into barium acetate and barium alcoholate. When an acetate is subjected to destructive distillation, there is a body which is generated named acetone; if barium or calcium acetate is distilled, acetone is given off and carbonate of the alkaline metal remains. The production of this body is not, however, confined to acetic acid, as it has been obtained by the reduction of citric acid with permanganate of potash or binoxide of manganese and dilute sulphuric acid, the citric acid splitting up into acetone, C_3H_6O, carbonic acid and water But properly speaking acetic ketone, or acetone, is a derivative of acetic acid; when acetic acid is decomposed by being passed through a porcelain tube, heated to redness, acetone is one of the products. In the case of alcohol it is transformed into aldehyde and then into acetic acid by gradual oxidation; in this case it is quite different. It is derived from acetic aldehyde by the substitution of the alcohol radical CH_3 for the hydrogen in the group COH.

There are some very interesting phenomena connected with bodies, similar in many respects, but very dissimilar in others. The dissimilarity, however, rests mostly in their physical characters, because they often approach each other in very closely molecular constitution, in many cases being identical. This can only be accounted for, as the text-books state, by the way in which the atoms group themselves together. Further allusion must not be made, however to those matters, as they belong to isomerism, allotropy, etc., and are apt to lead away from the points under consideration.

The sources and methods of production of some alcohols are very unlike in character. Ethylic alcohol can be obtained from anything of a saccharine or farinaceous nature; while methyl is derived solely from vegetable matter by destructive distillation. Amyl, on the other hand, must be a secondary product when farinaceous matters are undergoing the vinous fermention. Grape sugar does not yield it. It can only be generated where there is starch; it evidently is due to the starch breaking up into something other than grape sugar. The ethylic alcohol can be obtained only by the fermentation of saccharine matter; methylic alcohol by the destructive distillation process alone; amyl probably by the action of some albuminoid or ferment on the already active starch cells, similar perhaps to sinapin in mustard (black) or amygdalin in bitter almonds. Acetic acid is the natural acid of ethyl alcohol by the fermentation generated by the *Mycoderma aceti*, or vinegar plant, also by the oxidation of alcohol with platinum black, both of which methods first convert the alcohol into aldehyde, or the intermediate body between alcohol and acetic acid. Then as to formic acid, which is, in fact, the analogue of acetic acid, the former being derived from methyl or wood spirit. Formic acid was once solely prepared by distilling the bodies of ants with water—hence the name. In preparing formic acid from wood spirit there is no intermediate compound corresponding to aldehyde produced, which, however, is scarcely a distinguishing characteristic, as ethyl aldehyde is so easily reduced to the condition of acid. The corresponding acid of amyl, I need scarcely mention, is valerianic acid, rather a wide divergence considering that it is obtained from a body so closely to ethyl alcohol.

Another source for the same body is valerian root which, as the name implies, takes its derivation from this circumstance. Formic acid can also be easily obtained from sugar, tartaric or oxalic acids, or starch; when sugar is acted on by nitric acid, oxalic acid results, but when sugar is acted on by sulphuric acid and binoxide of manganese, formic acid is formed, and to show the close relation of oxalic and formic acids, oxalic is converted into formic acid by distilling it along with either pumice stone or sand. The oxalic radical is $H_2C_2O_4$, the formic CH_2O_2, a considerable difference certainly when contrasted the one with the other.

It seems to be a distinguishing character of the two acids, nitric and sulphuric, the latter to convert organic substances into formic and the former into oxalic acid. I have not yet sufficiently investigated the matter to determine an explanation of this phenomenon, whether it may be that the hydrogen of the sulphuric acid is abstracted and the oxygen of the nitric; this I am afraid hardly explains this property peculiar to these two bodies, as it is undoubtedly the result of oxygen in both cases. The nitric acid is deprived of a portion of its oxygen to convert the sugar into oxalic acid, and most certainly the liberation of oxygen is the most prominent and direct disturber of the equilibrium when sulphuric acid and binoxide of manganese are present in this compound. It may be that it is simply a physiological effect produced in the same manner that metaphosphoric acid coagulates albumen while tribasic acid does not possess that property. It is not improbable that these properties, on the other hand, may be explained, in the one case by the oxygen simply being in its normal condition, and in the other case, that is where we have sulphuric acid and binoxide of manganese, it may be that the oxygen is in its allotropic condition, in the form of ozone and consequently more active, and it is well known how very much more active ozone is compared with the element in its unaltered condition. Whether this may be idle speculation or not is immaterial, but certain it is that nitric acid converts sugar into oxalic acid, while the same substance yields formic acid by another process of oxidation. We now have an idea what is the behaviour of sugar when submitted to the direct influence of an oxidizing body; on the other hand when it is exposed to conditions similar to those of starch for conversion into grape sugar,—or expose the cane sugar to the influence of the peculiar azotized principle known as diastase, contained in malt,—it undergoes the same phenomenon as starch; it is just probable, however, that it immediately becomes converted into grape sugar by absorbing the elements of water, while starch must assume an intermediate condition, that of dextrin, under the same circumstances.

I have in a rather imperfect manner pointed out in the preceding remarks two kinds of acids allied to acetic, and these are, those allied to acetic acid because they owe their origin to an alcohol, such as formic and valerianic acids, and secondly, those that bear a resemblance to acetic acid, inasmuch as they are produced by a ferment, such as lactic and butyric acids. There is yet one more acid which I will venture to allude to, and that is gallic acid, to which I have not made any reference hitherto. I mention it as being the produce of a ferment. It is generally supposed that gallic acid is the body that results when tannin is subjected to the joint influence of moisture and atmospheric air, whereby it is converted into the more highly oxygenated body known as gallic acid, which is so far correct. But, according to the researches of M. Antoine Larocque, the peculiar body which effects this change is a ferment or organism, and, moreover, this organism converts sugar into alcohol and carbonic acid in the same manner as yeast does, while beer yeast, muscular flesh and caseous matter change tannin into gallic acid. The similarity of the gallic and vinous fermentation may hence be reasonably inferred.

What is this fermentation? Pasteur, whose researches in this direction are acknowledged to be unparalleled, has defined it as "life without air." If yeast be examined through a microscope, it will be found to be an assemblage of living cells, and supposing the supply of atmospheric oxygen suddenly cut off, they will live and thrive at the expense of the oxygen of the sugar in the liquid. Thus the living cells of fruits can absorb oxygen and breathe out carbonic acid, exactly like the cells of leaven; but supposing oxygen cut off, will they die? Pasteur demonstrated this by placing under a bell-jar twenty-four plums; he filled the jar with carbonic acid gas; beside it he filled a jar with twenty-four plums, uncovered. At the end of eight days he removed the plums from the carbonic acid gas, and the result was as he expected. He compared them with the uncovered plums: the covered plums remained hard and firm, their fleshy portion not being at all watery, while the others were soft, sweet and watery, and, moreover, yielded 6½ grams of alcohol. In the case of the conversion of grape juice into wine, it is unnecessary to add yeast, as in pressing out the juice the little plant is unconsciously sown, as it adheres to the external portion of the grape. The atmosphere is full of all kinds of bacteria, which makes it necessary to take precautions against their introduction into a liquid undergoing the vinous fermentation as well as the acetic. Heat kills these bacteria, cold numbs them. The distiller, on the other hand, requires to add yeast to his vats to set up the action. If a little of the pure juice of the grape be extracted, so that it will not come in contact with the external portion of the grape, and be exposed to pure air, fermentation will not ensue. Pasteur's researches prove that glycerine and succinic acid are also products of the alcoholic fermentation, and that it is not altogether a question of the sugar splitting up into alcohol and carbonic acid. His experiments have proved this. To prove that the dust brushed off the grape and the minute cells of the yeast are one and the same thing, if we brush it into the inert juice, they very soon show all the symptoms of the budding torula.

The liquids of the healthy animal body are also sealed from external contamination. Pure blood, for example, drawn with due precautions from the veins will never ferment or putrefy in contact with pure air. We have seen that the ferment of the grape clings like a parasite to the surface of the grape. Nor is it necessary to impregnate beer wort with yeast to provoke fermentation; exposed to ordinary air, it would sooner or later ferment. But the chances against it containing alcohol would be very great; it might, by accident, contain the torula. By the same rule, in the production of vinegar by the mycoderma, if other organisms are allowed to effect entrance into the vinegar vats, the whole product might be vitiated, so that the vinegar plant is essential to the production of vinegar in the acetous fermentation. To sum up, acetic acid is now generally accepted as being reduced alcohol, or alcohol minus two atoms of hydrogen and one of oxygen substituted, and it is very interesting to note that while acetic acid is converted into a mass of ice at 34° F., and remains crystallized at 48° F., alcohol has never been known to freeze, although Faraday succeeded in rendering alcohol as thick as oil, by immersing a tube of it in a mixture of carbonic acid snow and ether. The former is the term applied to the fine snow-like body which results when a vessel containing liquid carbonic acid has an orifice made into it; evaporation proceeds so rapidly that a portion of the vapour freezes by the intense cold produced. This snow may be collected. More than this, by means of the cold produced by a mixture of solid carbonic acid, liquid nitrous oxide and ether, alcohol is rendered so viscid that it does not run out of the vessel when inverted.

A very cordial vote of thanks was given to Dr. Husband and Mr. Gorrie for their papers.

Provincial Transactions.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

A meeting of the Law and Parliamentary Committee of this Association was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on December 10, 1880, Mr. Thomas Barclay (Birmingham), President, in the chair.

Present—Messrs. Andrews (London); Bell (Hull); Cross (Shrewsbury); Churchill (Birmingham); Hampson (London); Holdsworth (Birmingham); Johnson (Malvern); Southall (Birmingham); Williams (Manchester), and the Solicitor of the Association.

The Secretary said that a number of replies had been received to the President's circular, asking for information as to the laws of foreign countries affecting pharmacists residing in those countries. The replies and accompanying printed matter on the subject were laid on the table.

At the suggestion of the President it was resolved:—"That a linguist be engaged to read from the replies and printed matter such portions as were considered likely to be of value to the Association, and that a note should be made of same."

The Assistant-Secretary reported the results obtained in visiting certain towns with the object of collecting subscriptions, and obtaining new members.

It was agreed to recommend to the Executive that the names of all members of the Association whose subscriptions are two years in arrear be erased from the Register.

A letter from the Home Office was read, acknowledging the receipt of the memorial from the Association on the subject of exemption of chemists and druggists from jury service.

A report having been received from the Solicitor to the Association on the proceedings in the case of Mr. Whittle, it was resolved:—"That the decision in the case of Regina *v.* Whittle be appealed against, and that the Solicitor be instructed to take steps to obtain all necessary evidence for the appeal."

A discussion then ensued upon the Pharmacy Act Amendment Bill, and it was resolved:—"That the Council of the Pharmaceutical Society of Great Britain be respectfully requested to provide this Association with copies of the draft of the proposed Bill to amend the Pharmacy Act, when finally agreed upon by the Council at its meeting to be held on the 14th inst., and this Committee hopes that sufficient time will be allowed to enable the Executive to consider the clauses of the Bill, with a view to assist the Council by united action in carrying a satisfactory Bill through Parliament."

ROCHDALE CHEMISTS' ASSOCIATION.

The annual meeting of the Rochdale Chemists' Association was held in the Acker Street Committee Room of the Public Hall, on Wednesday evening the 24th ult., when the Secretaries' report and the Treasurer's financial statement were read, showing a balance in hand of £4 8*s.* 6*d.*

The officers were requested to continue their duties until the next meeting, when the appointments will be finally made.

The question of patent medicines occupied the attention of the meeting the remainder of the evening. One gentleman stated that an advertised stamped medicine would not remunerate the proprietor for his trouble if the total cost of the bottle, contents, wrapper and label was more than 2*d.* for a 1*s.* 1½*d.* article. This statement was received with some surprise, but was proved thus—

	s.	*d.*
Bottles, contents, wrappers and labels . . .	2	0
Advertising	3	0
Stamps	1	6
Gross profit, out of which to pay for labour .	1	6
Total . . .	8	0
Price to wholesale dealers	8	0

This estimate has been supplied by a gentleman who has been part proprietor of a medicine, and knows a great deal about the trade. It was thought in the meeting that it would be well for the estimate above given to be widely circulated among the trade.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fourth general meeting of the thirty-second session was held at the Royal Institution on Thursday evening, November 25, Mr. Edward Davies, F.C.S., F.I.C., presided, in the unavoidable absence of the President.

The minutes of the previous meeting were read and confirmed, and the following donations announced:—The *Pharmaceutical Journal*, from the Society; the *Canadian Pharmaceutical Journal*, from the Editor; and the *Chemists' Journal*, from the President.

Mr. Edward Davies made a communication on the expansion of glycerine by heat, in answer to an inquiry made at the previous meeting.

Mr. Albert Kehlstadt, Ph.D., read a paper on "Benzene."

The paper was discussed by Messrs. Chubb, Conroy, Davies and Watt.

The author replied to the points raised, and a hearty vote of thanks to Mr. Kehlstadt brought the meeting to a close.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The monthly meeting of the above Association was held on Monday evening, December 6, at the School of Pharmacy, College Street, Mr. G. C. Osborne in the chair.

Mr. J. Hayllar, who had conducted classes in chemistry and pharmacy during the past month, read a very satisfactory report, stating that the attendance had been good, and it was evident that the members had prepared for the classes in a more thorough manner than they had done previously. In conclusion, he informed the meeting that the Laboratory had been entirely remodelled, and that one night every fortnight would be devoted to practical chemistry.

Mr. Osborne, who had conducted the botany and materia medica classes, briefly referred to them, agreeing with Mr. Hayllar as to the attendance, etc., and he congratulated the members on their making such a good start for another session.

The subscriptions having been received, the meeting separated.

Proceedings of Scientific Societies.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association, held on Wednesday, November 24, Mr. F. W. Branson in the chair, two biographical papers were read, one by Mr. C. Parkinson, on "Sir Humphrey Davy," the other by Mr. F. W. Collinson, on "Michael Faraday."

Mr. Parkinson sketched the character of Sir H. Davy; traced his career from his apprenticeship to a surgeon at Penzance to his winning the blue riband of science, "The Presidency of the Royal Society." He drew attention to the extraordinary capacity for work which Davy possessed, the range and variety of his studies, his fishing and shooting excursions, his poetic faculty, how he was lionized by London society, his eccentricities, his sudden friendships, his scarcely disguised contempt for the French *savants*, his unfortunate jealousy of his great pupil, Faraday, his slovenly manipulation in his own laboratory, and the exquisite delicacy and neatness of his experiments at lectures, the ready way in which he overcame difficulties, adapting his apparatus with a facility which seemed almost an inspiration, and expressed his regret that we were unable to love the man so much as we respected the philosopher, one of whose chief claims to our regard was that when he might have retired and enjoyed an inglorious ease, or utilized his great gifts for the accumulation of wealth, he voluntarily devoted his life to the study of science for the benefit of mankind.

Mr. F. W. Collinson commenced his paper by defending the position of such subjects as the biographies of Sir H. Davy and Michael Faraday in the calendar of the Association, because of their influence upon the scientific world, also from the examples and lessons to be derived from their lives. He glanced over the more important incidents of Faraday's life, which showed a steady advance from his birth until his death, apparently unmarred by the failings common to most men, and gave some extracts from letters and lectures which illustrated the nobleness, simplicity and greatness of his mind. He also gave an account of Faraday's opinions upon the position science should occupy in the education of the young, and the honours due from the country and society to men who devoted their whole lives to the pursuit of scientific discovery. The author then drew attention to the charming absence of sordid or unworthy motives in Faraday's character, proved by his giving up a handsome income and the opportunity of accumulating a magnificent fortune, in order that he might apply himself more to scientific research. The author then proceeded to review Faraday's most important discoveries, amongst which were—

1. The deflection of the magnetic needle by the electric current, the basis of the system of electric telegraph.
2. Magneto-electricity, now applied for the production of the electric light.
3. The convertibility of all known forces.
4. The magnetization of polarized light.
5. The liquefaction of gases.
6. The discovery of benzol, now applied in the manufacture of aniline dyes.

He also touched upon Faraday's theories upon electrochemical decomposition, terrestrial magneto-currents, etc., etc. These discoveries proved him, he said, from Tyndall, to be the "prince of investigators." The author concluded with an extract from *Punch*, which appeared after Faraday's death.

After a few remarks by the Chairman, a hearty vote of thanks was passed to Mr. Parkinson and Mr. Collinson for their interesting papers.

Parliamentary and Law Proceedings.

Poisoning by Vermin Killer.

Mr. William Carter, coroner for the Eastern Division of Surrey, held a very long inquiry in the Perseverance Tavern, Brixton, on Tuesday, as to the death of Joseph Moller, aged twenty-three, who committed suicide on Saturday last by swallowing strychnine, at his lodgings, 14, Cowley Road, Brixton.

Miss Annie Shaw deposed that the deceased was employed by a syrup manufacturer at the corner of Mark Lane. He had been residing with her mother as a lodger for the past three months. Lately he had been down in spirits, and did not relish his food. On Saturday morning she heard a moaning noise. She jumped out of bed, and went to deceased's room, where she found him in convulsions, and when she touched his limbs they became contracted. Upon asking him what was the matter he made no reply. He asked for some water. She took up a glass, but finding some sediment in it did not use it. (The glass was produced in court.) Deceased died at a quarter-past five on Saturday morning. Before he died he said he had taken vermin powder, which he had obtained at a chemist's.

Mr. Wilkins, M.R.C.S., having certified that death had resulted from poisoning by strychnine, and

The Coroner having expressed his regret that these poisonous vermin powders could be so easily obtained from chemists,

The jury returned a verdict of "Suicide while in an unsound state of mind."—*Standard.*

Infringement of Trade Marks.

In the case of the Apollinaris Company, Limited, *v.* John Lyon and Co., of Liverpool, his Lordship, the Vice-Chancellor Sir James Bacon, pronounced judgment on November 26 last, perpetually restraining the defendants, John Lyon and Co., their servants and agents, from manufacturing, preparing, selling, or advertising any mineral or other waters as "Apollinaris," or under any name of which the word "Apollinaris" forms part, and ordering defendants to render an account of all profits made by them through the sale of such water, and to deliver up to the plaintiffs all bottles and labels in defendants' possession bearing the name "Apollinaris," either alone or in conjunction with any other words. It was further ordered that the defendants, John Lyon and Co., Liverpool, should pay the costs of the action.

Review.

British Wild Flowers by Natural Analysis. By F. A. Messer. London: David Bogue. 1880.

In the present day when books on botany follow one another in rapid succession, it would seem difficult to strike out a new method of teaching a knowledge of British wild flowers. This, however, the author of the book under notice appears to have done. Like many others he has felt apparently that the condensed anglicized Latin, which seems to characterize the botanical descriptions of the present day, by no means conveys a good idea of the plants to the mind of one who has not seen the plants themselves, and in the little work before us he endeavours to explain the descriptions by diagrammatic representations of the structure of the flowers of each class, family and genus. The author claims, and with some reason, that diagrammatic representations have not the disadvantages of full illustrations of the individual plants, inasmuch as there is no possibility of the student attempting to identify a plant by its general resemblance to the diagram, and neglecting a knowledge of the reasons of its position in the natural system.

If the author succeeds in inducing young botanists to ascertain for themselves the structure of the flowers of each plant in order to acquire a knowledge of classification, the book will be a most valuable one; but it is much to be feared that it will not be so used, unless such a practical knowledge is required in botanical examinations.

A knowledge of the names of plants is that which young botanists generally endeavour to obtain first, and afterwards a knowledge of their structure and the reasons for their position in a system of classification. Those who have arrived at this second stage, and who have a desire to learn something of the structure and relationships of the different orders will find this little book most valuable. The ovary especially is a difficult organ to understand when in the young state, as it occurs in the flower, and even a transverse section does not always appear very clear under a lens. The excellent diagrammatic representations of this organ will help the tyro to understand what he should be able to see. The representations of the sori and indusia of ferns, and of the different forms of the paleæ and glumes and awns in grasses and sedges, will also prove very useful.

The arrangement of the analyses resembles that followed in Lowndes Notcutt's 'Handbook of British Plants,' and while it has not the advantage of that little work, nor of Hayward's, in giving the characters of each species, yet it will serve as a most valuable aid in distinguishing the more intricate genera, and in understanding the structure of the more minute flowers.

As every second page of the analysis consists of a table of diagrams, the cost of the book is greater than that of those above mentioned, while its size is rather too large for the pocket. As a very useful supplement to either of them for home use we can strongly recommend it to those who are commencing in earnest the study of the wild plants of our fields, woods and hedges. The student should, however, carefully read the instructions in the preface, which are not quite so full as they might be.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Experimental Chemistry for Junior Students. By J. Emerson Reynolds, M.D., F.R.S., etc. Part I. Introductory. London: Longmans, Green and Co. 1880. From the Publishers.

Abridged Therapeutics: founded upon Histology and Cellular Pathology. By W. H. Schüssler, Dr. Med. et Chir. Authorized Translation. London: Elliot Stock. 1880. From the Publisher.

The Chemists and Druggists' Diary for 1881. London: Office of the Chemist and Druggist. 1880. From the Proprietors.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[451]. As regards the "hyd. chlor." prescription, I think, if it is not an understood thing what the doctor really does want dispensing in the lotion, it is quite necessary to ask him. Now chloral hydrate is as likely to be meant as anything else. To prove that, I had a lotion to dispense for the eyes (from a prescription by Dr. B. Carter) a few days ago, containing 4 grs. of chloral hydrate to the oz. On the same prescription was ordered hyd. subchlor., which was to be used (in the dry state) for the eyes also.

From that it is evident that both are used for the eyes, but as to hyd. bichlor. I cannot say anything; neither do I think it likely that a heavy powder like calomel (which is next to entirely insoluble) would be intended for a lotion for the eyes.

Endymion.

[469]. Solution of Ergotine:—

℞ Ergotine . . . . grs. xij.
Aquæ Dest. . . . . ʒj.

Dose. Five minims by subcutaneous injection.

T. S. H.

[484].

℞ P. Rhei . . . . ʒss.
Mag. Carb. Pond. . . . . ʒij.
Ext. Taraxaci. . . . . ʒiv.
Tr. Gent. Co. . . . . ʒij.
Aq. . . . . ad ℥vj.

M. ft. mist.

The above prescription was handed to me to dispense a day or two ago, and I was informed that on two or three occasions it had exploded after having stood for a few days in an ordinary temperature. Can any reason be given for this?

W. G. T.

[485]. The following was dispensed by me yesterday:—

℞ Ammon. Carb. . . . . ʒiss.
Tinct. Scillæ . . . . ℥j.
Tinct. Cinchon. . . . . ℥iss.
Aq. . . . . ad ℥viij.

M. A tablespoonful in water before meals.

It was labelled "shake the bottle." To-day it is brought back with a complaint that when previously dispensed (in Scotland), it was a clear, pale yellow mixture. I suppose it had been filtered. Ought it to have been so? And what appearance should the mixture have had?

Cinchona Calisaya.

[486]. Terrors of Dispensing.—Under some such heading I may be allowed to describe the rather alarming consequences of having to compound the subjoined prescription, which was sent to me last week:—

℞ Calcis Hypophosphitis . . . . . ʒss.
Potass. Chloratis . . . . ʒss.

M. ft. pulv. vj.

One to be taken three times a day.

Proceeding cautiously to powder each separately, and then mixing them carefully together, I was priding myself upon the evident amity of these ingredients looking so pure and innocent in my glass mortar. I thought that having got their latent potentialities to agree so well up to that point, they would as peacefully submit to removal by the palette knife. But "Alas! poor Yorick!" at the third touch of the cold steel they resented the insult by vanishing into fire, smoke and noise, leaving the astonished dispenser half stunned and minus some eyebrows and lashes, a sadder but wiser man. Thanks to my spectacles, which were on, iritis has not supervened; but the next man who tries the experiment with better eyes may find that disease troubling him. Or should he be operating on double the quantity, it may "give him fits," as we say.

A. R.

[487]. The following recipe was given me to make up this week. Will any reader kindly inform me how he would prepare it?—

Cocoa Nut Oil . . } Equal parts of each.
Rum . . . . . . }

Make up a large bottle of the above hair wash, using only the two ingredients ordered.

I may add that when melted together, although kept in brisk motion, the cocoa nut oil separates on cooling.

Despero.

[488].

℞ Pulv. Alumin. . . . . ʒss.
Plumb. Acetat. . . . . ℈j.

M. ft. pulv. To be dissolved in a pint of water as a lotion.

On rubbing the above together in a mortar a thick paste is formed. Will some reader tell me what reaction takes place, and the best form of sending it out to the patient?

London. Alpha.

[489]. I had to dispense the following prescription last week:—

℞ Hydrargyri Iodidi Rubri . . . gr. xviij.
Sodii Iodidi . . . . gr. vj.
Aquæ . . . . ℥iij.

M.

Label "Poison. For outward application only."

Should this be dispensed as written, putting a "shake the bottle" label on, or would a dispenser be justified in adding sufficient sodium iodide to effect solution?

Austral.

[490]. In the following prescription would someone kindly inform me what ointment is ordered?—

℞ Pulv. Plumbi Acet. . . . . gr. vj.
Acid. Acet. Dil. . . . . ♏ v.
Aq. Destil. . . . . ℥vj.

M. ft. lotio.

To be used twice daily.

℞ Ungt. P. . . . . ℥j.

Use every night.

I am at a loss to know what is meant by Ungt. P.

Before it was sent to me it had been dispensed by a Manchester firm, and an ointment of a pink colour sent out.

Ointment.

[491].
℞ Mist. Cinch. Co. . . . . ʒij.
Acid. Sulph. Dil. . . . . gtt. vj.
Aquæ . . . . ℥vj.
Ft. mist.
Etiam,
℞ Tinct. Catalp. Syr. , ... ʒij.
Aquæ . . . . , ℥vj.
Ft. mist. Sign. Cpt. ʒij quaque hora dua alternat.
(None of the t's are crossed).

The above prescription, as brought to me, was a copy by a registered chemist in a large midland town, who had dispensed it. There were no initials, but my customer considered it the copy of a prescription from a well-known homœopathic doctor; but, on inquiry, I found that the two chief ingredients were not in the Homœopathic Pharmacopœia, nor known to some eminent dispensing firms in London, who frequently dispense the aforesaid doctor's prescription.

A respectful and friendly note of inquiry, enclosing an addressed envelope, was therefore sent to the above chemist, and in due course the following reply was received:—

"Dear Sir,—Referring to your communication I beg to reply as below.

"Yours truly,
"———."

This was printed evidently from the usual gelatine tablet, as if such inquiries are frequent. Then follows:—

"You have evidently been mislead (*sic*) by statements."

Then, apparently written by the same person, but with different ink and another pen, "If you cannot dispense it I cannot help you," and nothing more.

I am aware that Squire gives a formula for mist. cinchon. co., but this contains ammonia, and would hardly be dispensed with acid. sulph. dil.; but what about the second formula which, as written, may either be tinct. calalp. syr., or more more probably, tinct. catalp. syr.?

Barnstaple. W. SYMONS.

[492]. The other day I had the following brought to me to dispense:—
℞ Sodæ Bicarb. . . . . ʒss.
Zinci Oxydi . . . . ʒij.
Sax. Olei Purificati . . . . . ad ℥ij.
M.
To be applied night and morning.

Can anyone inform me what is meant by the last article?

J. P. I.

Notes and Queries.

[687]. "S." may try a small quantity of oxalic acid.

[693]. GLYCERINE JELLY.—"Minor" would like to have a good receipt for glycerine jelly, emollient and not so gelatinous as those mentioned in volume ix. of the *Pharmaceutical Journal*.

[694]. GRANULAR EFFERVESCING SALICYLATE OF SODA.—"Hove" would be glad to know of a good form for making granular effervescing salicylate of soda. A form has been tried in which salicylic acid was substituted for the citric acid in "Sodæ Citro-Tartras Effervescens' of the B. P.; but it would not granulate at all, after several different attempts.

[695]. LIQUOR PEPTICUS.—I shall be obliged if any of your correspondents could give me a good form for making "liquor pepticus" from pepsine. A preparation under that name was made some years ago by Mr. Titterton, but who has given up business.

DIGITS.

[696]. WHITE FIRE.—Will any kind reader oblige me with a recipe for white fire, without sulphur?

L. W. S.

[697]. CONCENTRATED INFUSION OF GENTIAN.—I should like to ask the best method of making concentrated infusion of gentian. Whether it would be better to add all the spirit during maceration or only half the quantity, or whether the ingredients would be thoroughly exhausted without spirit. In such a case, of course, adding sufficient spirit afterwards to keep the infusion any length of time.

C. JONES.

[698]. SHAMPOO LIQUID.—Will some reader please furnish X. Y. Z. with a receipt for very soapy and creamy-looking preparation to use as a shampoo?

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE POSITION OF WIDOWS IN RELATION TO THE PHARMACY ACT.

Sir,—In the discussion on a new Pharmacy Act it has been suggested more than once that provision should be made to enable a business to be carried on in behalf of a widow.

Whilst deeply sympathizing with widows in their misfortune, I would ask, how we can with any show of reason demand legislation on the one hand to allow unregistered persons (widows) to carry on business, and, on the other hand, expect legislation to prevent other unregistered persons from doing the same thing?

Our demand for legislation must rest on the plea that it is for the benefit and safety of the public; if, in the case of a widow this is sufficiently guarded by employing a qualified assistant, how can we say that it is not sufficiently guarded should any other person or persons carry on business with a qualified assistant?

Should a Bill be introduced in which these very opposite views are embodied, they will, I think, prove to be a stumbling block.

Kilburn. W. T. TUCKER.

CHEMISTS' PRICES.

"No preparation sent out unlabelled. Prices rendered as low as possible, considering the quality of the medicines, which are always the best that can be obtained."

Sir,—The above statement appeared on the business card of a dispensing chemist, with whom I served as assistant in my younger days.

Now, I find no fault with those who maintain high prices by elegant dispensing; but many chemists are obliged to be content with low prices, and a qualified pharmacist has a right to fix his own prices on his own goods. The Pharmaceutical Society is not a trade union to uphold prices. The Society attends to education and qualification.

As long as retail druggists have penny customers so long will low prices be popular and needful in poor districts. One man will certainly thrive on low prices and penny customers, when another will fail at full prices, with heavy rent and taxes, etc. No doubt each man is required in his right place, but time and chance happen to all men.

The applicants to the Benevolent Fund show an endless list of poor druggists. In Shakspere's play, Romeo tempts the poor apothecary to supply poison for an unlawful purpose, by his purse of money, and the apothecary soothes his conscience by the well-known words, "My poverty, but not my will, consents." The same words would suit the pharmacist, when he receives the poor man's last shilling for full price dispensing. If the dignity of pharmacy can only be maintained by full prices, the sooner the dignity is snubbed the better, by grocers and co-operative stores opening dispensing departments, conducted by qualified assistants.

Dr. Johnson's epitaph on a poor surgeon will suit the poor druggist—

> "His virtues walked their narrow round,
> Nor made a pause, nor left a void;
> And sure the Eternal Master found
> His single talent well employed."

Downside Villa, Chilcompton, Bath. **JOSEPH LEAY.**

SAFFRON, SUGAR, ETC.

Sir,—In the discussion which took place on the reading of the two papers on "Saffron," at the last Evening Meeting, I am reported to have said: "Saffron was largely used by the Spaniards in South America." This may be the fact, but it is not quite what I intended to convey. What I said was that saffron entered into the composition of the preparation known as laudanum Sydenhami, which was largely used by the Spanish population of South America. How far the narcotic effect of this preparation may be modified by the stimulating properties of the saffron, I am not prepared to say; but certain it is that this Sydenham's laudanum is preferred to most other forms of opiate.

Touching on the sugar question, again brought forward by Dr. Symes, I should like to add that given a pure sugar in other respects, the presence of a minute quantity of blue colouring,—ultramarine, or what not,—is less objectionable than some of the other impurities we hear of. It is easily got rid of by subsidence, as pointed out by Mr. Williams; not so, however, the other impurities present in some sugars, my own opinion being that the greatest difficulties arise from the presence of lime salts. I speak from experience, and with special reference to the preparation of the class of remedies known as "chemical syrups." Whether the source of the sugar be beetroot or cane juice, I believe to be quite immaterial, provided the resulting product has been carefully and perfectly purified. Of course, the presence of ultramarine is liable to produce an evolution of H_2S when such sugar is used for making a syrup containing an acid, and thus impart to it a most disagreeable odour. As no one seems to have given a satisfactory reply to the question asked by Mr. Plowman regarding the evolution of SO_2 from a sample of sugar which had been made into syrup of phosphate of iron, I would suggest that calcium sulphite or bisulphite had been employed in the preservation of the cane juice to prevent fermentation and consequent loss, and that this product had to some extent remained in the finished sugar. In view of his statement that the sulphur existed as a combined sulphite, it would be interesting to know whether he found lime as well.

I used to find that the sugar sold in small, dry, hard crystals, and known as Finzell's crystal, was the most satisfactory for pharmaceutical use.

ALFRED E. TANNER.

17, Devonshire Square, Bishopsgate, E.C.

SYR. FERRI IODIDI.

Sir,—Having recently supplied some syr. ferri iodidi to a customer, he remarked that my preparation was not the same colour as some that he had obtained elsewhere. I obtained from him a small sample of the said syrup, and, on examination, found that it was quite of a yellow colour, and, to my surprise, contained a notable quantity of sulphuric acid.

Now, I am aware that mineral acids, among other things, have been recommended for keeping the syrup, but I have yet to learn that such additions are necessary and justifiable. I have always been satisfied with the syrup of the Pharmacopœia, which, in my opinion, when carefully prepared and kept in full bottles, leaves little to be desired.

As uniformity is desirable, and that those who, like myself, are anxious to dispense prescriptions faithfully, should be protected from the unjust suspicions of their customers, I think that before such additions are made, some attempt should be made to prove that they are necessary, and obtain for them some legal sanction.

I shall be glad to obtain expressions of opinion from others of the fraternity who have been troubled in the like manner as myself.

IODINE.

BORURETTED HYDROGEN.

Sir,—The following is a copy of notes taken by myself from a class lecture, delivered by Mr. F. Jones, at the Manchester Grammar School, some time in 1879:—

"Boron hydride, BH_3, is obtained by the decomposition of magnesium boride with hydrochloric acid. The magnesium boride is prepared by heating excess of magnesium with boron trioxide,

$B_2O_3+6Mg=3\,MgO+Mg_3B_2$; $Mg_3B_2+6HCl=3\,MgCl_2+2BH_3$

Boron hydride is a gas burning with a green flame; is soluble in water, and the solution gives a precipitate with silver nitrate."

Mr. Jones is, I believe, still engaged on the determination of the density of the gas.

APIS.

NOTE ON SPR. AMMON. AROM., B.P.

Sir,—In answer to remarks by Mr. Thresh and others, I find, on referring to my laboratory book, that in one year I distilled at twelve different times 168 pints imp. of sp. arom. ar., that is in double the quantities each time of the B.P. I fortunately have it noted down on each occasion, the specific gravity of the product, and this I find to average 872½; this will be sufficient to to show that by a little care the standard may be very nearly attained. I am certain that I get the proper quantity of ammonia, as I find a portion is deposited in a few days, especially if the weather is cold; indeed, I believe the excess of my specific gravity is owing to the amount of ammonia present. I use one of the thick earthenware shells and worms, made by Messrs. Doulton, this is put into a copper steam jacket; this part of my apparatus I do not use for any other purpose, thus being sure of any taint.

Each time I put in 12 pints of sp. rect. and only 5 pints of water, instead of 6 pints, as ordered, the essential oils, the ammonia being added a portion at a time as the distillation proceeds. By using a pint less water I can more readily draw over the last part of the product, and by adding the ammonia gradually there is no risk that the lower end of the worm will be blocked up by a deposit of the salt, which is sometimes the case if the steam is turned on to the still with the whole of the ammonia present.

I do not find that the sp. rect. can at times be depended on. I have had it sent out as 60° over proof, and it has proved to be only 50° over proof. I use it 56° over proof.

On the whole, I question, when properly prepared, whether we have in the Pharmacopœia a more elegant, stable, or certain preparation, or one which answers the purposes for which it is intended so well as that of spt. ammon. arom.

Norwich. **OCTAVIUS CORDER.**

"*Discipulus.*"—You are recommended to read an article on "Pills and Pill Coating," published in the *Pharmaceutical Journal* for December 15, 1877 (vol. viii., p. 461).

A. W. Forster.—We do not think it fair to ask for recipes imitative of particular preparations.

"*Sarniensis.*—Rubini's tincture of camphor is a solution of camphor in its own weight of 60 o.p. spirit.

A. J. S.—*Pharm. Journ.*, [3], vol. x., pp. 855 and 1027.

"*Novice.*"—See Neubauer and Vogel's 'Guide to the Analysis of Urine.'

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Hutchins, Schivardi, Leaffler, Illingworth, Calumbo, J. M. J., C. T. M., M., G. B., W. R.

"THE MONTH."

The scarcity of holly berries and haws in hedgerows is generally considered indicative of a green yule-tide, and notes from a botanical correspondent in the Isle of Wight seem to show that the saying is likely to prove true, in respect to the coming season, at all events. During the last few days of November the primrose and buttercup (*Ranunculus acris*), and during the first fortnight in December *Linaria Cymbalaria*, *Ruscus aculeatus*, *Honkeneja peploides*, *Parietaria diffusa*, and several other plants were observed in blossom, while the fragrant winter heliotrope (*Petasites fragrans*) was observed in flower on November 28, nearly a month before its usual time of appearing.

Those among our correspondents who occasionally send mosses to be named will probably enjoy their Christmas holiday this year, for a mild winter frequently causes species rare in fruit to produce fructification, and many a woodland gem may be expected to delight the "moss-trooper" who ventures to botanize during the approaching winter.

The medicinal plants in blossom are necessarily few at this time of year. One which may now be seen in a few botanical gardens is in blossom; but it is rarely seen outside them, although it has been in cultivation in this country for nearly a century and a half, and grows freely in any common soil. In its natives countries—the United States and Canada—the witch hazel, *Hamamelis virginica*, is a native of damp woods and thickets, and forms a shrub 6 to 10 feet high. The leaves somewhat resemble those of the common hazel; the flowers, which are borne in clusters of three or four at the axils of the leaves, are remarkable for their tassel-like appearance. The involucre which surrounds them consists of three ovate leaflets; the calyx is four-cleft, and the four petals are long, linear, greenish-yellow and curiously twisted. The nut-like, two-celled, and two-beaked capsule, containing two black oily edible seeds, does not ripen until the next autumn, when it may often be seen mingled with the new flowers. A woodcut of a flowering twig is given in the *Garden* for December 11, p. 585. The bark is used in the United States as a remedy for hæmorrhoids, hæmorrhage and congestions, and forms the principal ingredient in a well-known patent medicine in this country. It has been recommended also for preventing abortion, and in obviating the effects of cotton root in bringing on miscarriage. The use of this plant for the first-mentioned purpose appears to have been borrowed from the native Indians, and for the last-mentioned purpose from the negroes. Its value in inflammation and congestions is such that it would form a valuable addition to other domestic remedies, if cultivated in cottage gardens.

The researches of Schnetzler on the colouring matter of the flowers of the peony and on that of the leaves of the Canada vine, *Ampelopsis hederacea*, have yielded some interesting results. These investigations seem to suggest that the calcium oxalate and carbonate may play an important part in the coloration of such plants as rhubarb, cactus, and other plants that are known to contain them in quantity, while the inactivity of absorption, and consequent lessening of the supply of soluble carbonate of lime, etc., to the leaves, might account for the tendency of the leaves to redden in autumn.

In the red leaves of the creeper it is found that chlorophyll still exists, concealed by a red substance, probably a derivative of chlorophyll, and also soluble in alcohol. When potash is added to the red solution it becomes of a beautiful green, but is no longer fluorescent, as solution of chlorophyll would be.

A dilute solution of calcium carbonate added to an alcoholic solution of the colouring matter of peony petals, causes the colour to change successively into purple, purple-violet, blue, green and yellow, while calcium oxalate changes the colour to a fiery red; the green colour so produced has a red tinge in transmitted sunlight, and is not changed back by acid reagents into red. The addition of ferroso-ferric sulphate gives with the original solution a blackish-blue precipitate, indicating the presence of a tannic substance, which seems to have some connection with the red colouring matter of the peony, as well as with that of the *Ribes sanguinea* and the rose.

In a paper contributed to the Scientific Proceedings of the Vienna Academy (*Nature*, December 16, p. 159), Herr A. Stohr details the results of investigations on the presence of chlorophyll in the epidermis of leaves. It has been hitherto supposed that submerged phanerogamous plants, with a few exceptions, contain chlorophyll in their epidermis, while terrestrial phanerogams, also with a few exceptions, have an epidermis destitute of chlorophyll. Herr Stohr's experiments, however, point to a different conclusion. He finds that while chlorophyll is contained in the epidermis of most of the broad leaved gymnosperms and of by far the greater number of terrestrial phanerogams, it is absent from that of the needle-leaved gymnosperms and the terrestrial monocotyledons. In most cases the chlorophyll does not occur in the epidermis of the upper surface of the leaf, being quickly destroyed on its formation by a too intense light; but is only to be found in that of the under surface and also of the leaf petioles and stipules. So far as the evolution of the chlorophyll bodies was observed the latter showed themselves as starch-chlorophyll bodies. These experiments appear to have been made upon the leaves of nearly one hundred species.

M. H. Comes (*Comptes Rendus*, vol. xci., p. 335), as the result of experiments on the transpiration of plants, finds, among other things, that plants transpire most water when exposed to that part of the solar spectrum where they absorb most light and that only those rays which are absorbed favour transpiration, so that transpiration is least under the rays coinciding in colour with the organ, and therefore reflected, and greatest under the complementary rays, and the more intensely coloured the organ and the more intense the light, as at midday, the greater the transpiration.

At a meeting of the Royal Horticultural Society, on December 16, Professor Henslow remarked with regard to the black hellebore, or Christmas rose, that the white sepals have three separate functions, being at first protective of the internal organs, then attractive by their white colour, and, lastly, nutritive, for they become green again subsequently, and so prepare nourishment for the ripening follicles and seed. The interior of the tubular petals had been discovered by Dr. Masters to possess the power of assimilating nitrogenous food presented to them, and as in the sundew, the protoplasm in their cells had been observed to undergo the process of aggregation. Dr. Masters exhibited a chrysanthemum in which one half of the flower head was composed of yellow florets, and the other of longer florets of a pink colour,—the two halves representing on the same head two well known distinct varieties.

Some of our readers have probably, during the August holidays, noticed that the common cow-wheat, *Melampyrum pratense*, is freely visited by ants. Mr. E. Rathay has recently shown that the nectariferous glands which attract them are minute scales on the epidermis on the under side of the bracts. The gland consists, in *M. arvense*, *M. nemorosum*, *M. pratense* and *M. barbatum*, of a short pedicel wall and a circular peltate disk, composed of a single layer of prismatic cells. The fluid is secreted beneath the cuticle of the upper surface of the disk, and is set free by the rupture of the cuticle. The secretion contains at least 2 per cent. of sugar, which does not reduce copper oxide in the cold. Humble-bees and other insects have also been observed to visit these glands. With respect to this plant, as with some other root parasites, it has been observed that they turn black in drying, but the nature of the juice and its applicability as a hair-dye or for other purposes do not seem to have been the object of chemical investigation.

Some further light has been thrown on the formation of resin or oil canals in plants by the researches of Mr. T. F. Hanausek on the resin passages in certain cone scales. He finds that although resin may be formed as a true secretion by special secretive organs, or by the transformation of certain cell contents, yet it may also arise from a deliquescence of the outer walls of particular cells (schizogenous resin passages), or by metamorphosis of the entire cell wall and cell contents (lysigenous resin passages).

At a recent meeting of the Linnean Society a large attendance was present to hear two papers by Mr. Francis Darwin; one, "On the Power possessed by Leaves of placing themselves at right angles to the direction of Incident Light," and the other, "On the Theory of the Growth of Cuttings," illustrated by observations on the bramble. The object of the first paper was to test the relative values of the theories of Frank on the one hand, and De Vries on the other; the former supposing that leaves and some other organs are diaheliotropic, *i.e.*, have a specific sensitiveness to light, which causes them to place themselves at right angles to the incident light, and others heliotropic, *i.e.*, exhibit a tendency to place themselves parallel to the light; the latter supposing leaves to take up a horizontal position or otherwise in obedience to the combined or opposed influences of geotropism and heliotropism, while in some cases epinasty and hyponasty come into play, *i.e.*, a preponderance of growth on the upper or lower surface of the leaf. The result of experiments made by Mr. Darwin, when he had destroyed the geotropic tendency by the use of a klinostat or clock-work instrument, which revolves the plant in a horizontal plane—seemed to point to diaheliotropism as being the really important influence at work in affecting the natural balance of the forces that would otherwise keep the leaves in a horizontal position.

With regard to the bramble, the author arrived at the conclusion that the behaviour of cuttings is a repetition of the normal process of a deranged function in the plants; in other words, that the rooting of bramble tips is determined by an internal impulse or morphological force which regulates the growth of roots.

The *Gardeners' Chronicle*, December 18, p. 786, states that the Java Government quinine crop of 1878, shipped to Holland during 1879, amounted to 91,469 kilos, and netted 179,000 florins, while the expenses of culture amounted to 52,862 florins. There are stated to be at the present time 397,550 cinchona plants of various sorts in the nurseries at Bandong, and 1,678,670 trees planted out. It will, therefore, probably be some years before the Indian, Jamaica and Bolivian plantations will be able to compete successfully in supplying so large a quantity of the best bark as Java is able to do at the present time. Some very fine quill Bolivian calisaya, however, the growth of plantations in that country made at the suggestion of Mr. Ledger when travelling there, has lately been sold in the London market, and yielded 7 per cent. of quinine sulphate. According to Mr. Whiffin, such a yield of quinine has never before been obtained from any South American bark, and the Bolivian bark is quite equal in value, if not indeed superior to the Ledger bark of Java.

In Guatemala, crown bark of good quality is being grown, and the results of the recent sales of Jamaica bark show that the crown and red barks (*C. officinalis*) can compete successfully with those of Ceylon and India, having fetched higher prices in the London market. Unfortunately the calisaya cultivated in Jamaica turns out to be only a hybrid between *C. officinalis* and *C. succirubra*, and not more valuable than red bark. It may be hoped that the Ledger variety of calisaya will be soon planted extensively in that island, as well as the pubescent variety of *Cinchona officinalis* yielding 6 per cent. of quinine and 5 per cent. of cinchonidine; also the valuable calisaya of Santa Fé, as soon as seeds and young plants can be obtained in quantity.

Dr. J. Moeller, of Vienna, in the *Pharm. Cent.*, describes the bark of mokundu kundu, brought by Dr. Livingstone from Mupanga, Central Africa. After giving a thorough microscopical and chemical description of the bark, he arrives at the conclusion that it is not, as was supposed, derived from *Nauclea africana*. The bark has a pure bitter taste and is said to be not inferior to cinchona. Its active principle is soluble in both hot and cold water. Dr. Moeller tested for the presence of an alkaloid without success, but had only two grams to operate on.

In a paper on the materials containing tannin used in Japan, Mr. J. Ishikawa (*Chemical News*, December 3, p. 275) states that Japanese galls give the same reactions as Aleppo galls, but contain a larger percentage of tannin. The galls are gathered in July, August and September, placed in wooden tubs and boiling water added, in which they are allowed to remain for half an hour; they are then removed and dried in the sun for three or four days. In Kiyoto they are said to be kept in storehouses for some years before being used, as the dyers prefer the old kinds, which they say are stronger. The old varieties, which are more brittle and yield darker decoctions, are said in some specimens to contain 63·26 of tannin while the younger specimens give only 60·9 of tannin. A remarkable liquid, called "kaki-no-shibu," prepared from the astringent fruits of the persimmon (*Diospyros Kaki*), is used for giving strength and durability to paper, which is applied to many more uses in Japan than in Europe. This property appears to be due to the deposit from the film of liquid, with which the paper is covered, possessing somewhat of the character of lacquer, while the tannin acts as an antiseptic. The film formed by this liquid on materials coated with or immersed in it is almost insoluble in water or alcohol and is not perceptibly attacked by boiling with dilute sulphuric acid. The kaki-no-shibu is prepared from the fruits gathered early in the summer and beaten in stone mortars. The mass, transferred to wooden tubs, is covered with water for half a day and then filtered through a straw bag. The liquid so prepared is a milky fluid of a light or dark grey colour and evidently holds minute particles of solid matter in suspension. Other tanning materials used in Japan are "kashiwa kawa" bark (*Quercus dentata*), containing 2 to 7 per cent. of tannin, betel nuts, pomegranate bark, shibuki bark (*Myrica rubra*), yielding 11 to 14 per cent. of tannin, and yasha bushi fruit (*Alnus firma*), with 25 to 27 per cent. of tannin.

A celebrated febrifuge of Cochin China, known there as "thuang son," has recently been introduced to European gardens as a decorative plant (*Gardeners' Chronicle*, December 18, p. 790). It belongs to the Acanthaceæ, and is called *Meninia turgida*.

A good deal has been written about the adulteration of drugs lately. That of food, however, is not only more common, but is apparently on the increase. The *Garden*, December 18, p. 616, quotes a statement made by Mr. Medhurst, a British official in China recently, that 53,000 lbs. of willow leaves were being made ready to be mixed with teas at one port alone.

With respect to the consumption of saffron in this country, referred to by Mr. C. B. Allen at the last Evening Meeting, a correspondent, who is one of the largest importers of saffron in this country, writes to say that out of the last 5 cwt. received, half of it was sold in Cornwall, and that it is quite usual for half the quantity imported to be supplied to that county. He also states that a good deal of saffron goes to Ireland for colouring butter, and some quantity to leather dealers in Walsall.

In *Comptes Rendus*, December 6, pp. 942–945, Messrs. Gaireau and Machelart describe a new crystalline principle, called bergenin, which they have obtained from several species of *Saxifraga*, notably from *S. sibirica*, *S. cordifolia* and *S. crassifolia*. Bergenin is stated by the authors to be a nervine tonic suitable in those diseases which enfeeble the vital forces, and they consider that, as a tonic, it should be placed between quinine and salicin. The formula of bergenin is $C_6H_4O_4$. It crystallizes in tetrahedrons from alcohol, and in prisms with dihedral summits from a watery solution. It appears to possess the properties of an acid, as it forms soluble salts with potassium, calcium, barium and magnesium, and a precipitate with lead soluble in excess of the acetate of lead.

A new acid, to which the name of phytolaccic acid has been given, has been obtained by M. Terreil from the fruit of *Phytolacca Kæmpferi*, and in smaller proportion from that of *P. decandra* (*Comptes Rendus*, vol. xci., p. 856). It appears to exist in the plant as an acid salt of potassium. This salt and the free acid are freely soluble in water, and the aqueous solutions have the peculiarity of becoming, when heated with hydrochloric acid, coagulated into a kind of jelly which is no longer soluble in water, though it is very soluble in 90 per cent. alcohol. The acid is stable, and reddens blue litmus strongly, but neither it nor its salts have yet been obtained in a crystalline form.

A neutral crystalline bitter principle has been obtained by M. Tanret from the fruit of the *Simaba Waldivia*, which like its cogener, the *Simaba Cedron*, has a considerable therapeutic reputation in the Central American republics. It was prepared by exhausting the finely powdered waldivia with 70 per cent. alcohol, distilling, and shaking the residue while still warm with a considerable quantity of chloroform. The chloroformic solution is distilled to dryness, and the residue taken up with boiling water, which deposits the "waldivin" in a crystalline form upon cooling. It is slightly soluble in cold water, and soluble in 30 parts of boiling water, 60 parts of 70 per cent. alcohol, and 190 parts of absolute alcohol. In chloroform it is very soluble. Its aqueous solutions froth abundantly, and are excessively bitter. It is easily decomposed by alkalies, losing its bitterness with caustic alkalies nearly instantaneously. Its composition is represented by the formula $C_{18}H_{24}O_{10},2\frac{1}{2}H_2O$. M. Tanret failed to obtain the bitter principle of the *Simaba Cedron* in the crystalline form, answering to the "cedrin" of M. Lewy, and appears to think that that investigator might have had some fruit of *S. Waldivia* mixed with the cedron fruit on which he operated.

Some chlorinated derivatives of strychnine have been described by Messrs. Richet and Bouchardat (*Comptes Rendus*, vol. xci., p. 990). Monochlorated strychnine is obtained by passing into a warm concentrated solution of hydrochlorate of strychnine chlorine equal to one molecule for each molecule of the alkaloid, and adding ammonia, which precipitates a mixture of strychnine, monochlorated strychnine, and more chlorinated products. Treatment with strong alcohol leaves the strychnine undissolved, and the solution is neutralized with hydrochloric acid. It is then evaporated and treated with water, which dissolves out the hydrochlorate of monochlorated strychnine. This body is very soluble in water, chloroform, ether, and strong alcohol, and is represented by the formula $C_{21}H_{24}ClN_2O_2$. It combines with acids, though it is not a strong base; but it is as toxic as strychnine, which it resembles in some points. With sulphuric acid and bichromate of potash, however, it gives a magnificent red colour, and with a mixture of sulphuric and nitric acids an intense cherry-red. Trichlorated strychnine is deposited together with strychnine when chlorine is passed through a cold solution of hydrochlorate of strychnine to saturation. It is separated by washing the precipitate with acidulated water, then with warm water, and dissolving the residue in alcohol, from which it crystallizes slowly. It is insoluble in water, and soluble in ether and chloroform, and it is represented by the formula $C_{21}H_{24}Cl_3N_2O_2$. It differs from the monochlorated derivative by giving no special coloration with sulphuric acid and bichromate of potash, and a purple colour with nitrosulphuric acid; it appears also to be almost without physiological action, even in doses of from 0·5 to 1 gram. Further it no longer combines with acids.

The results of some experiments upon the dialysis of ferric oxide dissolved in a solution of ferric chloride have been recently reported to the French Academy of Sciences by M. de la Source (*Nature*, Nov. 25, p. 86). He represents "fer Bravais" by the formula $30Fe_2O_3{\cdot}Fe_2Cl_6$, and he states that after three months' dialysis of a weak solution of this preparation the greater part of the chlorine had passed into the dialysate, and the proportion of ferric chloride had been reduced to one molecule to 116 of ferric oxide, the chlorine not even then having ceased to pass through. He is of opinion that under certain conditions ferric hydrate *per se* is soluble in water.

A communication by Herr Herzen on acetous fermentation, mentioned *Nature* (November 25, p. 86), seems to furnish an instance of the perversity with which sometimes experimenters proceed on the plan how not to do it. Two of the experiments were as follows:—In one flask was placed 100 c.c. of water, to which was added 10 per cent of pure alcohol and a drop of fermenting wine full of *Mycoderma aceti*. In another was placed the same quantity of water, and 5 per cent. of acetic acid and a drop of the wine added. After eight days there was no *Mycoderma* in the first flask, but a considerable quantity in the second, and from this Herr Herzen infers that the *Mycoderma* is not a cause but a consequence of the change. Pasteur's method of manufacturing vinegar would, in that case, be based upon error. Now it has been expressly stated by Pasteur, and confirmed in practice (see before, p. 133), that the presence of more than 2 per cent. of alcohol hinders the development of the acetous fungus, and it has also been found that it does not flourish in a liquid containing less than 2 per cent. of acid. Therefore, when the experimenter used five times that quantity of alcohol and omitted the acid he produced conditions in which it was previously known the fungus cannot multiply, if even, indeed, it can maintain life. In the second flask with less alcohol and in an acid liquor there was a closer approximation to favourable conditions. A similar phenomenon occurs in alcoholic fermentation, which is well known to be retarded or stopped in the presence of too much alcohol. Further, Boussingault has recently found that sugar is more rapidly transformed into alcohol by the action of yeast if the alcohol and carbonic anhydride be removed from the liquid as they are produced. He also states that fermentation may go on rapidly in the presence of a considerable excess of alcohol, if it be conducted in a partial vacuum. On the other hand, it will be remembered that Mr. H. T. Brown found (*Pharm. Journ.*, [3], vol. iv., p. 615), that with otherwise ordinary conditions fermentation proceeds more slowly under diminished pressure.

Some curious experiments, performed by Dr. Brown Séquard (*Medical Times and Gazette*, November 27, p. 627), on the effects of the local application of chloroform, seem to show that the application of chloroform liniment to the nape of the neck, or to that portion between the shoulder and the neck, known as the epileptogenous region, may not be without some degree of danger.

In the *British Medical Journal*, December 18, p. 957, in the report to the Scientific Grants Committee of the British Medical Association, a very full account is given of the physiological action of a number of anæsthetics with which experiments have been made. From the results obtained it appears that ethidene dichloride occupies an intermediate position between chloroform and ether, being safer than chloroform, while a less quantity is effective than of ether. One paragraph in the report seems so important, especially to manufacturing chemists, that it may be quoted here word for word. "It is worthy of observation that two substances, butyl chloride and isobutyl chloride, which have the same chemical formula, exhibit such different actions. The same contrast is seen in the actions of ethene dichloride and ethidene dichloride, which are also isomeric. The first of these produced severe convulsions, while the second promises to be an excellent anæsthetic without any convulsive effects."

The mixed anæsthetics, such as chloramyl (made by adding 2 drachms of nitrite of amyl to 1 pound of chloroform) and mixtures of ether and chloroform, etc., do not appear to have as yet been experimented upon. Benzine, acetone, pyrrol, amylene and bichloride of methylene (apparently a mixture not having a constant boiling point), methyl and ethyl chlorides and nitrous ethyl ether, did not yield satisfactory results.

The elder (*Sambucus nigra*) has been the subject of an investigation by M. Govaerts (*Répertoire*, Dec., p. 529) with a view to determining what part of the plant and what pharmaceutical preparation is most favourable for obtaining and administering the active laxative principle. He finds that the juice from the fresh leaves is the best form, in doses of about 60 grams, with 5 drops of spirit of peppermint. The juice of the bark is also said to produce excellent effects, if the preparation is well made; it may be given in doses of 15 to 30 grams. The most agreeable preparation is a wine of the fresh bark (30 parts in 100), and it keeps the best; in doses of 15 to 30 grams it produces copious alvine evacuations, but these are accompanied by nausea and vomiting. A high temperature or drying appears to exercise a deleterious effect upon the leaves and bark, and preparations of them, by completely destroying the active principle.

In a paper read before the Philadelphia College of Pharmacy (*Amer. Journ. of Pharm.*, December, p. 593), Dr. Wolff describes some experiments made with a view of overcoming the inconveniences sometimes attending preparations of morphia intended for subcutaneous injection. He finds the best results obtained by making a quarter of a grain of the hydrochlorate and an equal quantity of sodium chloride into a pellet by moderate pressure in a suitable pill press. Such pellets are said to keep without difficulty in a glass tube that can be carried in the pocket, and to dissolve readily. Dr. Wolff finds also that the solution causes less pain than the ordinary solutions of either morphia salts alone or with the addition of an antiseptic.

In the *British Medical Journal* for November 27, p. 841, some remarks on the proper form in which to use pancreatine, from the pen of Dr. H. Dobell, will probably interest those readers who have a demand for pancreatic preparations. In the same journal, Dr. Murrell describes the results of experiments with Chaulmoogra oil in phthisis, and finds that the best mode of internal administration is to take it in milk, or externally to rub it into the chest.

The curious practice of swallowing a spider in dough or spider's web in a pill, for the cure of ague, would seem from the letters of correspondents on p. 909 of the same journal, to point out that at least these insects deserve a chemical investigation. Ants are known to contain formic acid, which has reputed therapeutical properties, and spiders certainly possess some power, not merely of poisoning their victims, but preserving their bodies from putridity until intended to be used, if the stories in books on natural history are to be believed. If spiders really contain a substance of value in ague it might, doubtless, be also prepared artificially, and would then be less likely to excite disgust in patients.

In the *Practitioner* for December an account is given of an empirical cure for diphtheria, discovered by a woman at St. George-sur-Loire, which was adopted with success by Dr. Cornilleau. On analysis the remedy proved to contain oxalic acid and traces of tannin. The formula used by the Dr. Cornilleau in imitation of this remedy was—pure oxalic acid, 1·5 gram; infusion of green tea, 120 grams; syrup of bitter orange peel, 30 grams; a dessertspoonful being given every three hours. Seventeen out of eighteen cases are reported to have been successfully treated by this remedy.

Dr. Sporer, of St. Petersburg, states that chloral in the solid state will relieve the most severe toothache in a few minutes, if a small piece wrapped in cotton wool is placed in the cavity of the tooth and allowed to dissolve.

At a recent meeting of the Berlin Medical Society (*Medical Times and Gazette*, November 27, p. 623). Professor von Langenbeck exhibited a new material for forming plaster splints and dressings which has received the name of tripolith. It was originally intended for stucco and decorative purposes, but its greater lightness and the fact that when once hard and dry it absorbs no more water attracted the attention of Professor Krönlein, to whom it was mentioned by a patient as being superior to the plaster of Paris dressings in ordinary use. Its exact composition is not known, but it is supposed to be a compound of calcium and silicium oxides with a minute portion of iron. It forms a grey powder of the same weight as plaster of Paris, but finer and softer to the touch.

The colouring of wall-papers has been for years past a subject of sporadic communications, containing a full share of clap-trap, but referring chiefly to the danger resulting from the use of arsenical greens. Herr Bernbeck now calls attention (*Pharm. Zeit.*, Dec. 11, p. 792) to a possible inconvenience resulting from the use of ultramarine. He states that a room covered with an ultramarine coloured paper was observed to be tainted by a smell of sulphuretted hydrogen, the source of which long escaped detection. Eventually, however, it was associated with the paper, and a closer examination led to the conclusion that the ultramarine on the surface was being slowly decomposed under the influence of the alum in the paste used in hanging the paper. This appeared to be confirmed by the fact that a piece of the paper steeped in very dilute solution of alum gave off sufficient sulphuretted hydrogen to be perceptible to the nose and to blacken lead paper.

During the past week, by a judgment of the Exchequer Division of the High Court, the right of the Government to a monopoly of communication by telephone in this country has been so far established, and unless this judgment be reversed on appeal there is some probability of a considerable development in this direction. Under these circumstances it may be interesting to mention one of the possibilities in connection with the necessary manipulation. The *Scientific American* states that recently a workman on the roof of a house in New York, in arranging the wires, dropped an electric light wire upon a telephone wire belonging to a Messrs. Silcox. The result was that the persons in the office of this firm were startled by a burst of flame from the telephone instrument on the wall, the heat produced being so intense as to melt the magnets. It is true that such accidents may be prevented by a proper use of insulating materials, but the point is that in this instance the precaution was neglected, as it might be in others.

At the present time, when selenium is likely to be in demand in connection with the photophone, it may interest some to know that a mineral is found in the region of Cachenta, in the province of Mendoza in the Argentine Republic, which contains 28 per cent. of selenium (*Brit. Med. Journ.*, December 18, p. 993). This mineral contains also 28 per cent. of copper, and lesser quantities of iron, lead, silver, tellurium and sulphur.

At the meeting of the Physical Society on the 11th inst., Lieut. Darwin read a paper on the rate of loss of light from phosphorescent substances, based on some experiments with Balmain's paint (*Chem. News*, Dec. 17, p. 302). It was illustrated by a curve which appeared to show that the loss is independent of the original intensity of the illumination, and that it diminishes very nearly in proportion to the square of the intensity of the light. Lieut. Darwin seemed to think that for the charging of the paint a short exposure to a strong light is not equivalent to a longer exposure to a feeble light. A slight increase in the temperature of the surface considerably increases the quantity of light given off in a certain time.

Turning to the "Dispensing Memoranda" of the past month, in the remarks on the mixture of liq. arsenicalis with liq. ferri dialysat., sufficient attention has not been paid by correspondents to the fact that Wyeth and Co.'s solution of dialysed iron was used in the original prescription, and therefore that the results accompanying a mixture of a 5 per cent. solution of dialysed iron with liq. arsenicalis may not be quite the same as those attending a solution of which Wyeth and Co. are the makers. This is an inconvenience which must necessarily occur occasionally with preparations of foreign manufacture, and those for which there is no definite official strength.

In Mr. Langbeck's communication with regard to aq. caryoph., he suggests a method of making it by rubbing down the oil with magnesia and water. The practical inconvenience attending a water made in this manner has been alluded to by a correspondent. The result of a little of the magnesia being dissolved by the water may, in some combinations, be a decomposition of one or more important ingredients in the mixture. In addition to this there is a gradual deposit in the shop bottle from a water prepared in this manner. Such a water at best is but a poor substitute for one drawn from the cloves, and a mixture dispensed at an establishment where water made with the oil and magnesia had been used would not compare favourably with one from a house using aq. caryoph. drawn from the cloves.

Mr. Kendall thinks "there would be less discrepancy in dispensing if prescriptions were made up as written." A very comfortable notion to entertain, but one that is scarcely, in the presence of existing facts, practicable. He probably may not be a careful reader of these columns, or may, perchance, have overlooked the correspondence which has taken place on hyd. chlor. The question arose, what was written? and conflicting have been the answers to that apparently simple question. The dispenser must exercise some discretion, and bring his practical experience to bear in the discharge of his very important duties.

The balsam of copaiba could not be taken in divided doses if the mixture No. 475 were sent out as written. It is necessary, therefore, to make an emulsion of it by means of the same quantity of mucilage with trituration in a mortar, and the infusion of roses being gradually added with the acid sulph. arom., the copaiba will, by this method, be suspended and diffused through the mixture. It will not separate within a reasonable time, but there is that tendency in all emulsions, and sooner or later they will separate. It cannot, therefore, be said that it will not afterwards separate.

The recipe No. 476 is not the prescription of a duly qualified medical practitioner. It is difficult to say what appearance it should have when made, as great liberties are often taken with these domestic recipes for external application. The juice of Solomon's seal may be obtained in the same manner as other expressed juices by bruising in a mortar and pressing out the liquid.

The difficulty in No. 477 is more apparent than real. The prescriber has clearly ordered a ℥iss mixture and the first three ingredients being ℥ss ℥j more is required to be added of equal parts of simple syrup and distilled water to complete the quantity. This method of ordering the vehicle is not uncommon, but at the same time many dispensers may not have had the opportunity of seeing it. It is not by any means the most simple method of ordering what is required and little can be said in its favour.

The prescriber of No. 478 evidently intended that the iodine should be dissolved for use in the ol. terebinth. and tr. opii, but perhaps was not aware that iodine is soluble to a very limited extent in either of these two ingredients. The iodine should first be dissolved in a little sp. vini rect. and then mixed with the other ingredients. In the presence of such a difficulty the addition of a little spirit is quite admissible, having regard to the evident intention of the prescriber when he wrote the prescription that the iodine should be in a state of solution and thus capable of application.

The prescription No. 479, if dispensed as written, will not make a colourless solution unless a much larger quantity of ammonia be used, which is not admissible without the direct sanction of the prescriber. Time favours the decolorization. Dispensed as written it must stain the skin on its application.

Croton chloral hydrate is ordered in prescription No. 480 to be given, 15 grains for the first dose and 7½ grains every two hours until the pain ceases, and the dispenser seems to think the dose excessive and that such a dose should be brought under the notice of the prescriber previously to its being dispensed. Dr. R. Engel (in his paper on croton chloral hydrate in the *Pharmaceutical Journal*, [3], vol. v., p. 341) says, "croton chloral is hypnotic in doses of ½ to 1 gram"—that is, in doses equivalent to the first of 15 grains ordered in the prescription,—and the writer guards against an excess of the remedial agent by a direction that one tablespoonful be repeated every two hours till the pain ceases. An acquaintance with the medical literature of this substance will show that a dose of 15 grains followed by doses of half that quantity is not beyond what may be given in cases of acute neuralgia, and with such a prescription there can be no reasonable excuse for referring to the writer for consideration.

Mr. Spence has a prescription, No. 481, containing ℥j aq. laurocerasi, and states that taking the Pharmacopœia as his guide, the dose is excessive, and at the same time he asks if the dispenser would be justified in reducing the dose. It is most important that a dispenser should recognize an unusual dose in a prescription and he would naturally refer to his Pharmacopœia, but the preparation referred to is by no means constant in its strength. The writer of the inquiry may read with advantage Mr. Umney's paper on aq. laurocerasi [2], vol. iv., p. 469. He will there find how variable this preparation is, even when freshly prepared, and reckoning the percentage of hydrocyanic acid in some of the best samples and comparing it with the acid. hydrocyan. dil., B.P., he will find that, supposing the aq. laurocerasi to be of a quality yielding the largest proportion of hydrocyanic acid, the dose given in this prescription would be equivalent to 3 minims acid. hydrocyan., B.P., a dose very commonly largely exceeded. There would seem, therefore, no reason why aq. laurocerasi of the best and freshest make should not be given in doses of ʒj. It must, however, be stated here that a dispenser may decline to dispense the prescription if he considers that it is attended with danger to the life of the patient, but when there is no evident error in the prescription he is not justified in reducing a dose. Such a liberty may lead to great irregularities.

There is no difficulty in making a very satisfactory mixture of No. 482. By mixing the quinæ sulph. with the acid. sulph. arom., putting the solution into the bottle with half the quantity of the aq. chlorof., then dissolving the salts in the other half and mixing the two solutions, an elegant but slightly opalescent mixture will result, without any separation. It is difficult to understand why the question should have been asked, and the writer, who has signed his appropriate, if not his proper name, should at least state how he got into a difficulty and what that difficulty was which induced him to ask the question.

The question in No. 483, as to what magnesia should be used when magnesia is ordered, has on more than one occasion been referred to and fully explained; one will be found in [3], vol. viii., p. 849, to which "Bute" is referred. At the same time he is requested to study the magnesias and to acquire clear notions of the differences in constitution indicated by the different names. When the B.P., under magnesia, gives a formula for its preparation by driving off carbonic acid from the carbonate, how can "Bute" use mag. carb. pond.? Again, as to the bismuth, why use bismuth. carb.? On reference to the B.P. it will be seen the bismuth. subnit. of the present Pharmacopœia was called bismuth. alb. in the Pharmacopœia of 1864. The introduction of bismuth. carb. is comparatively recent, while bismuth has had a place in successive Pharmacopœias from a remote date. The present bismuth. subnit. should undoubtedly have been used in this prescription.

Prescription No. 484, has exploded after standing a few days. The decomposition which took place must have been due to the ext. tarax. being more or less acid, and on the addition of mag. carb. carbonic acid would be liberated and cause the result complained of. With ext. tarax. in that condition, the best course to adopt would be to dissolve the extract in hot water, and to add the carbonate of magnesia in an open vessel. Under these circumstances the gas would soon be driven off, and no further change of the character named need be anticipated.

The combination of ingredients in No. 485 must result in a precipitate, and a "shake" label was very properly placed on the bottle. It would have been a great mistake to have filtered the mixture for the sake of appearance, as the most active constituents would assuredly have been filtered out. If a dispenser has acquired a reputation for faithful dispensing he has no need to fear an occasional inquiry with regard to the difference in appearance of a medicine dispensed at his and any other establishment.

The explosion of the ingredients in prescription No. 486 might have been anticipated, and the publication of such a result may serve to put dispensers on their guard against such combinations.

With regard to the recipe No. 487, a solid cocoanut oil cannot be mixed with rum for a hair-wash; but there is an article known in the market as liquid cocoa-nut oil, which may be used in the same manner as the widely known preparation of rum and oil, celebrated of old as one of the best applications to prevent the hair falling off, and this fluid oil is probably the one indicated in this recipe. A separation takes place, and it must be shaken before use.

The powder of No. 488 should be dispensed with each article separately powdered and perfectly dry; there will thus be no occasion for rubbing the two ingredients together, which would facilitate their decomposition. If each powder be in a proper state there will be no immediate decomposition or any serious inconvenience in dispensing it.

In No. 489 the application should be dispensed as written, with a "shake" label attached to the bottle. The dispenser would not be justified in increasing the iodide of sodium with a view to dissolving the iodide of mercury. There is no evidence that the writer intended complete solution Had he written "solve" instead of "misce," there would have been some show of reason for a doubt on the subject.

The prescription, No. 490, seems to be one intended for piles. It is difficult to determine what was meant by ung. P. It may mean one of the lead ointments of the Pharmacopœia, or equally ung. picis, and the fact that it was sent out, by a Manchester firm, of a pink colour would tend to the latter.

Mr. W. Symons has done good service in publishing prescription No. 491, with the correspondence. It probably represents one of those "unholy alliances" of medical men with special pharmacists, which have so often been deprecated in these pages.

The sax. olei purif., of prescription No. 492, is one of the varieties of petroleum, known in the trade as saxoline, and of which vaseline may be taken as typical.

THE USES OF HENNA IN ALGERIA.

The following observations, chiefly abstracted from a recent page of the *Répertoire de Pharmacie*, may supplement some details of information on the subject of henna, which appeared in our columns of July 4, 1874.

The name "Henné-al-hennah," is given by the Arabs to a plant belonging to the order Lythraceæ (*Octandria monogynia*), the *Lawsonia inermis* of Linnæus. This shrub, well known to the ancients, is very common throughout India, Cabul and Persia, appears to be a native of Arabia, and to have been distributed by the Arabs into Turkey (Asiatic and European), Egypt, and along the coast of the Mediterranean. It is, however, rather uncommon in Algeria, and the bulk of the products derived from it are obtained from the East.

A considerable business is done in the leaves of this plant, which are collected in the green state and dried in the sun. An aqueous decoction made from the coarsely powdered leaves gives, after a few hours, to objects to which it is applied a peculiar ruddy coloration, somewhat similar to that of red ochre, but not quite to so deep a tint, and this stain lasts for some three or four weeks. The flowers are remarkably fragrant, whether fresh or dry, and are particularly grateful at a distance. The leaves are in daily domestic use by nearly every tribe obeying the Mussulman law. The women use it for dyeing the palms of their hands and the soles of their feet, partly with the idea of enhancing their natural charms, as the Japanese will blacken their teeth and the Indians tattoo themselves. Henna is also used for staining the hair of children of both sexes, not only for beautifying purposes, but as a specific against the skin diseases so frequent in youth, especially when the hair is allowed to grow very long, as is the case with the young Arabian girls and with the boys until a certain age, when the head is shaved, leaving only a long tail from the crown. This custom of shaving the heads of boys is not, however, general; certain religous sects, amongst which the very wide-spread one of the Aïssaonas (especially near Morocco) allow the *chevelure* of both sexes to grow long.

The indigenous Jews also adopted the use of henna for the same purposes as the Mussulmans, those only who have acquired French habits having abandoned it,—at least, so far as using it for toilette purposes.

The peculiar reddish-brown stain of henna deepens the natural colour of the hair, and to certain tribes, especially that of the Kabyles, whose hair is very fair, the effect of its coloration is more pronounced, often leading strangers who see it for the first time to believe the colour natural.

On moistening the dried leaves a slight odour is perceptible; their taste is bitter and faintly aromatic; they contain a red colouring matter, an essential oil and tannin. A medicament prepared from them is employed by the Arabs in the treatment of wounds of all kinds, causing the skin to grow over and healing them very quickly; these effects are probably due to some exciting action of the essential oil, and to the astringent properties of the tannin. They use this remedy principally on horses, to heal wounds or sores caused by friction of the harness or otherwise on a journey. Having stopped for a rest and unsaddled, they will apply a plaister of it, and continue their march without taking more thought of the wound, which, if it does not heal, at least does not extend, and causes less suffering to the horse. They also employ it as a means of preventing the opening of old wounds, where the hair has not grown over the scar; it closes up and hardens the tissues,—in fact, tans the skin.

For similar reasons, the Arabs who can afford to indulge in the sport of gazelle hunting will give their horses a foot-bath of henna, especially if the animals are young, or have not taken great exercise for some time. There may be some analogy to this in the custom prevailing amongst Arabian women of staining the palms of the hands and the soles of the feet,—it may render the skin less tender.

In India a cosmetic is made by beating up the fresh leaves with catechu. Although a decoction of fresh leaves stains the skin it does not appear to communicate its colour to cloth.

Acids destroy the colour, but alkalies and infusions of astringent vegetables deepen it.

The species *Lawsonia spinosa* is considered by Roxburgh to be nothing more than the *L. inermis* (or *alba*), grown on a dry sterile soil, causing it to be very thorny and the branches short and rigid.

THE CHARGE AGAINST A CHEMIST UNDER THE WEIGHTS AND MEASURES ACT.

The following communication from the Board of Trade, upon the subject of the recent conviction for being in possession of verified incorrect apothecaries' measures, has been kindly forwarded by Mr. Whittle for publication:—

"Board of Trade,
"(Standards Department),
"7, Old Palace Yard, S.W.,
"*December* 21, 1880.

"Sir,—I am directed by the Board of Trade to acquaint you that their attention has been called to a report of a prosecution under the Weights and Measures Act, 1878, at the Court House, Saint Marylebone, on the 6th inst., and as it appears that the decision of the magistrates is to be appealed against, I am to transmit to you herewith copy of a letter addressed by this Board to the Chairman of the Magistrates before whom the summons was heard.

"I am, Sir,
"Your obedient Servant,
"C. CECIL TREVOR,

"Mr. E. C. WHITTLE,
"Chemist,
"6, Townshend Road,
"St. John's Wood."

[*Copy.*]

"Board of Trade,
"(Standards Department),
"7, Old Palace Yard, S.W.,
"*November* 24, 1880.

"Sir,—With further reference to your letter of the 8th inst., I am directed by the Board of Trade to transmit to you herewith copy of a statement of the errors which have been found to exist after comparison with the Imperial standards in the four graduated glass apothecaries' measures received from the Inspector of Weights and Measures for St. Marylebone, and I am to state that having regard to the practical difficulties of construction and graduation of measures of this particular form, the Board of Trade, as at present advised, think that the measures now in question may be accepted as correct for the purposes of ordinary trade; although the differences from the Imperial standards, as shown in the accompanying statement, are larger than should be allowed in other forms of apothecaries' measures.

"I am, Sir,
"Your obedient servant,
"(Signed), C. CECIL TREVOR.

"THOMSON HANKEY, Esq.,
"Chairman of the Petty Sessional Division,
"Court House,
"St. Marylebone."

"*Statement of the errors, in minims, of four graduated glass measures, Nos.* 1, 2, 3 *and* 4, *received from the Inspector for Marylebone.*

No. 1 *Measure.*

Graduation.		Error.	
5	minims	− $\frac{3}{10}$	minim.
10	,,	− $\frac{1}{10}$	,,
15	,,	− $1\frac{8}{10}$	,,
20	,,	− $1\frac{1}{10}$	,,
25	,,	− $1\frac{1}{10}$	,,
30	,,	− $\frac{3}{10}$	,,

No. 1. *Measure—continued.*

Graduation.		Error.	
35	minims	+ $\frac{1}{10}$	minim.
40	,,	+ $1\frac{1}{10}$	,,
45	,,	+ $\frac{9}{10}$	,,
50	,,	+ $1\frac{6}{10}$	,,
55	,,	+ $1\frac{2}{10}$	,,
60	,,	+ $1\frac{4}{10}$	,,
70	,,	+ $\frac{5}{10}$	,,
80	,,	− $\frac{3}{10}$	,,
90	,,	− $\frac{6}{10}$	,,
100	,,	− $1\frac{5}{10}$	,,
110	,,	+ $\frac{4}{10}$	,,
120	,,	− $\frac{1}{10}$	,,
150	,,	− $\frac{2}{10}$	,,
180	,,	− $\frac{3}{10}$	,,
210	,,	+ $\frac{1}{10}$	,,
240	,,	+ $2\frac{5}{10}$	minims.

No. 2 *Measure.*

5	minims	− $\frac{4}{10}$	minim.
10	,,	− $\frac{5}{10}$	,,
15	,,	− $1\frac{3}{10}$	,,
20	,,	− 1	,,
25	,,	− $\frac{5}{10}$	,,
30	,,	− $\frac{9}{10}$	,,
35	,,	− $1\frac{2}{10}$	,,
40	,,	+ $\frac{3}{10}$	,,
45	,,	− $\frac{1}{10}$	,,
50	,,	− $\frac{8}{10}$	,,
55	,,	+ $\frac{6}{10}$	,,
60	,,	+ 1	,,
70	,,	+ $\frac{3}{10}$	,,
80	,,	− $\frac{1}{10}$	,,
90	,,	− $\frac{9}{10}$	,,
100	,,	− $1\frac{3}{10}$	,,
120	,,	− $\frac{7}{10}$	,,
120	,,	− $\frac{4}{10}$	,,
150	,,	− $\frac{9}{10}$	,,
180	,,	− 2	minims.
210	,,	− $\frac{5}{10}$	minim.
240	,,	+ $\frac{7}{10}$	,,

No. 3 *Measure.*

5	minims	− $\frac{1}{10}$	minim.
10	,,	− $\frac{9}{10}$	,,
15	,,	− $\frac{1}{10}$	,,
20	,,	+ $\frac{5}{10}$	,,
25	,,	+ $\frac{3}{10}$	,,
30	,,	− $\frac{1}{10}$	,,
35	,,	+ $\frac{3}{10}$	,,
40	,,	+ $\frac{4}{10}$	,,
45	,,	+ $\frac{3}{10}$	,,
50	,,	+ $\frac{4}{10}$	,,
55	,,	+ $\frac{6}{10}$	,,
60	,,	+ $\frac{1}{10}$	,,

No. 4 *Measure.*

5	minims	+ $\frac{9}{10}$	minim.
10	,,	+ $\frac{3}{10}$	,,
15	,,	+ $\frac{4}{10}$	,,
20	,,	− $1\frac{1}{10}$	,,
25	,,	− $1\frac{2}{10}$	,,
30	,,	− 1	,,
35	,,	− $\frac{7}{10}$	,,
40	,,	+ $\frac{8}{10}$	,,
45	,,	+ $\frac{2}{10}$	,,
50	,,	+ $\frac{2}{10}$	,,
55	,,	+ $\frac{1}{10}$	,,
60	,,	− $\frac{2}{10}$	,,

"Where the measure is short or in deficiency the sign is —, and where it is large or in excess the sign is +."

The Pharmaceutical Journal.

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Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE CHARGE AGAINST A CHEMIST UNDER THE WEIGHTS AND MEASURES ACT.

In speaking of the prosecution of Mr. WHITTLE under the Weights and Measures Act a fortnight since, we ventured to express the opinion that such cases ought not to be brought before the magistrates without the previous reference to some authority competent to judge of all the circumstances and to decide whether there is sufficient reason for proceedings being taken. In doing so we merely took a common sense view of the matter, having regard to what might be taken as probable in Mr. WHITTLE's case, and we had not the advantage of any special acquaintance with the actual circumstances of it beyond what had been made generally public. There was only one particular which might appear to be somewhat out of accordance with the view we felt disposed to take as to the impropriety of this prosecution, and that was the fact that the magistrates stated that they had received a communication from the Board of Trade, according to which the measures in question were declared to be incorrect. That communication appears to have been put forward by the magistrates as supporting the action of the Marylebone inspector, and therefore inducing them to decide upon a conviction; for the Chairman of the Bench of Magistrates remarked, "we have the evidence before us that the "Board of Trade has pronounced these measures "deficient, and that is sufficient, according to our "opinion, to guide us, and we have the opinion "of our own officer, which agrees with the Board "of Trade. Therefore, the only course is for us to "act upon the evidence of the Board of Trade and "our own officer, and allow you to appeal."

These remarks would certainly imply that there was some valid ground for the prosecution, and it is, we think, to be regretted that, after they had been made, the actual communication from the Board of Trade was not produced in accordance with the request of Mr. GLAISYER, especially as it had been treated by the magistrates as being evidence in the case.

We are this week enabled to publish the letter addressed by the Board of Trade to the Marylebone magistrates, a copy of it having been sent by the Board to Mr. WHITTLE, "in consequence of the an"nouncement that an appeal would be made against "the magistrates' decision," and it will be seen, no doubt with very much surprise, that the opinion of the Board of Trade authorities is very far from being of the nature that the magistrates' remarks would indicate. A complete examination of all the graduations of the four measures sent by the magistrates to the Board of Trade appears to have been made at the office of the Standards Department. The letter is accompanied by a tabular statement of the results obtained by the Board of Trade in testing the measures in question, and those results differ very materially from the data of the Marylebone inspector. Taking those graduations of the four measures which were stated by the Marylebone inspector to be incorrect, and comparing his data with those of the Board of Trade, it appears that some of them are much in excess of those given by the Board of Trade, while others are of smaller amount, and only two or three accord with them. Thus, for instance, the 5-minim graduation of measure No. 1 was stated by Mr. TIBBEY to be 1 minim deficient, while the Board of Trade reports it to be only three-tenths of a minim deficient. The 10-minim graduation stated by Mr. TIBBEY to be 1½ minim deficient is reported by the Board of Trade as being only one-tenth of a minim deficient.

Similar discrepancies between the data of the Marylebone inspector and those of the Board of Trade obtain in regard to most of the other graduations, and the evidence furnished by the results of the Board of Trade examination of the measures is not only no confirmation of the inspector's charge against Mr. WHITTLE, but it distinctly shows that the inspector's results were incorrect. A glance at the tabular statement on the previous page will satisfy anyone of this, and it is therefore astonishing that the Marylebone magistrates could have viewed it as supporting their officer's allegation that Mr. WHITTLE's measures were unjust.

Moreover, in the letter addressed to the Chairman of the Magistrates, it is distinctly stated that the measures in question might be accepted as correct for the purposes of ordinary trade. This opinion was based upon considerations of the practical difficulties of constructing and graduating measures of the kind, and it is one that will command the acquiescence of everyone conversant with the subject. The further remark that the discrepancies from Imperial standards in the graduations of the measures in question are greater than should be allowed in other forms of apothecaries' measures does not in any way lessen the force of the Board of Trade's approval of those measures as being proper for use, but, as we understand, it applies only to measures of small capacity, such as are suitable for measuring small quantities of potent medicines, and, as we pointed out in a previous article, half-ounce measures would not be used for that purpose.

We cannot conceive why the information furnished by the Board of Trade in regard to this case should not have been made known when the adjourned hearing of the case came on. That information appears to have been given so far back as the 24th of November last, and coming from so authoritative a source it ought to have been allowed to influence the magistrates' decision in the direction to which it so clearly points. To our apprehension the case against Mr. WHITTLE is entirely disposed of by the Board of Trade's evidence, and the fact that he has been compelled to undergo the ordeal of appealing against a conviction founded upon such insufficient grounds is a hardship to which he ought not to have been subjected by the magistrates, even for the sake of supporting the position assumed by their official.

The case, elucidated as it now is by the letter we publish this week, affords strong reason for the adoption of such a course as we suggested when last writing on the subject. Inspectors of weights and measures are not qualified for the work of testing graduated measures and the finer kinds of weights, and until adequate provision is made for this work being done properly prosecutions should not be entered upon. We make no reflection upon the Marylebone inspector, and do not doubt that he has done his best and has lodged the complaint against Mr. WHITTLE in perfect good faith, but it is as obvious now, as it was before probable to every one capable of judging, that he was mistaken, and that by the action he has taken grievous injustice has been inflicted upon Mr. WHITTLE as well as the makers of the measures referred to in the prosecution.

CHINESE MATERIA MEDICA.

MR. CONSUL ALLEN, writing from Shanghae, refers to some curious articles of trade which are imported there for use in Chinese medicine. About three tons of tigers' bones were so imported during 1879, and this supply was supplemented by four tons of crocodiles' scales. Young deer's horns are also met with, and a considerable quantity of ginseng is imported from Japan. It is conjectured that much more ginseng enters Shanghae than is accounted for at the custom house, its small bulk relatively to its value making it a convenient article for smuggling.

Reporting on the trade of Macao, Mr. Vice-Consul MURRAY says that star-anise reaches that place from the province of Kwansi, and is exported to the coast ports, and a large quantity goes to England and the Continent. The quantity exported in 1879 amounted to about 8000 piculs (nearly 500 tons), valued at 160,000 dollars. Star-aniseed oil is also exported to Europe and a little finds its way to Manila occasionally. Cassia oil also is sent into the same markets generally as star-anise oil.

Persian opium appears to be making its way into all parts of China and together with the native opium enters into competition with that of Indian growth. The Persian opium is, however, said to be frequently adulterated with sugar.

Transactions of the Pharmaceutical Society.

GENERAL MEETING—BENEVOLENT FUND.

ELECTION OF ANNUITANTS.

A General Meeting of the Members, Associates in Business, and Associates of the Pharmaceutical Society, and of the Subscribers and Donors to the Benevolent Fund, was held at the house of the Society, 17, Bloomsbury Square, on Friday, December 17, at 12 o'clock, for the Election of FOUR ANNUITANTS.

Mr. THOMAS GREENISH in the chair.

The notice convening the meeting was read.

Scrutineers were appointed, who examined the voting papers and brought up the following report:—

Scrutineers' Report.

We, the undersigned Scrutineers, appointed at the sixteenth election of annuitants on the Benevolent Fund of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following result:—

Barker, John	**4711**
Woods, Elizabeth	**4441**
Dutton, Sarah Ann	**3520**
Kennett, Louisa	**3268**
Watkins, Louisa	3093
Godden, George	2148
Hellowell, Mary Ann	1370
Bowen, Margaret Sophia	1214
Robinson, Samuel	856
Rowlands, Amelia C.	660

3455 voting papers were received, of which number 62 were informal (42 unsigned) and were disallowed.

J. ROBBINS, Chairman.
SIDNEY PLOWMAN.
E. N. BUTT.
CHARLES A. BLAKE.
CHARLES E. TURNER.
CHARLES J. MEAD.
WILLIAM GULLIVER.
ROBERT FISHER YOUNG.
EDWARD L. CLEAVER.
WALTER HILLS.
W. H. SYMONS.
R. S. DAMPNEY.
W. H. FERGUSON.
THOMAS RICH.
WM. TOOGOOD FROST.
JOHN S. LINFORD.
WM. VALENTINE RADLEY.
CHARLES B. ALLEN.

December 17, 1880.

The Chairman declared the following four duly elected Annuitants:

Barker, John.
Dutton, Sarah Ann.
Kennett, Louisa.
Woods, Elizabeth.

A vote of thanks was given to the Scrutineers for their long and arduous duties.

EXAMINATIONS IN EDINBURGH.

December 15, 1880.

Present—Messrs. Ainslie, Borland, Gilmour, Kemp, Kinninmont, Stephenson and Young.

Professor Maclagan was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Two candidates were examined, and were declared qualified to be registered as Pharmaceutical Chemists:—

Dunlop, Thomas	Govan.
Lees, David	St. Andrew's.

MINOR EXAMINATION.

Twelve candidates were examined. *Five* failed. The following *seven* passed, and were declared to be qualified to be registered as Chemists and Druggists:—

Forret, John Alexander	St. Andrew's.
Grant, Thomas Mackay	Edinburgh.
Grigor, William George	Edinburgh.
Hewitt, John Richard	Birmingham.
Mair, William Low	Leslie.
Morison, John	Edinburgh.
Todd, Joseph	Carlisle.

Addendum.—Page 499, col. 1, above line 20 from bottom, add:—Dr. Greenhow was present on behalf of the Privy Council.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The fifth general meeting of the thirty-second session was held at the Royal Institution on Thursday evening, December 9, the President, Dr. Symes, in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations were announced:—The *Pharmaceutical Journal*, from the Society; and the *Chemists' Journal*, from the President.

The Honorary Secretary (Mr. Conroy) exhibited a caddy of falsely packed musk, which he stated was the worst sample that had ever come under his notice, every pod being more or less packed.

Mr. Thomas Williams, F.C.S., made an interesting communication on the Pharmacopœia test for phosphate of lime.

Mr. Thomas Garside, F.C.S., read the following paper on "Nickel and Nickel Plating," practically illustrating the plating process.

Nickel and Nickel Plating.

BY THOMAS GARSIDE, F.C.S.

Formerly nickel, together with cobalt, was obtained almost exclusively from mines in Sweden, Saxony, Austria and Italy. In these places it exists combined with sulphur or arsenic or both. By a series of roastings and meltings a concentrated matter is obtained which is afterwards treated in the wet way to obtain nickel oxide. The oxide so obtained is mixed with a reducing agent, such as wheat flour, and made into a stiff paste, which is divided into small cubes or grains which, when dried, are placed in crucibles lined with charcoal, a large excess of the latter being used to fill up the interstices between the grains. The crucibles are then stacked in large furnaces and maintained at a high temperature for a considerable time. The result of this operation is that the oxide of nickel is reduced, but the heat not being sufficient to melt the metal the cubes or grains retain their shape and have a porous texture.

The discovery within the last few years of extensive beds of nickel ore in New Caledonia, an island of the South Pacific, belonging to France, has occasioned an extensive development in the production of nickel. Some three or four years ago large quantities of these ores were brought to Europe, and, as a consequence, the price of nickel fell considerably, the demand not keeping pace with the great increase in the supply. From being worth 10*s.* to 14*s.* per lb. it fell, until last year it could be bought for 2*s.* 6*d.* The importation of the ore, however, suddenly ceased. I have not been able to hear of any having come to this country during the present year, and have been informed that there is no prospect of any more being being brought from New Caledonia. That the importation should cease until prices improved would be only in accordance with the law of supply and demand, but it appears that the mines in New Caledonia have passed into the hands of one firm in France, "The Garnier Company," who have established works at the mines, where the nickel is concentrated and a regulus produced containing about 75 per cent. nickel, 23 per cent. iron and 2 per cent. silica. In this condition it is brought to their works at Septêmes, near Marseilles, where the metal is refined. This being the case I presume that "The Garnier Company," will have a monopoly of this kind of ore until it can be obtained from some other source.

The New Caledonian ore differs from those first mentioned in that it contains no arsenic or sulphur, and the quantity of cobalt is so minute that it may be disregarded. In it the metal exists as a hydrosilicate combined with magnesium. This forms the green portions of the specimens. Iron in both the ferrous and the ferric state is intermixed with the green salt of nickel in considerable proportion, but only exists in minute quantity in combination with it. When the ore is pulverized and boiled with HCl, the nickel, magnesium and iron dissolve completely and a residue remains of silica and of a minute quantity of a black substance which, when fused with sodium carbonate and nitrate, imparts to its solution in water a yellow coloration, indicating chromium. This facility of decomposition by acids and its freedom from cobalt, arsenic and sulphur, and from the metals precipitated by H_2S, renders the preparation of pure nickel from this ore a much simpler operation than from the others. Several processes for the extraction of the metal have been suggested, and patents for most of them taken out, and upon these I will make a few remarks.

M. Garnier, who discovered and first described the ores, operates in the dry way and produces a carbide of nickel by fusing with carbon and suitable fluxes; the carbide being afterwards purified by another operation. This process is or was carried on, I believe, by "The Garnier Company," already referred to. By the wet way the usual method is to act upon the powdered ore by means of HCl. For this purpose it is necessary that the powder should be impalpable, otherwise a portion of the silicate of nickel will not be acted upon and loss will occur. I have found it impracticable to obtain it sufficiently fine, except by lixiviation with water. When the solution has been effected, a portion of the iron being in the ferrous state requires to be peroxidized, and for this purpose nitrate of soda, chloride of lime, or a stream of chlorine gas has been used. With the two former the operation is easy enough, but with the latter it would be both troublesome and expensive. After the peroxidation of the iron, chalk or carbonate of barium is added, which neutralizes the excess of acid and precipitates completely the iron together with any aluminium which may be present. I find that the carbonates of the alkaline earths will precipitate nickel to a certain extent from the solution. Carbonate of barium has the least action in this way and carbonate of magnesium the greatest. Any excess above what is necessary to separate the iron must therefore be avoided as much as possible. The solution will then consist of chloride of nickel, chloride of magnesium, and the small quantity of chlorides of calcium, sodium, or barium which have been added. The great difficulty now is the separation of the oxide of nickel from the magnesium, owing to the affinity which the latter appears to have for the former. One method is to treat the mixture with solution of chloride of lime, which precipitates the nickel as black sesquioxide; but as any excess of chlorine partially redissolves the nickel another operation is necessary to recover this, which is done by lime water. It is, however, impossible to prevent some magnesia from going down, and a practical difficulty appears to me to exist in the process of separating and washing the precipitate. The solution and washings containing chlorine would rapidly act upon any ironwork in the pipes, pumps, or filters. Another process is to add milk of magnesia in calculated proportion. The reaction which takes place is $NiCl_2 + MgO = NiO + MgCl_2$. This reaction, however, is never complete, the precipitate contains a large percentage of magnesia, while a considerable quantity of nickel remains in solution. The principal object of the author of this process appears to be to recover the HCl from the chloride of magnesium obtained, by evaporating it to dryness and treating it with superheated steam; a game which, in this country, at any rate, would not be worth the candle.

By another method the nickel is precipitated by sodium carbonate in insufficient quantity to complete the precipitation; the liquor is then drawn off and a little more sodium carbonate added to separate the whole of the nickel, and this last precipitate, mixed largely with magnesium carbonate, is used in the first part of the process to neutralize excess of acid. I have not tried the experiment, but I think it would be impossible thus to obtain the nickel carbonate without a large percentage of the magnesium salt.

Still another method of treating the HCl solution is to evaporate it to dryness and then ignite in earthenware retorts, when the chlorides of nickel and iron are sublimed. This appears to me to be a very troublesome and expensive process.

Sulphuric acid has been proposed for decomposing the ore instead of HCl. Mr. Allen, of Sheffield, has described a method by which he produces nickel sulphide and large quantities of magnesium sulphate, the latter to the extent of 150 lbs., from 100 lbs. of an average sample of ore. The very low price of this salt, however, detracted from the commercial value of the process. It has also been proposed to separate the magnesia by sodium phosphate. As, however, this reagent precipitates nickel as well as magnesium, I do not understand how the separation would be effected unless the solution were made ammoniacal, and the expense of doing so puts it out of the question.

Oxalic acid has also been used to separate nickel from other metals, oxalate of nickel being insoluble in dilute acids, while the oxalates of iron and magnesium are soluble. I find, however, that the precipitated nickel salt carries down with it traces of both these metals, which are not removed even by boiling with dilute HCl, and I have not been able to prepare pure salts of nickel in this way.

By the process which I have worked out and am now carrying on, I obtain nickel oxide with only a very small percentage of magnesia, and also a solution of magnesium chloride almost pure and quite free from nickel, and this when evaporated down yields an article which has a commercial value amongst cotton sizers. The process not being protected by letters patent, you will excuse me for not giving further particulars respecting it.

The presence of a small quantity of magnesia in the oxide of nickel prevents the making of a presentable-looking product by the usual methods for making cube and grain nickel, but if the metal is actually melted it does no harm, and, in fact, forms a slag with and removes any trace of sulphur which may be present and which would be hurtful to the quality of the metal.

The melting-point of pure nickel is very high, and it is only by the greatest care and the strictest attention in maintaining the high temperature that it can be successfully effected. I have melted several pounds on one or two occasions in a fire-brick furnace fed with hard foundry coke and the blast produced by a fan, but it required about five hours' continuous firing, and on some other occasions when I attempted it, the crucible at the end of the operation was not to be found, it having fused and run amongst the ashes like a slag. With the gas furnaces of Mr. Fletcher, of Warrington, however, the thing can be done in a short space of time. If properly managed a given quantity, say, four or five pounds, of metallic nickel can be perfectly fused in one of his medium-sized furnaces in twenty-five minutes, commencing with the furnace cold. Upon one occasion only have I done it in less time than this by a modification in the arrangement of the blow-pipe, but have been unsuccessful in all attempts to repeat the experiment. The chief difficulty I have experienced in the application of Fletcher's furnace is in reducing the oxide of nickel to the metal. With small quantities it is easy, but when crucibles above a certain size are used the crucible gives way before the centre of the mass of oxide of nickel is reduced. The most refractory pots I have been able to obtain will not stand the heat a sufficient length of time. Plumbago crucibles do not melt or soften, but the plumbago burns away. I am endeavouring to overcome the difficulty by arranging the furnace so that it will take a number of small crucibles in the place of one large one.

Ordinary pure nickel is somewhat brittle. Of late much attention has been directed to render it malleable, and this appears to have been effected by several persons. Mr. Fleitmann adds a small percentage of magnesium, the effect of which, if I understand it correctly, is not to produce an alloy, but to exclude certain gases which are absorbed by the metal in cooling and which render it brittle. M Garnier adds three-tenths per cent. of phosphorus, which probably acts in the same way as the magnesium. I have also a specimen of rolled nickel plate, made by Messrs. H. Wiggin and Sons, of Birmingham, but am not acquainted with the method by which it is produced. The advantages of a malleable nickel would appear to be confined chiefly to the manufacture of that class of articles in which the alloys of nickel with copper and zinc would be injurious, as, for instance, in surgical instruments and the anodes used in nickel plating. The alloys used for spoons and other culinary and domestic articles seem to leave little to be desired on the score of whiteness, and they are necessarily much cheaper.

The salts of nickel are made by dissolving the metal or oxide in nitric or sulphuric acids for the nitrate or sulphate, or using oxide and other acids for other salts. The double sulphate of nickel and ammonium is the only one for which there is any considerable demand. It is used in making the baths for nickel plating, and is formed by mixing the sulphate with the calculated proportion of ammonium sulphate and crystallizing in the usual way.

Mr. Allen, of Sheffield, pointed out some time ago that the double sulphate was almost insoluble in strong solution of sulphate of ammonium, and a patent was taken out by Mr. Unwin, of Birmingham, for the preparation of the salt in this way. A concentrated solution of sulphate of ammonium is directed to be poured in large excess into a concentrated solution of sulphate of nickel. A crystalline precipitate of the double salt separates, which can be collected, washed and recrystallized. I find, although the patentee professes to obtain it pure by this means, that ferrous and magnesic sulphates are not separated. I am at present making this salt direct from the New Caledonian ore by a process which yields a practically pure product.

Nickel plating, although known for many years, has only recently received much attention. In Muspratt's 'Chemistry as applied to the Arts and Manufactures,' published in 1860, the following reference is made to it: "Mr. Gore deposited nickel in the state of reguline white metal from a solution of the double chloride of nickel and ammonia by making a lump of metallic nickel the anode in a strong aqueous solution of hydrochlorate of ammonia —sal ammoniac—and passing a strong current of electricity through it for several hours, until the liquid acquired a pale greenish-blue colour; also by treating a solution of 1 part of arseniate of potash and 5 parts water in a similar manner.

"Nickel is likewise deposited from a solution formed by dissolving the pure metal in nitric acid, then precipitating it either by a solution of caustic potassa, carbonate of potassa, or cyanide of potassium; washing the precipitate, and dissolving it in a solution of potassium [ammonia is evidently meant], and operating by means of a battery and an anode of pure nickel."

The salt best adapted to the purpose, and the one now universally employed, is the double sulphate of nickel and ammonium, as before mentioned. The bath should be kept neutral or slightly alkaline and of a sp. gr. of 7° Twadd. By the use of this it is very easy to obtain upon copper or brass a white deposit capable of yielding a very brilliant polish with almost any kind of battery. In practical work, however, and especially in plating articles of iron and steel, considerable care and skill are required, and sometimes even the most experienced are troubled with irregularity of deposit and with the cracking and peeling off of the layer of nickel. To overcome this difficulty, in some cases a coating of copper is first given to iron and steel articles and they are afterwards plated with nickel.

Unless the battery power is properly adjusted to the rate of depositing the nickel may be separated from the solution more rapidly than its place is supplied from the anode, and the bath then becomes too weak and acid. Quite a number of receipts have been suggested or patented for making the baths, but I believe none have superseded the simple solution of ammonio-sulphate. Borax is directed to be added to the bath by one patentee. In other cases organic salts of nickel are recommended, such as the tartrate, citrate, or benzoate. I have been informed by a practical plater that the ammonio-chloride possesses the same advantages as the ammonio-sulphate, and I presume that the latter is used on account of its being more easily procurable. The Americans appear to have taken the lead in this branch of industry, and in the United States nickel plating is much more extensively employed than it is with us. The art is, however, developing very fast and will no doubt very soon be applied in every case where it can be of service. The deposit of nickel is almost as white as silver, but not quite, as may be easily seen by a comparison of the two, but unless placed in juxtaposition an inexperienced eye might find it difficult to distinguish one from the other. The metal is also very hard and not easily scratched, and is not blackened by hydrosulphuric acid; add to this its cheapness, and its superiority to silver for most purposes is very evident.

Although atmospheric influences do not act very rapidly upon it, yet they do so to an appreciable extent, especially if damp; and unless kept polished articles thus coated become tarnished in time. The amount of labour for this, however, is very small to what is required in the case of either brass or silver. In cleaning it care must be taken to use a soft polishing material, such as whiting or rouge, and not a harsh sharp one like emery, otherwise the coat of nickel may easily be stripped off.

A lengthy discussion followed in which the President, Messrs. A. Abraham, Conroy, Davies, Hughes, Mason, Watt and Williams joined.

Mr. Garside fully replied to the points raised in the discussion, and a hearty vote of thanks was passed to the author.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The third monthly meeting of the Nottingham and Notts Chemists' Association was held at the rooms of the Association, Britannia Chambers, on Tuesday Evening December 14, the President (Mr. Fitzhugh) occupying the chair.

There was a good attendance, and during the evening one new member and three new associates were admitted.

Mr. F. H. Spenser gave an interesting lecture on "Heat." He commenced by showing the terms heat and cold were merely different degrees of the same influence, and gave a brief sketch of the two theories advanced to explain the phenomena of heat, showing how the material theory failed and why the undulatory or dynamical theory was generally accepted by modern scientific men. According to this theory, heat was not a material substance, but a condition of matter; what to our sensation is heat, in the object itself is nothing but motion. He then proceeded to treat of the various sources of heat, physical, mechanical, and chemical. The effect of heat on matter was illustrated by numerous familiar examples, and practical applications were pointed out and explained. Exceptions to the general rule were next mentioned. The expansion of water on freezing was shown, and the effect it had upon nature referred to. Ice being lighter than water floats upon the surface, and the life contained in our rivers, lakes, and seas is thus preserved to our use. The boiling point of water and its dependence upon the pressure of the atmosphere were next considered. Papin's digester was described, showing that water, by increasing the pressure, could be heated beyond 100° C. It was also shown how by decreasing the pressure, on the contrary, water boils at a much lower temperature. In a good vacuum water boils at 20° C. That water boils by "convection" not "conduction" was proved, and bodies were divided into good and bad conductors of heat, according to the speed at which heat was propagated along the molecules of the substance. The action of Davy's safety lamp was explained. The lecturer closed with a few practical remarks upon the use and nature of clothing in summer and winter.

The lecture, which was listened to with great attention, was illustrated by experiments. A vote of thanks was accorded Mr. Spenser at its close, which was suitably acknowledged, the lecturer urging the young men present not to neglect the study of scientfic subjects.

LEEDS CHEMISTS' ASSOCIATION.

A lecture was delivered before the members and associates of the Association, on Wednesday evening, December 15, in the Lecture Theatre of the Yorkshire College (kindly lent for the occasion), Mr. Councillor Stead in the chair, by Louis Siebold, Esq., of Manchester, on the "Training of Modern Pharmacists."

The lecturer said the Pharmacy Act had now been in operation for twelve years and it was but natural that thoughtful men should begin to discuss the question whether, and to what extent, the higher education of pharmacists aimed at by the promoters of that Act had become a reality. He was afraid very little true progress had as yet been made in this direction. It was well known that out of the hundreds that, during the last twelve years, had passed their examinations very few ever participated in the work of original research or betrayed in any other way any signs of superior attainments they were generally supposed to have acquired. There were few callings the practice of which afforded better opportunities than pharmacy did for new and useful observations, and there were no societies more eager to receive accounts of such observations than the Pharmaceutical Society and the British Pharmaceutical Conference, yet these societies appealed almost in vain to the younger members of the profession for contributions to their literary records. There were notable exceptions, it was true, and some very excellent work had been done now and then by young pharmacists of the present period, but the number of these young and promising investigators was exceedingly small as compared with the large numbers who since 1868 has passed the pharmaceutical examinations. It was of equally rare occurrence that these men added any scientific employment, such as commercial and other analyses, to their ordinary duties as an additional source of income; and this appeared the more surprising in view of the fact that a portion of what was hitherto considered the legitimate business of the pharmacist was fast drifting away from him through competition from unexpected quarters. The question arose whether or not those who in recent years had joined the ranks of pharmaceutical chemists and chemists and druggists really possessed the scientific qualifications with which they were credited. He (the lecturer) believed that in the great majority of cases they did not, and his opinion on this point was the result of much thought, personal observation and diligent inquiry. He was well acquainted with many who had passed the Minor and Major examinations, but among them he knew but very few who could be trusted to perform an ordinary qualitative analysis or could make any useful practical application of the knowledge they had gained, and who would be able to pass the same examination again twelve months after their previous success without another course of preparation. The experience of others who had likewise given this subject much attention was the same as his own, and confirmed his impression that a very large proportion of those who annually satisfied the boards of examiners did not really possess the knowledge they appeared to possess.

The fact that these men passed their examinations merely proved that on a given day they were able to answer a large number of questions put to them, but it did not afford satisfactory evidence that their answers sprang from a store of sound and well assimilated knowledge such as would result from a protracted and conscientious course of study. They knew beforehand the kind of questions likely to be asked and had been specially trained in the manner of answering these questions by a process popularly known as "cramming," which bore the same relation to real teaching as adulterated food did to the genuine article. This process did not create reflecting pupils; it did not call forth any love of study; it did not develop habits of observation or any desire for further improvement; it did not qualify the student for the battle of life, as it failed to impart any permanent knowledge available to him in his future calling. It was a dull, toilsome process, burdening him with crowds of facts, but barren facts without coherence or meaning, to be remembered only for the day of examination and to be gladly forgotten as soon as possible afterwards. Yet this was the kind of training which the great majority of students of pharmacy seemed to prefer to any other. It was the process to which most of them trusted after wasting years of precious time without any serious attempt to acquire the scientific knowledge required of them. What was the remedy for this unsatisfactory state of things? An enforced attendance at some recognized school had been suggested as such, and he felt bound to say that he knew of no other plan more likely to be successful. How much more perfect would be the examiner's estimate of the candidate's knowledge if he were provided with satisfactory evidence that the latter had passed through a sound and systematic course of study, during which he had not only been a regular attendant at the lectures and at the laboratory, but had also satisfied his teachers in periodical examinations. Such evidence, coming from the hands of able and conscientious teachers, could not fail to prove a most valuable aid to the examiners in forming a correct judgment of the candidate's qualifications. Such a plan would also prove a boon to the honest and hardworking student, in securing to him a fuller recognition of his labours. The indifferent student, on the other hand, who neglected his opportunities and trusted to a final cram, would find himself placed at an enormous disadvantage. He (the lecturer) had no doubt that some such change would ultimately be carried into effect, and he most sincerely wished success to those who had first suggested it and had worked hard towards its realization. There appeared to him still another plan calculated to check the pernicious system of cramming, viz., a complete change in the system of examinations. He was far from wishing for any change in the composition of the present boards; he had the pleasure of personally knowing many of the examiners and entertained a high opinion of their ability, conscientious zeal, and impartiality. Important improvements, however, might be made in the present system of examination. He explained to the meeting his views on the changes he considered desirable, and stated that ere long he intended to deal with the subject at greater length in another place. The concluding portion of Mr. Siebold's lecture was devoted to a general sketch of a pharmacist's training, such as appeared to him best calculated to produce good results. He laid particular stress on the importance of an early beginning with scientific studies; the apprentice's technical education generally, occupied and properly occupied, most of his time; but some time, even if but one hour, should be set apart for reading every day. Provided with the standard works on pharmaceutical chemistry, materia medica, botany, and pharmacy, an hour's diligent reading daily would convey to the young student's mind a large amount of valuable information during his term of apprenticeship.

Studious habits being once acquired were not likely to be relinquished, but would be persevered with after the expiration of this term. The experiments described in the books, and especially the chemical tests, should as far as possible be practically performed, as it was impossible to acquire even the rudiments of analysis by reading only. If the youth was fortunate enough to live in a town where suitable lectures were provided, he ought to avail himself of such opportunities at some period during his apprenticeship or as soon after as circumstances permitted.

The advantages to be derived from such courses of instruction would be vastly greater to those who had already made good use of their books, than to those who had made no previous start with their studies; and at no time would these advantages be more keenly perceived than during the period which the student, after the completion of his technical education, should spend in a well appointed school of pharmacy, with the object of fitting himself for the higher duties of his calling. He appealed to employers, in particular, to impress these facts firmly on the minds of those committed to their charge, to encourage them in an early beginning of their studies, and to seize every opportunity of reminding them that it was only by a slow step-by-step process that true and lasting knowledge could be gained.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

A meeting of the Law and Parliamentary Committee of this Association was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on December 17, 1880, at 1 p.m., for the purpose of considering the Draft Bill to amend the Pharmacy Act, prepared under the instructions of the Council of the Pharmaceutical Society of Great Britain.

Mr. Thomas Barclay (Birmingham), President, in the chair.

Present:—Messrs. Andrews (London), Churchill (Birmingham), Cross (Shrewsbury), Hampson (London), Stead (Leeds), Symes (Liverpool), Williams (Manchester), and the Solicitor of the Association.

The President said, that by the courtesy of the President of the Pharmaceutical Society, Mr. Greenish, they were in possession of a copy of the intended Bill, and he was quite sure that the action of Mr. Greenish in furnishing them with the Bill would commend itself to the entire body of chemists and druggists throughout the country, who would see the extreme desirability of united action in the present crisis of the trade.

The Committee then carefully considered each clause of the Bill, and after much discussion, in which all the members present took part, the principles of the Bill were with a few exceptions approved.

It was then unanimously resolved "That the Draft Bill as amended be forwarded to the Council of the Pharmaceutical Society for consideration at its next meeting."

It was further resolved "That the Sub-Committee appointed by the Law and Parliamentary Committee to consider urgent cases, be requested to watch the progress of the Bill and take such action as it may consider necessary."

Proceedings of Scientific Societies.

BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, on Wednesday, December 15, 1880, Mr. H. B. Brady, F.R.S., in the chair. Mr. G. F. Schacht, Professor Attfield, F.R.S., Messrs. F. B. Benger, C. Ekin, T. B. Groves, S. Plowman, W. Southall, C. Umney, M. Carteighe and Dr. Tilden, F.R.S., were also present. Mr. R. Reynolds, the President, and Mr. Mason sent letters regretting their inability to attend.

The report of the Year-Book Committee, suggesting some modifications in the preparation and publication of the annual volume, and the best way of compiling a general index to all the year-books and volumes of transactions, was received and adopted.

A letter was read from the Assistant Secretary, Dr. Senier, tendering his resignation, which was accepted. Professor Attfield, Mr. C. Ekin, and the Honorary Secretaries were appointed a Sub-Committee to take the necessary steps for obtaining the services of a successor, and report to the Executive Committee at its next meeting.

It was resolved that the salary offered should be £100 per annum.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, December 16, Professor H. E. Roscoe, President, in the chair.

The following certificates were read for the first time:—B. Akroyd, H. Baker, M. M. Bird, H. P. Cooper, H. W. Fenner, T. S. Judson.

The President then called on Mr. Ruffle to read a paper—

On the Estimation of Nitrogen by Combustion, including the Nitro-Compounds.—For strictly correct chemical purposes the nitrogen in a substance is estimated by Dumas' method. In analytical practice the process usually employed is the well-known soda lime method of Will and Varrentrapp. It has long been known that with some compounds containing nitrogen this process gives very imperfect results. Thus sodium nitrate when burnt with soda lime gives an acid instead of an alkaline distillate. It has been proposed to add various substances to the soda lime to obtain better results. The author has tried the effect of numerous devices of this nature. Mixing with sugar, a current of hydrogen, of olefiant gas, of marsh gas, tartaric acid, citric acid, benzoic acid, sodium formate, sodium acetate, hydrogen sulphide, ferrous sulphate, sodium sulphide, sodium sulphite, sodium hyposulphite, potassium hyposulphite, barium hyposulphite, barium hydrate; instead of lime, mixtures of caustic soda with various reducing substances, sulphur, iron, charcoal, tin, zinc, antimonious sulphide, antimony, arsenic, arsenious acid, sodium hypophosphite. All, however, yielded results much too low, or were inconvenient. A mixture of sodium hyposulphite and sodium hydrate yielded theoretical results; but had the great objection that it could not be obtained as a powder, only as a wet mass. After many trials it was found that a mixture containing 2 molecules of sodium hydrate, 1 molecule of pure lime (from marble), 1 molecule of sodium hyposulphite, the first two being slaked together, dried and finely powdered, gave very satisfactory results with all varieties of guano, gunpowder, nitrates of soda, potash and silver, picric acid, sodium nitroprusside, East Indian linseed, milk residues, dried flesh, etc. The author uses ½ inch lap welded steam piping, bored out to ⅝ths inch, in 22 inch lengths for combustion tubing. The substance is mixed with 1½ gram of a mixture of equal parts of sulphur and wood charcoal. Thirteen grams of the above soda lime mixture and 21 grams of powdered hyposulphite of soda are weighed off, and mixed. Five grams of this mixture are placed at the back of the combustion tube; then the mixture containing the substance, then the rest of soda and hyposulphite, finally 18 grams of ordinary soda lime. The combustion is commenced 4 inches from the front end, and continued gradually until the evolution of gas ceases; it is maintained at a red heat for ten minutes. The average time of a combustion is forty-five minutes. As results may be quoted the following:—

	Theory.	Found.
Potassium Nitrate	13·86	13·16.
Silver Nitrate	8·23	8·03.
Sodium Nitrate	16·47	16·32, mean of five analyses.
Picric Acid	18·34	17·91, „ six „

In answer to Mr. Perkin, the author stated that he had not used the method with any organic nitro-compound other than picric acid. It did not succeed with aniline.

Mr. Warington said we must not too hastily conclude that the soda lime process does really fail. There were many eminent chemists who contended that when fairly conducted it gave good results. If the temperature was too high the ammonia formed was decomposed again. Errors also crept in when air was aspirated through the tube when hot; care should also be taken to have a good layer of soda lime in front of the mixture. He did not think that it was quite fair to conclude that the results obtained by the soda lime process must be wrong, because those by Dumas' method were higher. The question was one of very high practical importance in the analysis of manures.

Dr. Voelcker testified to the value of the author's process when mixtures of ammonia salts and nitrates had to be dealt with. He could strongly recommend it. The points to be attended to in the soda lime process were plenty of soda lime and complete combustion, without too high a temperature.

Mr. Ruffle said that he had carefully attended to the precautions just mentioned in the combustions he had made with soda lime.

The President then said that Dr. Carnelly had been good enough to promise to show the experiments concerning the *Effect of Pressure on the Fusing Point*, of which the Fellows present had doubtless heard. The author did not propose to read a paper, as his results were published elsewhere, but only to show the experiments.

Dr. Carnelly then explained the device which he had adopted in order to secure and maintain a vacuum in the case of ice; for the success of the experiment the tension must be below 5 millimetres. The apparatus consisted of a wide glass tube, ¾″ in diameter and about 5 to 6 feet high; this is placed in a vertical position and is connected at its upper end with a strong glass flask placed at right angles and surrounded with a freezing mixture. The apparatus having been inverted and filled with mercury, the lower end of the tube is closed with the thumb and placed under the surface of a layer of mercury about 10 inches deep. On withdrawing the thumb the mercury sinks in the tube to the barometric height and a large Torricellian vacuum is obtained, which is surrounded as far as the flask is concerned with a freezing mixture. A small quantity of boiled water is now introduced, which rises to the top of the mercurial column and surrounds the bulb of a thermometer suspended inside the tube. The water is then frozen, and the depth of the layer of mercury in which the tube stands reduced to about 3 inches; in consequence, the mercury in the tube sinks and leaves a detached column of ice with the thermometer bulb in its centre. This column acts as a cork, shutting off the large vacuous space above from the small vacuum below. By carefully heating the tube the ice is melted round the circumference of the plug and a fine annular opening is made between the ice and the inside of the glass tube; this restores the communication between the upper and lower portion of the vacuum. As soon as this is effected, any aqueous vapour which is formed is at once condensed by the freezing mixture, and the vacuum is kept intact. Under these circumstances the author has made the ice so hot that the thermometer in the centre of the cylinder stood at 180° C. before the ice melted. In the experiment shown to the Society the thermometer only rose to 30° C., when the cylinder (which was too large and therefore too heavy) dropped off the thermometer. To prove that the ice was really hot, the author has contrived and carried out some experiments in which the cylinder of hot ice was dropped into a small calorimeter filled with water; the temperature rose when the ice was introduced, whereas if ordinary ice, it would of course have been lowered. The author then showed two experiments with camphor and mercuric chloride, which were perfectly successful. The camphor was contained in a glass tube closed at one end and connected at the other with a Sprengel pump. On heating the tube the camphor melted, but on starting the Sprengel pump the camphor, as the pressure decreased, solidified, though the heating was continuous. The mercuric chloride was similarly raised many degrees above its ordinary melting-point, when kept under diminished pressure, without liquefying, but on allowing the atmospheric pressure to enter, by cutting the tube, the solid mass immediately melted and began to boil.

Professor McLeod suggested that the cylinder of ice might be used as its own calorimeter; on admitting the atmospheric pressure, if the ice were at 180° C., it should liquefy into water at about 100°.

Professor Ayrton pointed out that although these results seemed at first sight at variance with the experiments of Sir William Thomson and the well known calculations of James Thomson, according to which an increase of pressure lowers the melting-point, there was really no direct opposition between them, because the constants on which Carnot and James Thomson based their calculations, were only constants at temperatures at and below 32°, and we had no evidence until these experiments of Dr. Carnelly as to the value of these constants at higher temperatures. Under ordinary conditions an increase of pressure produces a slight diminution of the melting-point, yet it was perfectly in accord with the principles of thermodynamics to suppose that at temperatures above 32° a slight diminution of pressure might enormously raise the melting-point.

Mr. F. Brown said that he did not quite understand how removing the pressure from the outside of the ice would affect the ice in the interior, and it was difficult to see why the ice in the interior should not liquefy if raised to 180°, even if the diminution of pressure prevented the liquefaction of the surface layer.

A vote of thanks to Dr. Carnelly, from a crowded meeting was then passed by acclamation.

Dr. Armstrong then read a joint paper:—

On some Naphthalene Derivatives. By N. C. GRAHAM and himself. It was a continuation of the authors' former paper, and dealt especially with experiments they have made to establish the law of substitution, for β napthol. In their previous communication they have shown that Merz and Ebert are correct in regarding the naphthol-sulphonate produced by fusing naphthalene-β-disulphonate with potassium hydroxide as identical with that obtained from β-naphthol, and have pointed out that in this acid the radicles are probably in the relative positions 2:3 The action of bromine on the potassium salt of this acid is now described. The product of the action of a single molecular proportion is a highly characteristic bromo β-naphtholsulphonate, $C_{10}H_5Br(OH)(SO_3K)$, which crystallizes in colourless plates, sparingly soluble in cold water. If two molecular proportions of bromine are employed, a dibromosulphonate $C_{10}H_4Br_2(OH)(SO_3K)$ is formed, which is also colourless, but more soluble and less characteristic in appearance than the monobromo salt. By the action of three or four molecular proportions of bromine, however, coloured salts containing less bromine than those resulting from the employment of a less amount of the halogen are produced. The product of the action of $3Br_2$ is probably a mixture of the products of the action of $2Br_2$ and $4Br_2$. The latter crystallizes in lustrous deep orange plates, moderately soluble in water, forming a deep red coloured solution. Potassium and bromine determinations agree with the formula $C_6H_4(O)_2(OBr)(SO_3K)$, which is that of a potassium bromoxyl-α-naphthaquinonesulphonate. Bromine apparently has no action on this salt. Having obtained a quantity of what they presumed to be the dihydroxynaphthalene of Ebert and Merz, the authors converted it into a sulpho-acid by treatment with twice its weight of bromine. The product, however, was entirely different from that recently described by Griess, being incapable of forming colours with diazo compounds; on treatment with bromine, nitric acid, etc., it yields a number of highly characteristic bromonitro and bromo derivatives. The authors were thus led to doubt whether Ebert and Merz are correct in stating that only one of the two naphthalene disulphonates is convertible into a dihydroxynaphthalene.

The Society then adjourned to January 20, when a paper "On some Hydrocarbons present in Resin Spirit," by H. E. Armstrong, will be read.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association, held Dec. 8, Mr. F. W. Collinson, Vice-President, in the chair, a paper was read by Mr. F. W. Branson, on "The Geology of London District."

As an introduction to the subject proper, facts were given to prove the once molten condition of the globe, during the cooling of which the present crust was formed, which is generally allowed to be less than forty miles in thickness.

The chief physical forces which have caused land elevations and depressions were next noticed, as the formation of parallel mountain chains, due to lateral pressure, caused by contraction of the earth's crust. The ejection of lava might be produced by pressure of the earth's crust on the fused contents. This was shown by the effect caused on a mass of molten lead in a hot ingot mould, the crust of which, as soon as formed, was suddenly cooled by a stream of cold water, causing ejection of yet fluid contents through crater-like orifices.

Reference was also made to views held by Italian physicists respecting the attraction of sun and moon on the molten contents of the earth, in the causation of periodic volcanic eruptions.

Before passing to the consideration of deposits in the London basin, the more important rock systems were consecutively noticed and the more striking physical conditions of the periods pointed out, *e.g.*, the first differentiation of ocean and continent indicated during the early Cambrian period, also the formation of temperate, tropical and glacial climates from previously isothermal conditions, and also the strata in which the more important types of animal and vegetable life first appeared, the whole series showing a progressive development to more highly organized genera, air-breathing vertebrate animals and dicotyledonous plants finally appearing.

The deposits in the London basin were next detailed, attention being called to the similar character of the Hampshire, Paris and Vienna basins.

The area and thickness of the London clay was pointed out, this formation being thinly capped with Bagshot sand at Hampstead, Highgate and Harrow, the intervening districts having been in the past denuded of Bagshot sand and other deposits, which at that time extended over a large area.

The lowest member of the series, Thanet sand, chiefly met with on the surface at the mouth of the Thames, occurs as an inlier at Chislehurst.

A recent discovery at Northampton, of considerable geological importance, was then described, *e.g.*, the occurrence of igneous rocks and a good water supply at 800 feet depth, immediately below the Liassic formations. Fossils were exhibited from cores brought up from various depths. The Artesian borings of the London district were here noticed, and some remarks made on the water-bearing capacity of the rocks underlying London.

Lastly, reference was made to the varying geological condition existing during the Tertiary Period, and also to the more interesting fossil remains that have been found in the Thames Valley, *Sus scrofa* being found conjointly with several species of elephants, etc., and a little later evidences of human agency being discovered in the gravels by the finding of flint implements.

The paper was illustrated by a good series of diagrams and fossils, kindly lent for the occasion by Professor Tennant.

After a discussion, in which Messrs. Collinson, Wyles, Stuart, Parkinson, Robinson, Miller, Wallis, McKnight and others took part, a vote of thanks was passed to the author.

Mr. Branson then called the attention of the meeting to the variation in strength of solution of hypophosphorous acid used in pharmacy, the usual strength being 10 per cent.; some pharmacists, however, supply a stronger acid. The presence of calcium in larger quantities than is desirable was shown to exist in the samples exhibited by the addition of ammonium oxalate and ammonium hydrate. The occurrence of calcium was explained by the solubility of calcium oxalate in hypophosphorous acid, shown by precipitation, when the acid is neutralized with ammonium hydrate, and also by the incomplete decomposition of the calcium salt by oxalic acid, when the process advised in Parrish's 'Pharmacy' is followed. A very much purer acid may be obtained by decomposing pure barium hypophosphite with dilute H_2SO_4; but if the commercial salt containing calcium be used, the resulting solution contains calcium sulphate. Pure barium hypophosphite may be obtained by the reaction of excess of pure recrystallized barium hydrate on ammonium hypophosphite, and boiling off the ammonium hydrate, and separating by filtration, a little phosphate which forms when the solution is boiled finally decomposing with the slightest possible excess of H_2SO_4. Ammonium hypophosphite solution can easily be obtained by the reaction of ammonium oxalate with calcium hypophosphite in the presence of slight excess of ammonia.

The Chairman announced that the lectures given by the St. John Ambulance Society would commence on Tuesday, January 11, at 9 p.m., in the rooms of the Association. Lecturer, Dr. Casson.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday December 16, Mr. R. H. Parker, Vice-President, in the chair.

A paper was read by Mr. C. Walker, on "British Ferns and their Allies."—The author commenced with a description of ferns botanically considered, including the details of their manner of growth and reproduction. The principal British ferns were then described, and the localities in which they were found mentioned. Mounted specimens of most of the ferns were exhibited. The use of ferns in medicine was next treated of as follows:—

"In medicine ferns, with one or two exceptions, are now no longer used in this country. Formerly no less than twenty of our indigenous species were so used. How may we account for this? Have our ferns no real medicinal properties? Let us examine the question for a minute.

"With extension of commerce, intercourse with other countries and facilities for carrying on that commerce, many new drugs came into the market, and soon indigenous plants were thrown into disuse and despised, and foreign drugs were and are everything, and so comparatively little has been done in investigating the medicinal properties of our English plants and ferns.

"No doubt the virtues of our plants and ferns were exaggerated eighty, or in many cases a hundredfold. No chemical analyses could then be made, and they were used in a crude state, so that their real properties were not known. But allowing for all this, I think, from analyses of one or two that have been made, we are justified in believing that in our ferns as well as in our native flowering plants there may be found properties of value to the physician and to the chemist of the future which are not now known. Among the known constituents are tannic acid and gallic acid in abundance in many ferns, also soda, especially in the brake fern, formerly used for its alkali in soap-making; phosphate of potash, in the spores of *Lycopodium clavatum*; and starch, mucilage and sugar in most ferns; oxalate of potash and silicic acid in the Equiseta. *Lycopodium Helago* is purgative and emetic.

"I must say a word about *N. Filix-mas*, the only official fern. Its properties are well known and are well described in the 'Pharmacographia,' 'Medicinal Plants,' and other books. We are told it may be distinguished from *N. orcopteris*, *A. Filix-fœminina*, or *N. spinulosum*, that might be substitued for it, by the eight bundles of vascular tissue, and by its containing in the parenchyme glandular cells secreting a green oily fluid.

"Formerly, the following ferns were used as—

"Vulneraries: *C. officinarum*, *Osmunda regalis*, *S. vulgaris*, *B. hunasia*, *O. vulgatum*.

"Tænicides or worm destroyers: *N. Filix-mas*, *N. Filix-fœminina*, *P. vulgaris*, *P. oquelina*.

"Expectorants: *Asplenium trichomanes*, *A. rutamuraria*, *A. Adiantum-nigrum*, *P. vulgare*.

"Alteratives in fever: *C. crispa*, *S. vulgare*, *A. capillus-veneris*.

"Antilithic: *A. capillus-veneris*.

"Diuretic: *Equisetum arvense*.

"Purgative: *P. vulgare*.

"This list will show the extent to which ferns were formerly used in medicine."

After a discussion, a vote of thanks was awarded to Mr. Walker for his paper.

Mr. Hooper then gave his Report on Botany—

NOTES ON PARASITES AND SAPROPHYTES.

BY D. HOOPER.

In former times the word "parasite" comprehended every organism that was under any form found associated with or attached to or growing on some other specific type; but on the advancement of research plants and animals under this name have been divided and each section now bears a title more consistent with its characters. Hence in botany "parasites" are those plants which grow upon others called their "hosts," obtain their nourishment from them and eventually bring on their destruction; whilst "saprophytes," a term introduced about ten years ago (from σαπρος, putrid, and φυτον, a plant), is defined as "plants which obtain their support from organic matter in a state of decomposition."

Of parasites there are two kinds: those of (1) a green and others of (2) a pale colour. Examples of the former occur in the Loranthaceæ and Scrophulariaceæ; of the latter in the Orobanchaceæ, Rafflesiaceæ and certain fungi. Among the parasites of the first class, some interesting points connected with the life-history of the well known mistletoe (*Viscum album*), have been recently noticed. If a seed of this plant be made to adhere to a glass pane of a window, after some hours one or two arm-like shoots (according to the number of embryos in the seed) will protrude and twine towards the darkness of the room, avoiding the external light. When developed these roots also serve to fix the plant upon its host; and again, these are the organs by which it absorbs its food, and although formerly these parasitic roots were termed "nothus" or pseudo-roots, it would appear from their aspect and the functions they perform that these suckers or stem bases are morphologically and physiologically analogous to roots of ordinary plants. As the mistletoe grows the roots come in contact with the juices inside the bark and are prolonged inwards in a direction parallel to that of the medullary rays. The cellular systems of the two plants thus come in contact, but no communication takes place between their vessels. As growth goes on and annular rings of wood are added to the stock, similar rings are added to the mistletoe, so that the two woody layers become coincident. The presence of mistletoe on a tree is said to induce such an increased flow of sap in the stem and to prevent its due flow to the branches as to slowly and surely procure premature decay; an apple tree under these circumstances will for a few years grow faster than others and the yield of the fruit be finer; but this fast life is of short duration and the parasite seals its own fate with that of its supporter. It would seem that mistletoe absorbs crude sap which only consists of water with some mineral matter in solution and elaborates it in its foliage. The composition of the ash of mistletoe, according to the experiments of Grandeau, differs widely from that of its host. He found more K and H_3PO_4, but less Ca, and the amount varied according to the tree upon which it grew. The evidence as to the property of mistletoe depending upon the tree it preys upon is conflicting. *Viscum monoicum*, a parasite upon a species of *Strychnos*, is a deadly poison; preparations from the *Viscum* growing on the oak were used for their astringent and tonic properties; but Dr. Long, who has lately recommended it for use, is of opinion that its properties are not affected by the character of the trees on which it grows.

The pale coloured parasites, being destitute of chlorophyll, are not able to obtain their carbon by decomposing atmospheric CO_2, and must therefore obtain it in an assimilated condition from plants that have chlorophyll. For this reason they are found as the dodders on furze, etc., orobanche on roots, the Rafflesia on a kind of vine, and fungi as a disease on cereal crops. Among these, the habit of the broomrape deserves notice. Few plants produce more seeds than this parasite, and as the seeds are very minute their spread is accounted for by becoming mixed with those of the crop when gathered at the time of seeding. It occurs on different clovers. When a seed attaches itself to a root of this plant it at once strikes and then devolops underground a large starchy tuberosity, and then sends up a stem -bearing scales and flowers, the whole of a dull brownish-yellow colour. The absorbing surface of the root is so very small compared with the large amount of work done, that it was thought unnecessary for the union to continue throughout its life, and it has been found that if the parasite be detached soon after the stem has shown itself, it will continue to grow independently of its foster-parent. The persistent manner in which these plants grow on the same species, as if they were capable of the power of natural selection, is ascribed to their living only on those plants whose juices furnish them propitious nourishment.

Saprophytes are very similar in many respects to the pale parasites, the difference being more physiological than anatomical. The British examples are *Neottia nidus-avis* (bird's nest), *Epipogium* and *Corallorhiza*, and some schizomycetes fungi. Like parasites they are said not to possess proper roots, they are often leafless; the small organs attached to the stem, of a papery or succulent consistence, are called cataphyllary or scale-leaves. Their seeds are very minute and the embryo is frequently found to be undeveloped. But, unlike parasites, they obtain their carbon compounds from matter in a state of eremacausis or decay, and hence are found in peatland bogs and leaf soil; this vegetable mould forms humus, and this again by oxidation becomes a mixture of unknown and various acids, having an attraction for ammonia; soluble salts are thus formed, which are at once absorbed in various stages of decomposition by the lower extremities of the plant. By an indirect method, then, the decaying foliage gives up materials for growth of the saprophyte, just as cellulose in the endosperm of the date, oil in the seed of *Ricinus* and starch in cereal grains convey their support to the embryo of the seedling only after chemical transformation.

In classification, some of these parasites and saprophytes are closely related to plants which differ so widely from them in habit, the dodder is allied to the leafy convolvulus. This disparity is accounted for by the theory of descent. They are transformed descendants of leafy ancestors, which did form chlorophyll, but gradually became accustomed to take up the assimilated product and food materials from other plants or their available products of decomposition, and the more they did this the less needful did it become for the plants themselves to assimilate, the green leaves became meaningless and ceased to form chlorophyll, and therefore became of no service to the new form, and little substance as possible was employed in their development, and they gradually degenerated.

After a short discussion on the paper, the meeting adjourned.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[472]. Perhaps I. G., in his reply last week about aq. caryoph., is not aware that using magnesia in the preparation of medicated waters is rather a dangerous practice; as a small portion of the magnesia is soluble in water. When a water (prepared with magnesia) is dispensed with an alkaloid like strychnia, it is not at all improbable the strychnia will be thrown out, and the patient is thus liable to take it all with the last dose. Precipitated chalk will be found a better and a safer powder for rubbing the oil with, in making medicated waters.

ENDYMION.

[473]. From the answer as to the sulphate of iron, given by Mr. E. B. Kendall, I should say that he either uses very little of it, or knows nothing about it. It is most decidedly wrong to use ferr. sulph. exsic. unless specially ordered, as its chemical composition is very different to the other two sulphates. But, "ferr. sulph." and "ferr. sulph. granulata" are precisely the same, chemically, the only difference being the mode of crystallization, and any dispenser accustomed to using ferr. sulph. will at once say the granulated is by far the preferable of the two.

ENDYMION.

[473]. As the B.P., 1867, is the standard by which the dispenser has to be guided, I think he ought in every possible case to dispense the prescription as written according to the B.P. nomenclature, unless the intention of the prescriber is known to be otherwise, or that it bears evidence of an error committed in writing it. Ferri sulph. or ferri sulph. granulata should be dispensed, both being alike in chemical composition.

Coalville. W. R.

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[480]. H. K. was, I think, right in communicating with the prescriber, as the dose is so largely in excess of that usually attached by the wholesale houses, viz., 1 to 3 grains. If failing in this, I think he would be perfectly justified in dispensing it, as in severe neuralgic affections it is frequently prescribed in large doses, at intervals of two, four or six hours, with great benefit. I have myself dispensed it in doses varying from 1 to 12 grains.

Coalville. W. R.

[480]. I believe "Squire" states the maximum dose for croton chloral hydrat. to be 5 grains; this may be exceeded to a great extent, as from 10 to 15 grains is frequently given in acute facial neuralgia, and in some cases the dose has been extended to ʒss.

"374."

[480]. H. K. was quite justified in communicating with the prescriber. Croton chloral hydate is frequently given in 5 and 10 grain doses, and Liebreich has given as much as 60 grains.

It is much to be regretted that medical men do not adopt some method of underlining or initialing, in cases where the dose intended to be given exceeds the normal maximum. It would save the pharmacist a deal of trouble and prevent delay or suspicion on the part of the customer.

G. S. ILLINGWORTH.

[480]. Under the circumstance (*i.e.*, of doubt), H. R. was quite right in ascertaining the opinion of the prescriber, Now, the question asked is, "What is the usual maximum dose?"

There appears, on reference, to be a considerable amount of difference as to really what is the dose. In Squire's 'Companion,' it is from 1 to 2 grs., but may be increased to 5 or even 10 grs., if the patient bears it well. On looking elsewhere, I find it mentions the dose as from 3 to 40 grs. Now, clearly this great amount of discrepancy shows that it rests entirely with the medical man in attendance to regulate the dose.

C. T. M.

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[481]. I should by no means dispense this prescription, and if it were by any means possible I should communicate with the prescriber.

"374"

[481]. It would certainly not be right on the part of D. Spenser to tamper with the prescription. Fortunately, the remedy was at hand, which was the right course to pursue.

With this preparation, like many more, the dose seems to be entirely regulated by the prescriber, and the only method to adopt, which is at all likely to overcome the perplexity it causes to the dispenser, is for the practitioner to sign his initials against it, in order to show that he often gives such increased doses.

C. T. M.

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[482]. I should dissolve the quin. sulph. by means of the ac. sulph. arom. and a little aq. chlorof., then triturate the sodæ bibor. and pot. chlor. in a mortar with the rest of the aqua chlorof. and mix the two solutions, and put on the bottle a "shake the bottle" label.

"374."

[482]. Put the quinine into the bottle, then a little aq. chlorof., add the ac. sulph. arom., which will dissolve it. Make a solution of the pot. chlor. and sodæ bibor. in a mortar with the rest of the menstruum, and fill up the bottle. There will be a separation, due to the cinnam. and ginger contained in the ac. sulph. arom. A "shake the bottle" label is required.

C. T. M.

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[483]. I do not think "Bute" was justified in dispensing magnes. carb. pond.; if the written prescription is to be adhered to, magnesia, B.P. (MgO), should be dispensed; and I think also where "bismuth" simply is ordered, it is customary to use bismuth. subnit.

Coalville. W. R.

[483]. If "Bute" had taken the trouble to consult the B.P., he would have seen he had erred in dispensing "mag. carb. pond."

The proper preparations would have been "mag. calc. pond." and "bismuthi oxidum."

C. T. M.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

SPIRITUS AMMONIÆ AROMATICUS.

Sir,—In spite of the paper read at the Swansea meeting of the Conference and the article in last week's number of the Journal on this preparation, it is evident the subject is by no means yet threshed out. I take exception altogether to the statement that the Pharmacopœia process is an unsatisfactory one or that by it it is difficult to obtain a product of uniform strength. On the contrary, I maintain that the process is a good one, and in saying this I think I shall be borne out by every practical pharmacist.

If it be possible to do away with distillation, even in part, and to make a good preparation by merely mixing the ingredients, by all means let us adopt the simpler process. Surely nothing can be easier to prove, and if anyone can make a sal volatile without distillation equal to that made by the B.P. process, and will send a sample for inspection at the next Evening Meeting of the Society, he will be doing good service. In the meantime, I must say that often as I have seen the attempt made to do away with distillation, I have never yet known anything result but miserable failure. It is unfortunate, perhaps, that "modern chemistry cannot recognize the mixing certain ingredients in a retort and distilling something out of it as not exactly a proper process," but until that modest evolution of our time,—the modern chemist,—can show us a more excellent way, I hope we shall be allowed to retain our old fashioned preparation.

Where varying results are obtained, it is probably due to either—

Firstly. Too much heat being employed,

Secondly. Not sufficient condensing power,

Thirdly. The neglect at the close of each operation to add to the distillate the carbonate of ammonia that invariably collects in considerable quantity in the condenser, or,

Fourthly. Using a bad specimen of sesquicarbonate of ammonia.

By way of detail, I may add my practice is to distil from a glass retort sufficiently large to yield a Winchester quart of the finished preparation; to use a large Liebig's condenser with a copious supply of water; to form a connection with the Winchester quart which acts as a receiver by means of an adapter, so as only just to allow a sufficient exit for the air in the bottle and to conduct the greater part of the distillation at the heat of a water-bath, finishing the operation by means of the naked flame of a Bunsen's burner, the bottom of the retort being protected by a piece of wire gauze. At the close of each distillation the carbonate of ammonia collected in the condenser is washed with some of the distillate into the Winchester quart and the finished product is occasionally agitated until the carbonate of ammonia is all dissolved. Acting in this way, I can make comfortably three Winchester quarts of sal volatile a day. Practically speaking, the residue contains no ammonia, nor has there been any loss of ammonia or CO_2 during the distillation.

The water-bath is made of two large tin cones, soldered together at their smaller ends, forming a sort of huge hour glass. The lower one is partially filled with water, and the retort bedded in the upper one with tow. One of the advantages of this arrangement being that in case of fracture, the spirit is kept from the flame and all saved.

If there be any difficulty, as alleged, in getting uniform results on the large scale (though I think Mr. Thresh effectually disposed of this bugbear at Swansea), all I can say is, so much the worse for the manufacturer, and the sooner each pharmacist makes for himself so much the better will he be, both in pocket and reputation.

Bath. C. E.

SAL VOLATILE AND CHLORIC ETHER.

Sir,—In Mr. Thresh's paper on the above, p. 320 of this volume, he mentions, in regard to sal volatile, that I asserted that "it is impossible for the distillate to contain more than 1·7 per cent. of ammonia, without being deficient in carbonic acid; but . . . several of the samples examined contained more than this amount of ammonia . . . yet were richer in carbonate than samples containing less ammonia." I do not intend to dispute this, but from one point of view his sample richest in carbonate was still very deficient in it. It was the intention, no doubt erroneous, of the compilers of the 1864 Pharmacopœia, in which this formula first appeared, that the distilled spirit should contain in solution the normal carbonate of ammonia. Dr. Garrod, in his 'Materia Medica,' states, and I believe he mentions it with some authority, "the proportions of ammonia and carbonic acid in this preparation are such as to insure the formation of a neutral carbonate of ammonia." The quantities of carbonate of ammonia and strong solution of ammonia ordered in the formula are such as will theoretically produce this salt, but unfortunately it is very slightly soluble in the mixture of alcohol and water ordered for its solution. It is said to be quite insoluble in absolute alcohol. Assuming that as normal carbonate in solution would be the condition which the compilers of the Pharmacopœia would expect it to be found, my experiments, referred to by Mr. Thresh, were made, not by analysis, but somewhat synthetically, to show that the spirit could not contain near the quantity of ammonia it was assumed it did without breaking up the normal carbonate, in reality "being deficient in carbonic acid." Repeating some of my testings I find that taking the ingredients ordered in the Pharmacopœia formula, but using only one-third the water ordered,—this would nearly represent the resultant distillate, supposing no loss of ammonia or carbonic acid took place in distilling,—a clear solution is easily made of the carbonate and strong solution of ammonia in this quantity of water, and upon adding this gradually to the alcoholic solution of the oils, not one-eighth of the ammoniacal solution can be added before a crystalline precipitate begins to fall, whether the normal, or half-acid carbonate owing to the splitting up of the neutral salt and setting ammonia free, I cannot say, but supposing it to be the normal salt, calculated from these data only about 1 per cent. is held in solution when the precipitate begins to fall. No doubt more of it will be held in solution if an excess of caustic ammonia be present, and such is the case with the product when the mixture is distilled; but theoretically, according to Dr. Garrod, it will then be deficient in carbonic acid.

Skilled pharmacists, like Mr. Corder, Dr. Symes, and Mr. Thresh, may be able to produce a satisfactory preparation from the Pharmacopœia process; but that a preparation, on which often hangs the life of a patient, and which therefore ought to be as definite as possible, should have such variations in strength as Mr. Thresh has shown this preparation, as met with in commerce, to have, is not creditable to pharmacy, and, provided pure carbonate and solution of ammonia be used, there are great advantages in making it by admixture rather than by distillation, as, made by the latter process, it will always be of variable composition. This mode of making it without distillation, as suggested by Mr. J. F. Miller, has been carried out in the United States Pharmacopœia for twenty years. The U. S. formula has only about half the quantity of carbonate ordered that there is in the B. P.; it is as much as will be held in solution at ordinary temperatures. In addition to the oils of nutmeg and lemon, the U. S. formula orders oil of lavender, which would be better omitted, with the difficulty in getting it of good quality at the present time.

The refinement of distillation has been discarded in most of the spirits of the British Pharmacopœia. Mr. Symons's suggestion to distil the oils and spirits is good, but if fresh essential oils be used there appears to be little need for it. Distillation almost of necessity throws the preparation into the hands of the wholesale or large manufacturer, which is not desirable. Still this is specially a British preparation which has, perhaps deservedly, a large sale, and the flavour ought to be such as would please the most fastidious taste.

In regard to chloric ether, Mr. Thresh shows there is also a great variation. This is due to the mystery certain manufacturers have tried to surround this preparation with, and which ought to have been set at rest by the compilers of the Pharmacopœia, by inserting after the words "spirit of chloroform," *synonym* chloric ether, as they have done after "strong tincture of ginger, *synonym* essence of ginger." That such was their intention, Dr. Redwood, the editor, when lecturing on the 1864 edition, says[*]:—"Spirit of chloroform is new to the Pharmacopœia; but it has long been used under the name of chloric ether." I believe in all the medical schools the students are taught, and it is now generally accepted, that chloric ether and spirit of chloroform are synonyms. Prescribers have informed me that they object to the name spiritus chloroformi, which they intend to be given when they order æther chloric., because their patients get frightened at the word chloroform, and will not take the medicine. I have suggested to them the contraction sp. chlor.

10, *New Cavendish Street, W.* WM. MARTINDALE.

SUGAR.

Sir,—In reply to Mr. Tanner, I beg to say that the sample of sugar, to which I referred at the last Evening Meeting, did contain lime, both as phosphate and as salts other than phosphate.

SIDNEY PLOWMAN.

"*Inquirer*" (Bexley Heath).—You are referred to the rule as to anonymous communications, the enforcement of which is especially necessary in the case of dispensing queries.

A. S. T. should apply to the local authority for the district.

A. C. Burden.—We do not know; the information could possibly be obtained from the publishers, Messrs. J. and A. Churchill, 11, New Burlington Street.

"*Tormented*" will find numerous recipes for chilblain liniments scattered through the present series of this Journal. See, for instance, vol. ix., pp. 649 and 706, and a large number in vol. i.

M.—A recipe for composition powder will be found in vol. viii., p. 498.

"*Juvenis.*"—If you will furnish more precise information as to the hospital, we will endeavour to obtain the formula you require.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Rimmington, Planchon, Davis, Smith, Warriner, Goodall, Major, Specific Gravity, Inquirer, Transfugio, Hold Fast, Halle, Chemist, Molybdenum, Sarniensis, Wonderful, W. C. E., B. W. and N., A. S. T., A. H. H., J. M. J.

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[*] *Pharm. Journ.*, [2], v., 476.

A NEW METHOD FOR THE EXAMINATION OF COFFEE.

BY F. M. RIMMINGTON.

I think it will be generally admitted that the methods in use for estimating the degree of adulteration in coffee are far from satisfactory as regards definiteness and certainty, and that something approaching nearer to chemical accuracy is very desirable. Little has been done in this direction since the days of the Lancet Sanitary Commission.

It may, possibly, not be generally known to analysts that chicory, dandelion, and probably some other substances that are used for mixing with coffee, are readily deprived of colour by a weak solution of chloride of lime (hypochlorite), and that this agent has very little action on the coffee. When this method is adopted a portion of the coffee should be gently boiled a short time in water with a little carbonate of soda, so as to remove extractive as much as possible; after subsidence the liquor should be poured off, and the residue washed with distilled water. When this has been sufficiently done, a weak solution of the hypochlorite of lime is to be added and allowed to remain, with occasional stirring, until decoloration has taken place, which will be probably in two or three hours. The coffee will then form a dark stratum at the bottom of the glass, and the chicory a light and almost white stratum floating above it, and showing a clear and sharp line of separation.

The chicory after this operation is in the very best condition for microscopical examination, and it is not difficult to discriminate between chicory, dandelion, or other substances. Although the lower stratum may be dark, and have all the appearance of coffee, other substances may be present and should be sought for. I have recently met with a substance that is entirely new to me, as a coffee substitute, that is not affected by this treatment.

STUDIES OF THE GENUS STRYCHNOS.

BY G. PLANCHON,

Professor in the Ecole Supérieure de Pharmacie, Paris, and Honorary Member of the Pharmaceutical Society of Great Britain.

(*Continued from page* 492.)

III. The Curare of the Orinoco.[*]

The curious course of the Orinoco is well known. Issuing from the Parimé mountains, it winds at first in 3° N. lat. towards the west, as if it were about to throw its waters into the Pacific Ocean, then returns, forming the arc of a vast circle south of the bulk of the Parimé. After having received the Guaviare, it turns sharply towards the north, till it reaches the mouth of the Apure; finally, changing its direction, it flows towards the east, and falls, after a long course, into the Atlantic Ocean, through numerous mouths disposed as a delta.

In the first part of its course, from the convexity of the arc, it sends towards the south a remarkable branch, the Cassiquiari, which joins it to the Rio Negro and by this to the Amazon, furnishing thus, according to Humboldt, the only known example of a bifurcation and natural branching off of two great basins in the interior of a continent.[*] In the second part of its course it forms the famous cataracts of Atures and Maypures, the description of which forms one of the interesting "views of nature" of Alexander von Humboldt.

It is in this region that the tribes of Indians live who prepare the curare which has been made known to us by Humboldt and Bonpland, that is to say the first sort upon the botanical origin of which there was any approximate information given. Esmeraldas is placed not far from the bifurcation of the Orinoco and the Cassiquiari; the Padano falls into the Orinoco a little to the east of Esmeraldas; Andavace is situated at the point where it separates from the Cassiquiari; Vasiva is upon the Cassiquiari, between the Orinoco and Rio Negro; Javita is more to the left, not far from the Rio Negro, but upon the upper course of the Atabapo, which runs directly towards the north and falls into the Orinoco, quite near to the mouth of the Guaviare. These localities were seen by Humboldt and Bonpland in 1800. The first was visited by Robert Schomburgk in 1839.[†] Finally the report addressed in 1867 by the Governor of the Amazonas district in Venezuela to M. Eug. Thirion, the Consul-General of that republic at Paris, refers to this same country. He says, "The plant is found in the lands bordering upon the upper part of the rivers Femi[‡] and Cassiquiari and their affluents, and also of the river Orinoco and its affluents down to the fall of the Atures."[§] They are, moreover, the same tribes who are mentioned as making the poison; the Guinaus and Majonkongs are in fact, according to Schomburgk, designated by the Spaniards under the name of Maquiritares.[||] Now, according to the report of 1867, this same name and that of Piaroas is given to the tribes who make the curare sent to M. Thirion.

What is the plant that enters as an essential element into this curare? Humboldt and Bonpland name it *Bejuco demavocure*, and add[¶] to that designation the description of this creeper given by Kunth in a manuscript still unpublished at the time of the publication of their journey. It appears from this description that the plant has woody branches, which are opposite, cylindroid, and covered with a brownish tomentose down. The leaves are opposite, borne on short petioles 2 millimetres long, oval, oblong, acuminate, very entire, marked with three strong longitudinal veins, the ramifications of which form a network of numerous anastomoses. They are membranous, light green on the upper surface, paler on the inferior surface, glabrous on both sides, ciliated at the edges and bearing a brownish tomentum upon the inferior surface of the veins. They are from 4 to 6·5 centimetres long and 2 centimetres broad. The plant grows at the mouth of the Padano, not far from Esmeraldas.

Kunth was unable to see in these leaves either those of a *Phyllanthus* or of a *Coriaria*, as was thought by Wildenow. Without hesitation he recognized one of the Strychneæ, and he inclined towards the idea that it was a *Rouhamon*, already described by Aublet in his 'Plants of French Guiana.'

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[*] *Journal de Pharmacie et de Chimie*, [5], i., 295.

[*] 'Tableaux de la Nature,' vol. i., p. 236.

[†] R. Schomburgk, "On the Urari" (*Annal of Nat. Hist.*, vii., 420).

[‡] I do not find the river Femi upon any map, even upon that which has been constructed upon the scale of 1 in 900,000 by the Chorographic Commission of New Grenada. But I find there a stream called the Temi, which falls into the Atabapo near Javita, and I suppose that it is to this reference is made in the report.

[§] *Journal de Thérapeutique*, April, 1879, p. 283.

[||] Schomburgk, *loc. cit.*

[¶] 'Voyage au Nouveau Continent: Relation du Voyage,' vol. ii, p. 548 (note).

Schomburgk had the same idea, and he stated that he had been confirmed in this opinion by a conversation with Dr. Kunth, who determined Humboldt's plants.[*]

Nevertheless, in the 'Nova Genera et Species Plantarum Americanarum' of Kunth (vii., p. 163) the species is described, not under the name given by Aublet, but under that of *Lasiostoma* (?) *Curare*. Also in the 'Prodromus' of De Candolle (ix., p. 17) it is *Rouhamon* (?) *Curare*, DC., and not *Rouhamon Guyanense*, Aublet. And according to the authentic specimens of Humboldt, which I have seen in the Museum of Natural History, the plant does not answer exactly to the species described by Aublet and ought, in fact, to be distinguished from it.

It was natural to ask whether the plant which M. Thirion placed at the disposition of M. Gubler is identical with that of which the description has been quoted. It was sufficient to compare it with the specimens given by Humboldt to the Herbarium of the Museum of Natural History in Paris, to convince me that it did not at all resemble that plant and that it belonged to quite another species.

Concerning this new species, which I have named *Strychnos Gubleri*,[†] I will give all the information that I have been able to collect.

"The curare," says the official report, "is a creeper, the stem of which may attain a circumference of 24 inches. By means of its numerous ramifications it is able to raise itself above the other trees to a height of 40 to 50 feet. Its flower is small and white. It grows in the higher lands having a blackish soil and never in marshy and inundated ground."

The fragment of branch which I have had at my disposition, and of which fig. 1[‡] represents a small portion, is 2½ centimetres in diameter at its largest part; it is about 27 centimetres long, and bears at three-fourths its length a secondary branch, which diverges at nearly a right angle.

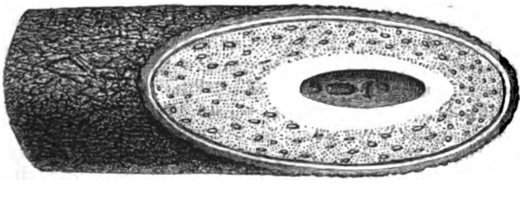
Fig. 1.—Fragment of a Branch, showing numerous lacunæ at the section of the wood.

A relatively thin ochraceous grey-brown bark, covered with chalky white spots and rugose on the surface, covers a greyish or tawny grey wood, remarkable for the considerable number of pores which open abundantly into a transverse section; a medullary canal, 5 millimetres in diameter, generally empty, occupies the centre.

I have already given, in some detail, the anatomical structure of these various parts,[*] and I, therefore, will not repeat them here. Fig. 2, represents the various layers of the bark,—suber, parenchyma, stony layer and liber,—and shows the relatively considerable breadth of the last but one of these layers.

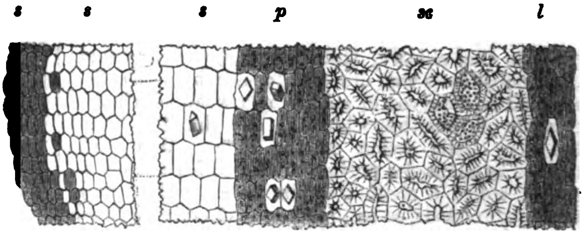

Fig. 2.—Transverse Section of the Bark. s,s,s, suber; *p*, reddish parenchymatous layer; *sc*, stone cells; *l*, liber.

With this fragment of wood M. Gubler entrusted to me a certain number of leaves, which enables me to give a description and figure of these organs.

These leaves are shortly-petiolate, membranous, stout, reddish-green above, pale below, elliptical or oval elliptical, 10 to 15 centimetres long, 5 to 7 centimetres broad, entire at the margin, attenuated at the base, acuminate at the apex. The midrib gives off at the base two fine longitudinal veins following the margin of the leaf, and at a variable distance two other veins, stouter than the lower ones, rarely opposite, which reach the apex within a short distance of the margin. Transverse secondary veins run from these principal veins, and form a network, prominent principally on the inferior surface. The leaf appears glabrous to the naked eye, but under a glass it shows rare, extremely short, appressed hairs, which become more numerous on the veins.

It will be seen by the descriptions which will be given subsequently that these leaves do not agree with either *Strychnos toxifera*, Benth., or with *S. Castelnæana*, Wedd., or with any of the species yielding the curares of other districts. Nor do they resemble more those of *S. Hachensis*, which grows in Venezuela, and has been described by Karsten in his 'Flora of Columbia.' The leaves of this species are more broadly ovate, and less gradually attenuated; the veins, covered with short hairs, all spring from the base.

The roots, which I was able to procure at the Exhibition of 1878, and of which M. Stanislas Martin also has kindly given me a specimen, are distinguished from the stem by the red colour of the bark, which is deeply furrowed transversely. This bark, which is relatively thin, covers a yellowish-white ligneous substance, pierced by numerous very fine openings that can only be well seen with the aid of a glass.

The anatomical structure of these two parts recalls strongly that of the stem. In the bark are distinguished the same layers: suberous, parenchymatous, stony and liber. But the characteristic stony layer has a development much less than in the bark. It is the interior or liber zone which extends considerably in breadth, it being nearly double as broad as the stony zone. The structure of the various layers is otherwise sensibly the same.

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[*] "I have little doubt that the plant with which the Indians of Esmeraldas prepare their poison is Aublet's *Rouhamon*, and in this I am confirmed by a conversation with Dr. Kunth, in Berlin, who, as is well known, determined von Humboldt's plants" (R. Schomburgk, *op. cit.*, p. 411).

[†] *Comptes Rendus*, Jan., 19, 1880.

[‡] We are indebted for the use of the wood engravings illustrating this article to the courtesy of Professor Planchon.—Ed. Ph. J.

[*] See before p. 469.

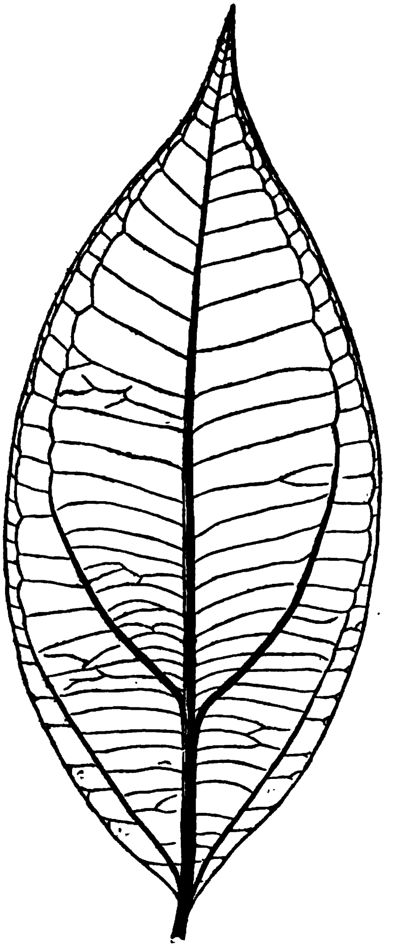

Fig. 3.—Leaf of *Strychnos Gubleri*.

As to the wood, it presents the same elements and the same characteristic lacunæ, differing from those of the bark only in their dimensions being much less.

Besides the *Strychnos Gubleri*, which is evidently the essential element of the curare, some others have been mentioned, which unfortunately are not known except by their vulgar names. They are the "cariri," "pieaton," "iare," and "hueva" of the official report. These names teach us absolutely nothing as to the affinities of these species. The same is the case with the plant which Humboldt has named "kiracaguero," concerning which we know only that it is derived from a tree with large leaves.

(*To be continued.*)

PEPTONE.*

BY C. A. PEKELHARING.

The researches of Plósz, Maly and Adamkiewicz, the author admits, point to the conclusion that albuminoids, although changed by the digestive fluids into peptones, resume after absorption their original properties, and further, that peptone may be substituted for albuminoids, as a food, not only without harm, but with positive advantage to the animal. But it is obvious from the methods of preparation of peptone adopted by these observers, that the word "peptone" has not the clear and definite meaning usually attributed to it. The method used in all these cases was the digestion of fibrin by gastric juice. But the times deemed sufficient by each observer for complete conversion vary widely. Plósz, two to three weeks; Maly, two to three days; Adamkiewicz, two to five hours. Despite these differences, the conclusions arrived at agree in the main, viz., that peptone can replace proteids as food, and that animals so fed will not only maintain, but increase their weight.

After examining these results more in detail, the author remarks on the importance of experimenting with a substance of constant composition, and proceeds to describe his method of preparing pure peptone, which depends on a property described by Place and Huizinga ('Onderzoekingen gedaan in het physiologisch laboratorium der Leidsche Hoogeschool,' 1870, and 'Maandblad voon Naturwetenschappen,' 1873, p. 29), viz., that in the cold a solution of peptone, having an acid reaction, is precipitated by neutral salts, the precipitate redissolving on warming.

Fibrin from bullocks' blood and egg-albumin was used, and was digested with 0·2 per cent. hydrochloric acid, and pepsin (either commercial or prepared by extracting pig's or dog's gastric mucous membrane in glycerol) for two to five hours at 40° C. The solution was then neutralized until the reaction was very feebly acid, heated to boiling, and filtered hot. The filtrate, after cooling, usually opalescent or distinctly cloudy, was evaporated a little, made strongly acid with acetic acid, and saturated with sodium chloride. The somewhat abundant flocculent precipitate so produced was filtered off, after eight to twelve hours. The fluid, which filters readily, passes perfectly clear through the paper, and the precipitate dissolves very readily in distilled water on warming, still not without a slight flocculent cloudiness, due to albumin which has not been completely precipitated by boiling in a feebly acid solution, but when precipitated by sodium chloride and acetic acid is not soluble on heating. If the precipitate is dissolved in a sufficiency of water, the fluid, when separated from the albuminoid precipitate, is perfectly clear; if, however, the distilled water be spared, with the idea of avoiding a large mass of fluid, the precipitate will return on cooling. The solution is then to be dialysed, in order to get rid of the acetic acid and sodium chloride. In one day, a precipitate of peptone is formed, which continually increases as the dialysis is pushed, and which on warming, or the addition of small quantities of acid, alkali or salts, is completely dissolved. After three or four days' dialysis, the fluid is nearly free from salts, and the precipitate may be removed from the dialyser, boiled in water, and the resulting solution, which is not quite clear, filtered hot. The filtrate is a pure peptone solution, and will yield a heavy precipitate on cooling. It is to be concentrated at a gentle heat, and finally dried in a vacuum over sulphuric acid. When dry, peptone so prepared is a pure white powder, and is not hygroscopic. It has the following properties:—

Heated over a flame, it does not melt, but forms strong tenacious bubbles. The ash is small. The substance heated at 105° gave 0·4 per cent. and 0·47 per cent. ash.

The powder is only partially soluble in cold water, but dissolves completely on warming, separating again as the solution cools. The solution has a perfectly neutral reaction.

Addition of a small quantity of sodium chloride will prevent precipitation on cooling; added in excess, however, it causes a slight turbidity in the cold, which disappears on warming.

Very small quantities of acids or alkalies will cause solution in the cold. Peptone is precipitated from the alkaline solution by sodium chloride in excess; this does not occur, however, if the peptone is warmed in the acid solution, provided the acid is not present in too small a quantity, and has acted thoroughly (this is best effected by warming); saturation with sodium chloride to the extent of 4 per cent. gives a precipitate, which completely disappears on heating. The same takes place if more salt is added. When 16 per cent. of salt has been exceeded, complete solution only occurs when the peptone solution is somewhat dilute. Peptone is precipitated from the feebly acid or alkaline solution by neutralization. If, however, too much acid or alkali has been used for solution, sufficient salt may be formed to hinder precipitation. Strong nitric acid gives a precipitate, which vanishes on heating, before the yellow coloration appears, and returns on cooling. Silver nitrate added to a solution of peptone which is cooling, and therefore is becoming cloudy, increases the cloudiness. The precipitate disappears almost entirely on cooling; a slight opalescence, due to sodium chloride, alone remaining. The precipitate produced by silver nitrate is soluble in acetic acid.

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* *Pflüger's Archiv.*, 22, 185—206. Reprinted from the *Journal of the Chemical Society*, December, 1880.

Absolute alcohol precipitates peptone in neutral, but not in acid or alkaline solution. Potassium ferrocyanide and acetic acid give a voluminous precipitate, soluble on heating.

Basic lead acetate, with ammonia, tannic and phosphomolybdic acids, give precipitates which are not soluble on heating.

The precipitate yielded by Millon's reagent dissolves with a red colour, if only small quantities of the mercury solution are used. More of the reagent gives a red precipitate, permanent on heating; cupric sulphate, ferric acetate, ferric sulphate, lead acetate, and basic lead acetate do not precipitate the peptone solution, unless sodium chloride or potassic acetate is present.

The author then proceeds to say that from these reactions no albumin can be present. Peptones from fibrin or albumin or other sources resemble one another in all their chemical properties. All are lævorotatory, but there is some difference in the degree of rotation, albumin peptone having the least, and casein peptone the greatest, effect on polarized light.

No elementary analysis was made by the author. The question whether peptone is isomeric with albumin, or differs from it by one or more molecules of water, is then raised, and the experiments of Huizinga and others on the subject criticized at great length. With the view of showing that these observers did not use a pure material, Meissner's peptones are examined with the same conclusion.

BEHAVIOUR OF TANNIN TOWARDS PEPSIN, ALBUMIN AND ALBUMINOIDS.*

The well-known property of the tannin of nutgalls to precipitate dissolved albumin, albuminoids, gelatin, etc., is of particular interest pharmacologically. These precipitates are insoluble in water, but soluble in moderately concentrated acetic acid, also in an excess of solution of albumin or gelatin (the resulting solution has a faintly acid reaction), in dilute lactic acid, and finally in carbonated and caustic alkalies. Tannin loses its property of coagulating gelatin and albumin after it has been mixed with an alkali to faint alkaline reaction. Such an alkaline tannate ceases to act perceptibly upon albumin, but still possesses the peculiar astringent taste characteristic of tannin, when put on the tongue.

Pepsin, as well as peptone, in solution in water, behaves exactly like albumin. Previous observers have partly misinterpreted the action of tannin in the stomach, in presence of those bodies, because they failed to take account of the simultaneous presence of hydrochloric acid. For if tannin is added to a solution of pepsin a precipitate is formed which only requires a little, say 0·1 per cent., hydrochloric acid to dissolve it. The same is the case with peptone. And if the solution of these bodies has been previously made acid, even by so small a quantity of hydrochloric acid as is normally present in the stomach, a precipitate is not produced at all.

Artificial digestion of fibrin or albumin by pepsin and hydrochloric acid, in presence of tannin, takes place normally, entirely uninfluenced by the latter. Nor is the tannin at all changed, a fact which the author of the paper we quote from has conclusively proven, by estimating the amount of sugar present before and after digestion. Tannin would split up into gallic acid and sugar. Experiment proved that the quantity of sugar present after digestion was the same as was contained in the original sample of tannin employed. (Commercial tannin is hardly ever entirely free from sugar.)

The conclusions of the author are: that the artificial digestion of albumin remains unaffected by the presence of tannin; that the latter does not prevent the formation of peptone and does not precipitate the pepsin; and that these facts are to be ascribed to the presence of free hydrochloric acid.

DUST, RAIN AND FOG.

At the meeting of the Royal Society of Edinburgh last Monday evening, an important paper was read on "Dust, Rain and Fog," by Mr. John Aitken, of Falkirk. The communication was very interesting, and was illustrated by a number of successful and conclusive experiments. Mr. Aitken's results may be briefly summarized as follows:—A vapour does not condense under ordinary circumstances when cooled below its boiling point, except on a free surface; that is to say, that if steam, for instance, be blown into a receiver filled with ordinary air, a white cloud is immediately formed by the condensation of the vapour on the innumerable particles of dust; but if a jet of steam be blown into a receiver filled with air, which has been filtered through cotton-wool, no cloud is observed. The same fact was demonstrated by means of another experiment. A large inverted flask was fitted with a cork, through which passed a tube, communicating with the air-pump. Over the interior surface of the cork was placed a little water. When the flask was filled with filtered air no effect was produced by exhausting with the pump; while with the flask filled with ordinary air a cloudiness was immediately apparent, which increased in density when the working of the air-pump was continued. By using a flask containing air not perfectly free from dust, an effect resembling a shower of rain in minute drops was produced on rapidly withdrawing a portion of the air. Among other things, it was shown that the fumes of burning sulphur (sulphurous acid will not do) have a powerful effect in producing fog. Into a receiver in which a grain of sulphur had been burned, a jet of steam was blown. This instantly caused a dense fog, through which nothing could be seen, and which continued to fill the receiver for a much longer time than if the atmosphere had simply consisted of unfiltered air.

From these and other observations which Mr. Aitken has made, he concludes that if the air were free from dust we should have no clouds, rain, or fogs; but that the excessive moisture would slowly condense on the surface of the earth, on the trees and houses, keeping them constantly wet. He is also of opinion that the large amount of sulphur which is daily burned in the coal fires in London, is a principal factor in the production of the "pea-soupy" fogs for which that city is famous.

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* Extract from a paper by Dr. L. Lewin. Reprinted from *New Remedies*, October, 1880.

The Pharmaceutical Journal.

SATURDAY, JANUARY 1, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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1880.

THE year Eighteen hundred and Eighty cannot well be described as having been unexceptionably favourable to pharmacists in Great Britain. For whilst the trade side of their calling has been assailed from outside by, if possible, keener competition than in any previous year, a breach has also been made in the professional citadel, hitherto considered to be impregnable, by an unexpected, and, to many, inexplicable judgment. Besides this, a struggle has been necessary to prevent the blunder of a parliamentary draftsman being perpetuated in an Act to the discomfort of those using methylated spirit; whilst the last month of the year has been marked by the conviction of a chemist and druggist for the incompetence of one official inspector of weights and measures that was held to have been proved by the evidence of another inspector. It is not surprising that under these circumstances the close of the year should be busily occupied with preparations for a campaign in which it is hoped that lost ground may be gained, and fresh ground occupied.

Necessarily the Council of the Pharmaceutical Society has taken a foremost part in the action and discussions which have been entailed by the events of the year, and it is satisfactory to find that, notwithstanding some impatient and inconsiderate criticism, provoked no doubt by the sharpness of the crisis, at no time in its history did it enjoy more completely the confidence of the general body of chemists and druggists than now, as is evidenced by the unanimity with which all look towards it as their natural leader in the attempt to battle with the difficulties by which they are beset.

The constitution of the Council does not differ much from that of the previous year. At the election in May twelve members of the former Council who offered themselves for re-election were all chosen, whilst two who retired, Messrs. RIMMINGTON and SLIPPER (the former after several years' service) were replaced by Messrs. RADLEY and ANDREWS. In July, Mr. SHAW, who had been a member of the Council nine years, finding that he should no longer be able to attend regularly, placed his resignation in the hands of the President, and the Council, after an expression of regret at losing Mr. SHAW as a colleague, at its next sitting filled up the vacancy thus created by the election of Mr. EDWARD NORTHWAY BUTT. At the first meeting of the new Council in June, Mr. SANDFORD having declined to occupy the chair again, Mr. GREENISH was unanimously elected President, Mr. ROBBINS being chosen to succeed him as Treasurer. Mr. SCHACHT was re-elected Vice-President.

It will be remembered that towards the end of the year 1879 a "burning question" was set at rest by a resolution of the Council that reporters other than the one appointed by itself should be admitted to its ordinary monthly meetings. A considerable portion of the January and a part of the February meetings were occupied in the elaboration of regulations for the proper carrying out of this resolution. It had so often been alleged that important discussions had been suppressed and that business which ought to have been made known to the members of the trade had been passed over in silence, that it was excusable in others, as well as in ourselves, to look forward with some curiosity and expectation to the time when the piquant revelations of our contemporaries should put us in possession of valuable information that had hitherto been withheld. In this respect, however, the year has been one of disappointment to us, at least, and we notice signs of a similar unsatisfied craving in the evident determination of one of the champions of publicity to pursue the flying truth even within the walls of a committee.

But the most important business of the Council during the year, which has been made known, has been in connection with the attempt to enforce the provisions of the Pharmacy Act in the case of co-operative stores and other similar public companies, with a result, we are sorry to say, that has disappointed the reasonable expectations based upon the judgment previously given in the Queen's Bench Division of the High Court of Justice, by the late Lord Chief Justice COCKBURN and Mr. Justice MELLOR, in the case of The Pharmaceutical Society *v.* The London and Provincial Supply Association. The appeal of the Association against this judgment came on for hearing in February, before Lord Justices BRAMWELL, BAGGALLAY and THESIGER, and in March their Lordships delivered judgment in favour of the appellants, each upon somewhat different grounds, but all holding in effect that a corporation was outside the scope of the Act and that, not being able itself to become qualified, it met the intention of the Legislature if the agent by which it effected the sale of poison were qualified. Their Lordships were thus in direct antagonism to the opinion expressed in the Court below, and which, to the non-legal mind, might appear a reasonable one, that no association of persons should be free to do that which in their individual capacity would unquestionably be an offence.

It now became the turn of the Council to appeal, and the case came on for hearing in the House of Lords on July 20, before the Lord CHANCELLOR, Lord BLACKBURN, and Lord WATSON. In the absence of Sir JOHN HOLKER, who had led on behalf of the Society in the previous stages, the case of the appellants was ably argued by Mr. BENJAMIN, the London and Provincial Supply Association being represented, as before, by Mr. WILLS. After the proceedings had extended over the greater part of two days, judgment was delivered against the Society and the appeal dismissed with costs. It was again held that the word "person" in the 15th section of the Pharmacy Act could not be construed to refer to corporations, and throughout their Lordships' judgments there was a manifest inclination to treat the words "person who shall sell," in the 15th section of the Pharmacy Act, 1868, as relating rather to the person effecting the sale than to the proprietor of the shop. Lord BLACKBURN went so far as to say that he felt "strongly inclined to think "that if a corporation or anybody else caused an un- "qualified person to conduct sales," then on the principle, "*qui facit per alium facit per se*," they would, under section 15, be themselves liable to penalties.

Although this judgment probably will not be so far-reaching in its effects as has been assumed by some persons, since it is not every proprietor of a large business that will care to throw it into the power of a limited liability company for the sake of adding another department to its operations, and, moreover, there were already known to be in existence great facilities for evading the Act, yet its great importance could not be questioned. The Council recognizing that a serious blow had been dealt at the pharmaceutical legislation which had been passed for the safety of the public, as well as for the protection of persons who, trusting to that legislation, might incur the cost and trouble of a special education to enable them to carry on the business of a chemist and druggist, decided at its August meeting, on the motion of the Vice-President, to refer the subject of the decision and its probable effect on the future of pharmacy to the special committee already charged with the consideration of improvements desirable in the Pharmacy Act, with the request that it would report as to the course it would be desirable to follow. In November this committee reported, recommending that steps should be taken to obtain an amendment of the Pharmacy Act, 1868. The report and recommendation were unanimously adopted, and on the motion of Mr. HAMPSON, a resolution was passed requesting the same committee to draft a Bill and to submit it to the Council at its earliest convenience. The resulting draft Bill was discussion by the Council at its ordinary meeting in December and again at a special meeting a fortnight afterwards, and it is understood still to be under consideration.

Whilst the Council has been thus engaged in the elaboration of a Bill which in satisfying the reasonable expections of chemists and druggists should also so commend itself to Parliament, acting on behalf of the public, as to have a chance of passing, there has been no lack of counsellors from the outside. As is natural from a large body so variously circumstanced, and with such differing interests, the advice has not been altogether concordant, and it must be confessed that some of the demands have been such as could hardly be expected to be granted by a House of Commons that was not composed mainly of chemists and druggists. In many cases there has been, unfortunately, a crudity of thought and narrowness of conception that implied inability to see beyond immediate surroundings and individual circumstances. Of course there have been many exceptions to which this remark does not apply and among them may be mentioned the paper recently read before the Glasgow Association by Mr. KINNINMONT.

The time occupied in considering, and as far as possible reconciling, the conflicting claims and in embodying those which appear practicable in a Bill will not to most reasonable persons appear to have yet been excessive, but in the opinion of some ardent spirits the work ought to have been done with a promptitude rivalling that of Mr. DISRAELI's celebrated, though short lived, "Ten Minutes Bill" of 1867. It has even been laid down exactly how many hours should suffice for the drafting of the Bill and how many more would be required to throw it into legal shape; but the writer, although not deficient in dogmatism, apparently does not aspire to the gift of prophecy, for he omitted to state how long would be required to secure acceptance of such a Bill, first, by the trade and then by Parliament. One might almost be excused for attributing the puerility of such advice to juvenility of the mentor. At any rate it certainly smacks of that kind of "logic" which LONGFELLOW'S student, in the 'Golden Legend,' describes to his young friend as making—

"An important part
Of the mystery of the healing art;
For without it how could you hope to show
That nobody knows so much as you know?"

For obvious reasons the Council has avoided a premature publication of the result of its deliberations, and we are, therefore, not in a position to discuss the subjects dealt with in the draft Bill. It is satisfactory, however, to notice that a copy of it, as it left the hands of the Council at the close of the special meeting a fortnight since, having been supplied by the courtesy of the President of the Pharmaceutical Society to the President of the Trade Association, is reported to have been laid by him before the Law and Parliamentary Committee of that body and in the main to have received its approval. But one subject may be mentioned which doubtless has been under consideration, and that is the amendment of the Pharmacy Act, 1868, by the elimination of the exemption in the 16th section of the making or dealing in patent medicines from the provisions relating to the sale of poisons, since, during the year, communications have been received by the Council from Associations in different parts of the country urging that steps should be taken to secure the restriction of the sale of patent medicines containing poison to properly qualified chemists and druggists. It is matter for grave doubt whether patent medicines are so free from the meshes of the Act as has been assumed, though perhaps nothing would have been gained by an attempt to unduly strain its provisions. But there can be no doubt that on several occasions during the year a power has been attributed to the Council by writers in the public press, especially with respect to the sale of proprietary narcotics, which it does not possess. Although, however, these statements were in themselves erroneous they were useful so far as they indicated the state of public opinion.

Several of the cases of poisoning reported during the year have an important bearing on this point, and some of them have evoked expressions of opinion that ought not to be lost sight of in the discussion of this question. Thus in one case of poisoning by "chlorodyne" the evidence gave rise to considerable discussion between the coroner and jury as to the facilities which exist for obtaining patent medicines containing poisons, and eventually the jury appended to their verdict an expression of opinion "that the most stringent provisions ought "to be enforced to prevent the sale of poisons in the "shape of patent medicines, and that, at all events, "it should be made compulsory that a label should "be affixed thereto bearing the word Poison." In another case of poisoning by "chlorodyne," which occurred a few weeks since, the medical officer of health deposed that he had examined three samples sold under this name and found morphia in them equal in quantity to 10 grains, 8 grains and 5 grains to the ounce respectively, and he considered that such dangerous liquids "ought to be dealt with "under the Sale of Poisons Act and labelled accord-"ingly." A third case of poisoning by "chlorodyne," which occurred at Leeds, also led to considerable discussion in the daily press.

Among the other cases of poisoning that have given rise to inquiries during the year, the following are worth notice:—One by carbolic acid administered for black draught in an infirmary; one by a baby's mixture made and sold by a huckster; one by chloral hydrate through insufficient dilution of a concentrated solution in a hospital; one by laudanum sold for paregoric; one by a liniment supplied by a medical man at the same time as a sleeping draught and in a similar bottle; another by a liniment that had been kept in a scent bottle; one by morphia sold by a boy in an "open surgery" during the absence of the assistant, and another by a very strong solution of morphia supplied by a chemist, a warning being given at the same time; one by "oleum phosphoratum, B.P.," supplied for "phosphorized cod liver oil;" one by prussic acid, which a surgeon is supposed to have taken instead of laudanum through mistaking the bottle; and one alleged case of poisoning by violet powder containing sulphate of lime. But the most curious case is one in which a herbalist poisoned himself and his assistant whilst attempting to demonstrate the innocuousness of a powder which he had prescribed for liver complaint.

It may be mentioned here that besides the important prosecution under the Pharmacy Act already referred to, there have been several instances in which the Council has been successful in enforcing the provisions of the Act against offenders, amongst which was one who for a time seems to have thought to extend the judgment in favour of corporations so as to include private partnerships. In a large number of cases, also, offenders have been compelled to desist from their illegal practices without going into court. Besides these cases, there have been other successful prosecutions, some undertaken by the Trade Association under the 17th section of the Act, which relates to the illegal labelling of poisons, and does not require the action of the Registrar.

The year shows a falling off in the number of persons applying for examination, the gross total reaching only 2017, against 2296 in 1879. This decrease extends to all the examinations, the largest proportion, however, occurring in the Preliminary. The net result shows a still further diminution in consequence of the larger proportion of failures. Thus, there have been but 125 candidates for the Major, of whom only 57 or 45·6 per cent. passed, against 134 candidates, of whom 76 or 56·7 per cent. were successful in 1879. In 1879 there were 656 persons sat for the Minor examination, and 340 or 51·8 per cent. passed, but during the past year, out of 652 candidates, only 311 or 47·7 per cent. succeeded. The Preliminary candidates numbered 1227, against 1474 in 1879, with 638 or 51·9 per cent. successful, against 738 or 53·1 per cent. There were 13 candidates for the Modified, of whom 5 passed. In addition 48 certificates of various examining bodies have been received in lieu of the Preliminary examination. Although, from one point of view, these figures may furnish ground for congratulation, as showing that a smaller number of persons have entered an already overcrowded trade, yet from another they indicate that the proportion of imperfectly educated persons prematurely entering the examination room is as great as ever. That this is the true cause of the large proportion of failures, and not an undue stringency in the examinations, is confirmed by the reports of the Visitors on behalf of the Privy Council, and Dr. MACLAGAN, speaking of the Minor, expressly states his opinion "that a "great many young men present themselves as candidates for admission to the profession of pharmacy "with totally inadequate ideas as to what is required "of them, and with apparent forgetfulness of the "fact that by passing this examination they are to "get entrance to what is understood to be a scientific "profession, not merely permission to follow a particular trade."

Indeed it has long been evident that, in the eyes of many persons, examination rather than education is the gate of entrance into pharmacy, and "preparation for examination" has consequently to a considerable extent overshadowed systematic training. In June this subject was brought under the consideration of the Council through a motion by the Vice-President for the appointment of a Committee to inquire into the relation to each other of pharmaceutical education and pharmaceutical examination. During the discussion and on other occasions there were indications of a disposition to look for a remedy in an enforced curriculum. The report of the Board of Examiners presented at the next Council meeting stated that the London Board had discussed the subject, and the opinion had been unanimous that the production by candidates for the Major and Minor examinations of a certificate of having completed a curriculum at some recognized school of pharmacy was very desirable if practicable. It was also stated that the Scotch Board had passed a minute to a similar effect, and was of opinion that if a curriculum were recognized at all it must be compulsory, not permissive. The Committee appointed by the Council has not yet presented a report.

Another subject that has been frequently under the consideration of the Council has been the Weights and Measures Act, 1878. It will be remembered that, as originally introduced into the House of Commons, this Act would have made it illegal for any chemist and druggist to have had in his possession for the purposes of trade the ordinary apothecaries' weights and measures, as not answering to any legal standard in the possession of the Board of Trade. By the influence of the Council, the issue of an Order in Council was obtained, creating and legalizing such standards. But it soon became apparent that in the undue prominence and freedom from control granted to inspectors under the Act, and in their inability, as a rule, to carry out operations requiring such nicety of manipulation as the verification of the delicate weights and measures used by chemists and druggists, there were elements threatening serious inconvenience to the trade in the application of the Act, which might be heightened by the idiosyncrasies and whims of individual inspectors. The subject was brought under the notice of the Board of Trade by a letter from Mr. SANDFORD, as President of the Society, and by a deputation which waited upon Mr. FARRER, the Secretary to the Board, and in response to an invitation a Memorial was drawn up by the Council, setting forth some of the difficulties which had occurred and the points upon which diversity of practice existed. In reply a letter was received, which, although containing an expression of opinion upon some of the doubtful questions, practically admitted that the Board of Trade had no power to do more than advise, and that its advice might be accepted or rejected at pleasure. The omission to provide for a body having a controlling action over the inspectors and authorized to decide in doubtful cases as to the propriety of prosecutions is no doubt a great blot in the Act. It has already been productive of inconvenience and hardship in the case of Mr. WHITTLE, who has been convicted for being in possession of unjust measures, although those measures were properly verified as correct, and did not vary so much from the standard as did the evidence of the prosecuting inspector, as tested by the figures of his own skilled witness, and by others, given as the result of a trial of those measures by the officers of the Board of Trade. The impotence of the Board of Trade to do more than express an opinion was very marked in connection with this case, for, although the magistrates had applied to the Board for advice, they not only suppressed the reply, but decided in direct opposition to the opinion of the Board, which was to the effect that the impugned measures were reasonably correct.

In June the introduction of a "Bill to Consolidate "and Amend the Law relating to the Manufacture "and Sale of Spirits" necessitated prompt action on the part of the Council, in consequence of an omission of a single word which would have rendered it illegal to be in possession of articles prepared with methylated spirit, the manufacture of which was allowed by the Bill. The chief interest to pharmacists lay in the utilization of methylated spirit in the preparation of poisonous liniments. Here, again, the Council was successful in impressing its view of the subject upon the Government, and secured the necessary correction in the Bill in its passage through the House.

As it is not likely that the poor will cease out of the domain of pharmacy for some time yet to come it is satisfactory to find that the stream of benevolence in our midst shows no sign at present of drying up. The amount received in donations and subscriptions has been upwards of £1350, or £100 in excess of the amount received in the previous year. The Council has thus been enabled to distribute, besides the sum of £980, already pledged on account of annuities, a further sum of nearly £650 in the shape of grants for temporary relief. Two marked features distinguish this fund from most others having similar objects, the cheapness of its administration and the absence of a necessity for expenditure on the part of applicants for assistance. Nevertheless, in some cases, a natural anxiety has led to the spending of money that could ill be spared, and at the first meeting of the Council in the year, the latter point, with which the name of Mr. **Shaw** is closely associated, was again discussed. Later in the year, apparently moved by the fact that a large proportion of the chemists and druggists on the Register do not subscribe to the Fund, Mr. **Robbins** moved that it should be an instruction to the Committee that in its administration members and associates of the Society and their widows and orphans and subscribers to the Fund should have a priority. This, however, was objected to on the ground that it would damage the catholic character of the Fund, and tend to make it more of a provident fund, and eventually the motion was lost. At the election in December four fresh annuitants were chosen, which brought the total number up to thirty-two, three of the former annuitants having died during the year.

The papers read at the Evening Meetings during the past year have been as follows:—"Tincture of Senega as an Emulsifying Agent," by Mr. H. **Collier**; "The Diffusive Properties of some Preparations of Iron," by Professor **Redwood**; "The Volumetric Determination of Alkaloids by Solution of the Iodides of Bismuth and Potassium," by Mr. J. C. **Thresh**; "The Histology of Araroba or Goa Powder," by Mr. T. **Greenish**; "Note on the History of Saffron," by Mr. C. B. **Allen**; and, "The Use of Saffron in the Pharmacopœia," by Mr. E. M. **Holmes**. It will be seen that the list is unusually meagre, and it must be admitted that although the papers read have, on the average, been fairly up to the standard that pharmacists have been accustomed to expect at the Evening Meetings of the Pharmaceutical Society of Great Britain, the fact that only six have been forthcoming on the five occasions which furnish the most favourable opportunities during the year for bringing forward subjects of pharmaceutical interest appears to indicate, so far as numbers can do so, a great dearth of pharmaceutical research. Explanations have not been wanting, and one that has gained some currency is that the scarcity of papers has been due to the withdrawal of a small honorarium which during a short time it was the practice of the Council to allow to the writers of papers. Fortunately, or unfortunately, however, it is hardly necessary to raise a question as to how many persons would be so influenced, or as to the probable value of communications the publication or extinguishment of which is deliberately allowed by their authors to depend upon a subsidy of a few shillings, for although the practice of payment obtained during the early part of the past year only four papers were then forthcoming in three months. Nor is this experience peculiar to the meetings of the parent Society, whilst a glance at the English journals will show that too large a portion of the current pharmaceutical literature is drawn from foreign sources. The principal cause probably lies deeper than the surface in the fact that the methods of pharmaceutical education prevalent in Great Britain do not create a taste for original research or foster an appreciation or even a tolerance of the records of results of such thorough pharmaceutical work as is done in other countries.

The Library has been increased by the addition, by donations and purchase, of between three and four hundred volumes and pamphlets. But the principal event in connection with this department during the year has been the publication of a complete Catalogue of the books in the Society's Libraries in London and Edinburgh; for from the thorough and careful manner in which it has been compiled by the Librarian, and the wide range of the books included in this Catalogue, it forms also a valuable index of the literature of the sciences allied to pharmacy. It appeared at the end of June, and a copy was ordered by the Council to be sent gratis to all Members and Associates in Business and supplied to Associates not in Business on application, and since that time about four thousand copies have been disposed of. Consequent, as it appears, upon the issue of the Catalogue there has been an increase in the number of books borrowed from the Library. On the other hand, there has been a marked decrease in the number of visitors to the Library, both in the daytime and in the evening. In 1879 the numbers amounted to 5201 in the day and 2264 in the evening; but for 1880 the numbers are about 3100 and 1600 respecpectively.

A reprint of **Bell**'s 'History of Pharmacy,' with a continuation to the period of the passing of the Pharmacy Bill, by Professor **Redwood**, has also been completed and issued during the year, and a copy has been forwarded to every Member and Associate in Business. Another work that has been compiled and published under the direction of the Council is an Index to ten volumes of this Journal. This and two similar indexes compiled previously, cover the whole of the time from the commencement of the **Pharmaceutical Journal** in 1842 to the completion of the eighth volume of the third series in 1878. It also has been supplied gratis to Members and Associates upon application.

The Museum of the Society has been greatly enriched during the year and easily maintains its position as the finest accumulation of materia medica specimens in the world. Especially the collection of Indian drugs has been much enlarged by numerous specimens from the late India Museum presented by the Government, and by further donations from Dr. **Dymock**, of Bombay, as well as by the purchase of a considerable number brought from Singapore by Mr. J. **Collins**, a star-anise among which was utilized in a recent paper. All these specimens are now available for reference, having been arranged in a new cabinet. The cinchona collection, thanks to the generosity of Mr. J. E. **Howard** and Mr. **Whiffen**, now includes specimens of all the India, Java, Ceylon and Jamaica barks. A number of drugs collected by Professor **Bayley Balfour** during his recent visit to Socotra have been presented, with a promise of information respecting them to follow. The Exhibition in May was also a means of adding to the stores. Duplicates have been freely distributed towards forming or improving museums in connection with several provincial associations, as well as medical schools in London, Glasgow and Aberdeen. Others have been sent to professors at various universities and museums and have brought many valuable specimens in exchange, especially from Dr. **Vogl**, of Vienna, and Professor **Dragendorff**, of Dorpat. It is satisfactory to know that the Museum is increasingly used for reference, and for the identification of plants, drugs, etc., not only by pharmacists, but by other investigators. It may be useful to mention, lest any should think that the dearth of papers at the Evening Meeting referred to in another paragraph is due to lack of subjects, that the Curator keeps a list of substances that still require investigation.

The Annual Meeting of the Pharmaceutical Society was held as usual in the month of May. It was fairly well attended, and the report presented by the outgoing Council was unanimously adopted. A novel feature in connection with this meeting, which was much appreciated and will probably be repeated in future years, was an Exhibition in the Society's rooms of articles connected with pharmacy. Most of the credit for its conception is due to Dr. **Symes**, whilst the success which attended it was secured by the energy and judgment with which the Curator and his assistants carried out the instructions of the Council.

The Annual Meeting was, as usual, preceded by a Dinner of the members and their friends, which took place at **Willis's** Rooms, and on the evening of the meeting the President and Council received a numerous company at the Annual Conversazione, held in the South Kensington Museum.

The Annual Meeting of the North British Branch of the Pharmaceutical Society took place in April, when a satisfactory report was presented and adopted. Mr. J. B. **Stephenson** was again re-elected President, Mr. **John Nesbit** Vice-President, and Mr. **John Mackay** was re-elected to the office of Honorary Secretary, which he has so long filled with benefit to the Society.

The first Evening Meeting of the Session was devoted, as usual, to receiving the reports of the Professors, the distribution of prizes and the delivery of an address to the students. It was reassuring to find that although the Society's School had been suffering from what we hope may be a temporary depression in respect to the number of students, it once again evidenced the high character of the education it can give, by furnishing the man who carried off the **Pereira** medal, the great open prize of the year. The **Jacob Bell** Memorial Scholarships have furnished matter for congratulation in the markedly increased appreciation of them, as evinced by a larger number of competitors than in any previous year. There were nineteen candidates for the two scholarships, and of these as many as nine obtained more than the minimum number of marks necessary for a qualification for a scholarship.

The address to the students was specially notable as being delivered by one who was himself formerly a student in the School, and who, although he has since won eminence in the medical profession, has never ceased to manifest interest in the work done by the Society. Besides addressing words of encouragement to the students, Dr. **Langdon Down** took the opportunity of expressing his opinion that a prosperous future for pharmacy would be dependent upon the development of its special and professional rather than its trade aspect. Borrowing an illustration from Nature, he argued that as greater differentiation of function marked a higher type of animal organism, so also a multiplicity of functions, which included the sale of patent medicines and counter prescribing with the practice of pharmacy proper, was a sign of retrogression. Admitting the severity of the present crisis, he said he considered that if the Society and the body it represented rose to what he conceived to be their duty, although there might be fewer pharmacists in the immediate future, they would be men of higher culture and scientific standing than at present. It would be well, however, if Dr. **Langdon Down**'s philosophical argument as to the importance of differentiation of functions were also well weighed by members of his own calling, and especially by those of them who, not content with dispensing for their own patients, compete with pharmacists for the prescriptions of other practitioners as well as for the trade in smelling salts, hair oil, and the like.

The future of the drug trade has also been the subject of a considerable amount of correspondence in this Journal, some of which showed failure on the part of the writers to recognize the extent to which the spirit of the age is antagonistic to protection Even should the most sanguine expectations as to what may be done by legislation be fulfilled, there can be no doubt, whether distasteful or not, that in the future as in the past, to use the words of Dr. **Langdon Down**, "the process of evolution will be "in pharmacy the same as in biology, one of natural "selection and the survival of the fittest."

Intimately associated with this question as to the future position of the pharmacist is another that has been before now discussed by the Council, and during the year has cropped up on several occasions, namely, the relation in which pharmacists should in future stand to the Pharmacopœia. The subject was brought forward by Dr. **Symes**, in a paper read before the Liverpool Chemists' Association, in which he advocated the importance of obtaining for pharmacists a legal right to be represented on the committee charged with the editing of the Pharmacopœia. On the motion, also, of Mr. **Hampson** a resolution was passed by the Executive Committee of the Chemists and Druggists' Trade Association, expressing an opinion that the Pharmaceutical Council, as representing pharmacy, should be legally empowered to act in conjunction with the Medical Council in framing and amending the future editions of the British Pharmacopœia. The subject was again broached at the meeting of the British Pharmaceutical Conference, and there is evidently the greatest unanimity of opinion amongst pharmacists as to the anomaly of their non-recognition in the construction of a work which has the force of law in relation to them. Perhaps at no other time has this anomalous position of the pharmacists of Great Britain in relation to the national Pharmacopœia been so marked as at present, when the three important Pharmacopœias of France, Germany and the United States, are being revised by committees each including a considerable proportion of pharmacists.

At one period of the year uneasiness was created in some quarters by an attempt on the part of a few dentists to expurgate from the Dental Register some names which they considered to be improperly included in it. As the decision rested with the Medical Council, there was never any ground for fear of unjust treatment, and the resolution of that Council not to be led into dealing with the cases *en masse* in deference to a sweeping dictum of counsel, but to decide each on its own merits, was no more than might have been expected. But the incident has proved how necessary was the action taken, and first suggested in these columns, to obtain the insertion of words in the Dental Bill while passing through Parliament, securing to pharmacists their then existing rights.

So long a time has elapsed since the Council of the Pharmaceutical Society obtained from the Government of the time a recognition of the propriety of exempting all chemists and druggists from jury service, that it is not surprising to find that many persons have forgotten or are ignorant of the true position of this question, and that although it has been delayed it has only shared the same fate as the larger question of the amendment of the law relating to juries, which has been set aside year after year in favour of what has been thought to be more pressing legislation. Some little agitation has taken place, and a memorial on the subject has been addressed by the Executive Committee of the Trade Association to the President of the Board of Trade, and acknowledged. Probably, considering the fact that the Association had previously had the subject under consideration, and decided that it was useless to seek legislation in a special Act, the acknowledgment was all that was to be expected, and the memorial will have served its purpose as a placebo to the more impatient members of the trade.

There have been numerous prosecutions under the Sale of Food and Drugs Act, but only a few of these have concerned chemists and druggists. Some cases of prosecution for the sale of cream of tartar containing excess of tartrate of lime, and sweet spirit of nitre deficient in nitrite of ethyl, in which chemists and druggists were the defendants, have been successfully defended; but the majority of prosecutions for the sale of adulterated drugs and medicines have been instituted against hucksters and unqualified shopkeepers. Notwithstanding this, and resting also upon figures given in the returns of public analysts, as to cases which had never undergone the ordeal of testing in a law court, the Local Government Board in its annual report made an assertion relative to the adulteration of drugs which might be misconstrued in a sense very injurious to the credit of pharmacy. A more careful consideration of the facts by this important department might much rather have been expected to evoke an expression of opinion favourable to a greater restriction of the sale of drugs to persons capable of judging as to their quality.

The British Pharmaceutical Conference met at Swansea, in August, under the Presidency of Mr. **William Southall**, who chose as a subject for his address some of the antiquities of pharmacy. The usual number of papers were forthcoming, and provoked interesting discussions among the not very large company of pharmacists present. The most interesting feature of the meeting was the presentation to Professor **Attfield** of an address and a large number of books, as a recognition of the valuable services he had rendered the Conference as one of its secretaries since its inauguration at Newcastle-on-Tyne, in 1863. The vacancy caused by the retirement of Professor **Attfield** was filled by the election of Mr. M. **Carteighe**. On the Continent the German Pharmaceutical Association held a successful meeting at Breslau, extending over five days, under the Presidency of Dr. **Brunnengraber**. The exhibition in connection with this meeting has been described in the columns of this Journal. In the United States the American Pharmaceutical Association held its Annual Meeting at Saratoga Springs, N. Y., in September. Amongst other notable meetings of the year may be mentioned that of the British Medical Association at Cambridge, in August, and that of the British Association at Swansea, in the same month.

The announcement of the intention to hold an International Medical Congress in London during the coming year suggested the opportuneness of reviving the deferred project for a meeting of the International Pharmaceutical Congress. The subject was brought before the Council of the Pharmaceutical Society by Mr. HAMPSON, and a committee was requested to make arrangements for the reception of the Congress on the occasion of its visit to London in August next. We understand that the preliminary inquiries have elicited very favourable responses, and that there is every probability that the meeting will be numerously attended by continental pharmacists.

In Ireland pharmaceutical affairs, at least, appear to have gone on with tolerable regularity and smoothness. Professor TICHBORNE has been again chosen President of the Pharmaceutical Society of that country, and the Council over which he presides has been able to put the Irish Pharmacy Act in force without receiving the untoward treatment experienced on this side of St. George's Channel. Sir DOMINIC CORRIGAN, the first President of the Pharmaceutical Society of Ireland, to whom, perhaps more than to any man, it owes its existence, has been removed by death, as have also two Members of its Council, Mr. WILLIAM ALLEN and Mr. JOHN GOODWIN.

The year just closed has not been remarkable for any important additions to the materia medica, notwithstanding that trade enterprise now appears to circle the earth in search of new drugs for the relief of disease. Certainly the substance which has created the greatest sensation, the resinous exudation from the *Pistacia Terebinthus*, known under the name of "Chian turpentine," was in use before the commencement of the Christian era, although in recent times it has dropped out of notice. It was brought into sudden notoriety through a paper published in the *Lancet* by Professor CLAY, in which he stated that by its administration he had obtained extraordinary results in the treatment of uterine cancer. The sudden increase in the demand for Chian turpentine revealed a great scarcity of the article, and the consequent high price induced searches among old stock for half-forgotten parcels of the drug that in many cases proved very remunerative to the fortunate finders. It also brought into the market a large quantity of factitious material, to which, notwithstanding that the characters of the true turpentine had been published in greater detail than ever before, Professor CLAY did not hesitate to attribute the want of success experienced by other practitioners. Commercial enterprise was, however, equal to the occasion. The probable amount of the next collection in the island of Chio was gauged, and in the prospect of a possible deficiency another source of the drug was suggested by Professor FLUCKIGER in the terebinth trees growing in the forests of Algeria. But meanwhile numerous observers have reported their failure to obtain the results expected, and the Committee of the Middlesex Hospital, which has a special ward for cancer cases, has announced its intention to purchase no more of the drug, so that although Professor CLAY appears to be as positive as ever as to its value, it is evident that with this disagreement among the doctors the future of Chian turpentine is rather uncertain at present. The revival of its use in medicine has, however, illustrated the service that can be rendered to medicine by skilled pharmacists, for as soon as it became evident that the formulæ originally devised by Professor CLAY for its administration were faulty, valuable suggestions for their improvement were forthcoming from Messrs. MARTINDALE, EVE, CHALLICE, PARKER, BRANSON and PALMER.

The cinchona barks have been the subject of several communications, and it is evident that the acclimatization initiated by the British Government in India and the Dutch Government in Java is at length exercising a widely spread influence. Now that it has been made evident that cinchona plants can be cultivated away from the native habitat of the family, and that such cultivation can be made remunerative, private enterprise is entering into competition in the production of bark, and if the anticipatory statistics quoted by Mr. J. ELIOT HOWARD from a Ceylon newspaper be nearly realized the time is not far distant when that island alone will be in a position to supply the world at its present rate of consumption. But quality is an important consideration as well as quantity, and if, as Mr. HOWARD appears to suspect, the zeal of the planters has outrun their discretion, the products will be disappointing. In Jamaica, however, very promising results are being obtained, some bark from that island having realized good prices in the market during the year. It is also interesting to note that some of the most valuable bark that has come to hand, rivalling the celebrated Ledger Calisaya in its richness in quinine, had been stripped from trees planted at the suggestion of Mr. LEDGER in a district in Bolivia where formerly the Calisaya flourished, but from which it had been exterminated by the improvidence of the method of collecting. In the presence of this extension of cinchona cultivation into countries differing considerably in climate, soil, and other conditions from its original home, it is not surprising to learn that samples of bark are now and again met with that upset all the old notions as to the determination of the value of a bark by its physical characters. In some cases the peculiarities that were formerly thought to be characteristic of rich quinine bearing bark have been present in samples nearly or quite devoid of that alkaloid, whilst, on the other hand, skilled dealers have been known to reject samples containing considerable quantities of quinine, because they did not present those peculiarities. Such an instance was brought under the notice of the Conference at Swansea by

Dr. B. H. Paul, as being furnished by a variety of bark first imported from South America about eighteen months ago, which was so unlike the ordinary kinds of quinine-yielding bark in appearance as to be thought not worth examination. Analysis, however, showed that it contained quinine, and it has since been imported in such quantities as to constitute a considerable fraction of the material from which quinine is manufactured. Some doubt has been expressed as to whether this bark is really the produce of a cinchona, and except in the fact that it contains quinine, there may be reason for this opinion, though on account of its coppery colour it has been termed *Cinchona cuprea* for the present. In any case its introduction serves to show that there is still room for investigation as regards the quinine yielding materials available in the South American continent.

Another bark, the quebracho blanco bark, has also been productive of considerable discussion in the journals, though much of this literature has been due rather to confusion caused by a similarity in names than to the importance of the place which the drug has yet attained in the materia medica. An announcement by Dr. Penzoldt that the bark of the quebracho blanco tree, a species of *Aspidosperma*, possessed properties useful in the relief of dyspnœa, created a demand for it which was in many cases supplied in the form of the wood of a "quebracho colorado," which is derived from quite another order, but happened just then to be better known as being used as a tanning material for red leathers. Whilst this mystification was being dispelled, another investigator, Dr. Wulfsberg, had arrived at the conclusion that the quebracho blanco bark itself was at least a very near neighbour to a false cinchona bark from Payta, described several years previously by Professor Fluckiger, and that the alkaloid isolated by Fraude from the former and named "aspidospermine," and by Hesse from the latter, and named "paytine," were identical. It is curious to note that a statement has been made that the red wood has been found even more effective than the white bark for which it was substituted in mistake; but it is possible that this has had its origin in the fact that the quebracho blanco wood has been found to contain the alkaloid which is looked upon as the active principle and that this statement is only a *réchauffé* of the original confusion. Though the uncertainty may have produced temporary inconvenience, it will prove a permanent gain to science, since it has called forth, in Dr. Hansen's 'Die Quebracho Rinde,' one of the completest pharmacognostical treatises that has appeared in recent years.

Curare, the arrow poison of the South American Indians, has been used to some extent in medicine, but it has presented the disadvantage of an uncertainty of composition that rendered its administration anything but satisfactory. Although in all cases virulently poisonous, very little was known as to its derivation, or even whether an article that professed to be uniform occurred in commerce under that name. Professor Planchon has, therefore, done good service in his "Studies of the Genus Strychnos," now in course of publication in this Journal, by showing that there are probably at least four kinds of curare, each prepared by Indians resident in different localities, but for all of which a species of *Strychnos*, though a different one in each case, is made to yield the principal ingredient. Two of these species appear to have been previously undescribed.

The praiseworthy ambition of Japan, which leads its merchants to compete with Europeans in their own markets, has introduced several new drugs into commerce. A "Japanese belladonna root," which was thought to contain atropine, has been examined by Mr. E. M. Holmes and referred by him to a species of *Scopolia*. This root is known to have been long used by Japanese physicians, and has been variously stated by Dr. Martin to contain solanine and by Dr. Langgaard to contain two new alkaloids, which he has named "rotoïne" and "scopoleïne." The plant is said to have the peculiarity of communicating to liquids an extremely strong fluorescence, and is certainly worthy of further investigation, both chemically and physiologically. Some further light has also been thrown upon the botanical history of Japanese aconite by Herr Geerts, resident in Yokohama. He refers it positively to *Aconitum Fischeri*, and says that the two varieties that have been observed as occurring in commerce are derived from the same species, but differ in consisting in the one case of the first tubers, and in the other of the succeeding but more poisonous ones. These are said to undergo a special preparation during which heat is applied, which would explain the differences in appearance and in alkaloidal yield that have been noticed. Star-anise is another drug that has been imported from Japan and was at first looked upon as star-anise which had been partially exhausted by distillation. It appears, however, that this was not the case, but that the star-anise grown in Japan is deficient in aroma as compared with the Chinese, and it seems probable that the *Illicium anisatum* of Loureiro and the *Illicium religiosum* of Siebold, which are given in all the text books as identical, are really two distinct species. The kinds of anise occurring in commerce have been recently described in a paper in this Journal by Mr. E. M. Holmes. An Indian henbane was brought under the notice of the Pharmaceutical Conference by Mr. Greenish as presenting indications that it might be profitably employed in European medicine, but a subsequent communication from Dr. Dymock seemed to show that the price charged for it in India is prohibitive.

The stigmata of maize have been recommended as of service in the treatment of cases of gravel and nephritic colic, but it does not appear to have yielded concordant results with different observers. Under the name of "tonga," a drug of a composite character was also introduced early in the year as a remedy for neuralgia. One of its constituents was identified botanically by Mr. E. M. **Holmes**, and Mr. **Gerrard** published some results of a chemical examination of it. But since that time the crude drug has disappeared in favour of a pharmaceutical preparation, though the outlandish name has by no means been kept in the background.

Another suggested addition to the materia medica is a chemical compound known under the name of resorcin, and is a substitution product of benzol, in which two atoms of hydrogen have been replaced by hydroxyl. It is said by Dr. **Andeer** to be a good antiseptic, but without any irritating action. Chemistry has also yielded two new anæsthetics, methyl chloroform and monochlorethylenechloride, as well as various mixtures that have been suggested. The relative value of some of these anæsthetics has been recently described in a report presented to the British Medical Association. Besides these, a series of borocitrates, said to have a specific action in calculous disorders, has been described by Herr **Scheibe**.

Considering the important position in medicine which has recently been assumed by antiseptics, it is curious to note that the class of minute organized bodies which they are used to combat also promise to yield increasingly valuable assistance in the treatment of disease. Pepsine and pancreatine have been in use some time, but the increased attention which has been paid to the subject, and which has shown that they are accompanied by at least five or six other distinct ferments in the digestive juices, has led to a better appreciation of their true functions and favoured their use in a more scientific manner. The valuable Lumleian Lectures delivered by Dr. **Roberts**, and published in this Journal, form an important contribution to the history of the subject, and show how these ferments may themselves be administered with the greatest advantage, or used in the peptonizing of different substances to form a nutritious, partially digested food, suitable for persons suffering from weak digestion. Amongst the preparations for which Dr. **Roberts** has furnished recipes may be mentioned peptonized milk, gruel, soup, jelly, blancmange and beef tea.

A valuable paper on the preparation of pepsine has been contributed by M. **Petit**, giving the results o a large number of comparative experiments. He reports that, taking fresh pigs' stomachs that have not undergone alteration, and using suitable precautions, he has succeeded in preparing pepsines capable of converting into albuminose one thousand times their weight of strongly dried fibrin. Sheep's stomachs yielded pepsine which was only one-tenth as active. It may be mentioned here that ostrich pepsine, which was vaunted to have a digestive power corresponding to the omnivorous reputation of the bird, as well as a preparation from the gizzard of the chicken, have been proved by the experiments of Mr. **James** to be practically destitute of the power of digestion.

Papaine, the ferment separated from the juice of the *Carica papaya* fruit by M. **Wurtz**, has lately been recommended for use in medicine. It has been further examined and found to be of an albuminoid nature, and is apparently produced by a process of hydration of the coagulable portion of the juice. Papayotin, the form in which this fermentative principle was separated by Dr. **Peckoldt**, is also quoted in the German price lists. Some allied subjects, though not pertaining to the materia medica, may be just referred to here, such as the ferment to which the formation of gluten in dough is attributed by Messrs. **Weyl** and **Bischoff**, the digestive ferment said to be formed during breadmaking and to be capable of peptonizing a considerable quantity of fibrin mixed with the dough, and the series of ferments found to be present in cheese by M. **Duclaux**.

As has been before stated, pharmaceutical research has not been active in this country, and although a large number of medicinal substances have been investigated and made to yield their active principles, the great bulk of the work has been done by chemists resident on the Continent or in the United States. One of the most indefatigable of these workers is Dr. J. O. **Hesse**, of Stuttgart, who, besides making innumerable contributions to the history of the cinchona alkaloids, finds time for the prompt, but exhaustive, chemical investigation of many of the new introductions to the materia medica. Amongst his work which has been recorded in this Journal during the past year may be mentioned his examination of a series of *Alstonia* barks, namely "dita" bark (*A scholaris*), "poelé" bark (*A. spectabilis*), and the "Australian fever bark" (*A. constricta*). Both "dita" bark and "poelé" bark were found to contain certain alkaloids in common, to which he has given the names "ditamine," "echitamine," and "echitenine," the second mentioned yielding a further peculiar basic product which he calls by the euphonious name "echitammoniumhydroxide." In the "poelé" bark he has found a fourth alkaloid, "alstonamine." The *Alstonia constricta* bark yielded still another alkaloid, which Dr. **Hesse** considers to differ from any noted by previous observers, and has called alstonidine.

The aconite alkaloids have been the subject of another report by Dr. **Wright**, which he proposes shall be, so far as he is concerned, a final one. In summing up the position of this investigation at the point of his resigning it, he claims that the term "aconitine" should be limited to a definite crystalline body which he has separated and represents by the formula $C_{33}H_{43}NO_{12}$. For such a definite body there would no doubt be a demand, but it is admitted that the difficulties attending its preparation have prevented manufacturers from supplying it at a moderate price. This difficulty, however, Dr. **Wright** considers to be one that pharmacists should attempt to surmount, and he thinks that the chemist having demonstrated the existence and characters of such a body, the commercial preparation of it may be left in their hands.

Among recent chemical investigations having the most important bearing upon pharmacy, the research of Herr **Ladenburg** upon the principal solanaceous alkaloids must take high rank. He has come to the conclusion that the bodies formerly known as hyoscyamine, daturine and duboisine, are, when quite pure, identical. Atropine has the same composition, and like them splits up into tropine and tropic acid, but it appears to be only isomeric, though it has been found practicable to convert hyoscyamine into atropine. Another alkaloid found together with hyoscyamine in henbane, which Herr **Ladenburg** has named "hyoscine," is also represented by the same empirical formula, $C_{17}H_{23}NO_3$, but splits up into tropic acid and a base only isomeric with tropine, and called "pseudotropine." Herr **Ladenburg** has further found that a whole class of new compounds, which he has designated "tropeïnes," may be formed by substituting various acids for tropic acid in recombining the alkaloid. One of these, homatropine, obtained by treating with hydrochloric acid the compound of amygdalic acid with tropine, promises to be in some cases a valuable substitute for atropine.

Another exhaustive research, possessing perhaps more botanical than pharmaceutical interest, is that of Mr. H. G. **Greenish** on nigella seeds. From these he obtained a new substance, melanthin, frothing in aqueous solution like saponin and digitonin, decomposing when treated with acid into melanthigenin and sugar, and closely related to the parillin of sarsaparilla and the glucosides of hellebore. No alkaloid was obtained, but a nitrogenous body possessing acid properties was observed. There was also an intensely fluorescent body, differing from that separated from the peony by Professor **Dragendorff** in being soluble in petroleum spirit. The fat acid of the solid fat contained in the seeds was principally myristic acid. Altogether the results were confirmatory of the observation that plants closely allied naturally often contain similar important constituents.

It must suffice to simply enumerate the more important of the remaining plants that have been examined and the principles obtained from them. Of alkaloids, the presence of one in *Baptisia tinctoria* has been established by Dr. **Greene**; methylpelletierine, pseudopelletierine and isopelletierine have been added to the alkaloid previously found in pomegranate bark by M. **Tanret**; thallictrine has been separated from *Thalictrum macrocarpum*; jaborine, a second alkaloid, from *Pilocarpus pennatifolius*; scybaline, from *Scybalium fungiforme*; tulipine, from the garden tulip, by Mr. **Gerrard**; and perhaps superbine from *Gloriosa superba*. Professor **Maisch**, on the other hand, claims to have disproved the presence of an alkaloid in the rhizome of podophyllum at any period of its growth. Mr. **Dott** has also arrived at the conclusion that the composition of the alkaloid beberia may be represented by the formula $C_{18}H_{21}NO_3$, upon grounds stated in a paper read before the North British Branch of the Pharmaceutical Society. Lastly, Dr. **Podwyssotzki** has published a process for the obtaining of pure emetine. Of non-nitrogenous bodies, *Phytolacca decandra* has yielded a crystalline neutral principle, phytolaccin, and a new acid, phytolaccic acid. The official jalap resin, obtained from an alcoholic tincture, has been found to contain two distinct resins, jalapin and convolvulin, whilst from podophyllin there has been separated a glucoside resembling convolvulin. Other glucosides prepared have been araliin, from *Aralia spinosa*, and eupatorin from *Eupatorium perfoliatum*. Picrotoxin, the poisonous compound prepared from cocculus indicus, has been separated by a series of fractional solutions into three distinct bodies, picrotoxin, picrotin and anamirtin, only the first of which is poisonous.

A most important paper was contributed to the Evening Meeting in March by Professor **Redwood**, on the "Diffusive Properties of Some Preparations of Iron." It was called forth by an assertion by M. **Personne**, that the preparation known as "dialysed iron," being in the colloid condition, could not diffuse readily, and consequently was inert as a medicinal agent. Professor **Redwood** was therefore led to make a number of comparative experiments as to the diffusive properties of the official preparations of iron, to ascertain whether they were open to the same objection. These seemed to show that while the sulphates and chlorides are preeminent in regard to the extent and rapidity with which they undergo liquid diffusion through a membrane, the scaled preparations, and especially those made with citric acid, are not deficient in this respect. His experiment with dialysed iron, however, appeared to be confirmative of M. **Personne**.

There have also been other valuable investigations that come within the class sometimes included under the title "pharmaceutical chemistry." An observation by Mr. R. H. **Parker**, that ferrous iodide is gradually decomposed in the presence of potassium chlorate, has been utilized by him in working out a method for the estimation of syrup of ferrous iodide. Some results obtained in the examination of samples from different sources went to show that a syrup of ferrous iodide prepared from a "liquor" differs materially from one prepared by the Pharmacopœia process. Mr. J. C. **Thresh** has pointed out the value of potassium iodide as a reagent for the detection of traces of bismuth, and has also attempted to apply a solution of iodide of bismuth and potassium in the volumetric determination of alkaloids to a further extent than previous observers. Mr. **Thresh** has also devised a method for estimating the strength of alcoholic solutions of chloroform, based upon the insolubility of alcohol and solubility of chloroform in petroleum spirit, and incidentally shown the great variation in chloroform strength of such solutions as met with in commerce. Mr. **Fletcher** has described a very delicate method for the gravimetric estimation of minute quantities of arsenic, based upon the large proportion of silver thrown out of solution by the reaction of arseniuretted hydrogen upon silver nitrate.

Mr. H. G. **Greenish** has furnished evidence that a large proportion of the cantharidin originally present in blistering flies is probably left in the residues as an insoluble compound, when they are only extracted with the ordinary solvents, the remedy suggested being to convert it by previous treatment into a soluble potash or sodium compound. Bromide of ethyl having come into use to some extent as an anæsthetic, attention has been directed towards methods for its preparation and purification, and preference appears to be given to that suggested by Dr. **De Vrij**, of distilling it from a mixture of potassium bromide, sulphuric acid and alcohol, with certain modifications. With respect to hydrobromic acid, it has been suggested that it may be prepared with advantage from barium bromide by decomposition with sulphuric acid. A method of preparing dilute phosphoric acid from amorphous phosphorus has also been described by Mr. **Lloyd**. Professor **Fluckiger** has shown that the effect of intense cold upon laurel leaves is to destroy in them the source of hydrocyanic acid and benzylic aldehyde. Professor **Van der Burg** has published results which indicate that Dr. **De Jongh** was in error in saying that the light coloured cod liver oil contained more inorganic ingredients than the dark.

In pure chemistry the work done has been too extensive to be even recapitulated here, but exception may be made to mention the synthesis of citric acid and that of indigo. There have also been some important discussions on the analysis of potable waters.

In the department of pharmacy the communications have not been numerous. Mr. **Martindale** has shown how the difficulty of dispensing a doubly dangerous substance like nitroglycerine may be overcome. Mr. **Elborne** has described a process, though not a new one, by which the residual tincture may be recovered from marcs by upward displacement. Mr. **Lloyd** has described the conditions essential to successful percolation. Mr. **Naylor** has contributed a practical paper on the preparation of green extracts. Emulsions have been the subject of another practical paper by Mr. **Gerrard**, who advocates the use of powdered gum acacia, and has furnished a series of formulæ convenient for making emulsions with various substances. Mr. **Collier** has added tincture of senega to the list of emulsifying media. Mr. **Diehl** has found that a soluble albuminate of iron in a dry condition can be obtained easily by precipitating its solution with common salt, and that the product so obtained is uniform in composition whether the solution has contained excess of ferric chloride or of albumen. Mr. **Barnes** has found that cold water does not remove the bitter principle from taraxacum and is also of opinion that an alcoholic extract of the root would be superior to the Pharmacopœia extract. Further, he has supplied a formula for ipecacuanha wine, prepared by macerating an acetic extract of the root in sherry.

In physics research has been very active and successful. Besides the marked advance in the history of the electric lamp, to which reference has been recently made, Dr. **Siemens**'s observations upon the influence of the electric light upon vegetation have opened up a wide field for speculation. The inquiry into the elemental state of matter, which received such an impetus from the statements of Professor **Meyer** in the previous year, have been continued with valuable results. The subject of the solubility of solids in gases recalls Mr. **Mactear**'s and Mr. **Hannay**'s experiments on the crystallization of carbon. Dr. **Carnelly** has contributed some valuable information as to melting and boiling points and has shown under what conditions ice can be maintained in the solid form at a high temperature. But one of the most striking as well probably as the most valuable triumphs of the year has been the utilization of a beam of light for the conveyance of sound by Professor **Bell**, in his photophone.

During the past year literature has been enriched by the addition of a large number of books specially interesting to pharmacists, but only one or two can be noticed. First among these may be placed the 'Medicinal Plants' of **Bentley** and **Trimen**, which has been issued in its complete form. Professor **Fluckiger** has given us an English translation of his 'Pharmaceutical Chemistry,' and is also sending forth a new German edition of his 'Pharmacognosy of the Vegetable Kingdom.' A translation of **Prantl**'s 'Text-Book of Botany' has placed the theories of advanced botanists within the grasp of English students. Another important botanical work is **Darwin**'s 'Power of Movement in Plants.' In Chemistry also a translation of **Wurtz**'s 'Elements of Modern Chemistry' has been furnished by the enterprise of an American publisher, besides which there has been published a large number of text books of more or less merit. Then there has been a re-issue of an old friend in **Cooley**'s Cyclopædia. We may conclude by mentioning two valuable contributions to pharmacy in the reports of the committees of pharmacists respectively charged with the consideration of alterations necessary in the pharmacopœias of Germany and the United States.

Death has been busy as usual among our ranks, and although the losses to British pharmacy have not, perhaps, been so severe as in some previous years, it has robbed us of many who will be much missed. In ADOLPHUS FREDERICK HASELDEN one passed away who in the course of twenty years served the Pharmaceutical Society as President, Vice-President, Member of Council and Examiner, and who contributed frequently to the Society's Journal. In WILLIAM WALTER STODDART we have lost another who for years occupied a seat on the Council and who successfully blended a love of science with the practice of pharmacy, and whose assistance to the students of his own neighbourhood will long be remembered. CHARLES CRACKNELL, also, after being one of the earliest prizemen in the Society's school, during twenty-four years acted as an Examiner and then for four years as a member of the Council. In WILLIAM AITKIN, the North British Branch has lost a former President and a Member of its Examining Board. Further, in JAMES THOMAS GWATKIN, of Brighton, CHARLES CORTIS, of Worthing, GEORGE SHIELD, of Arbroath, GEORGE DUTTON, of Bolton, and JOSEPH LININGTON RASTRICK, of Southsea, the Pharmaceutical Society has lost men who rendered valuable services as Local Secretaries for their respective districts.

We now bring this retrospect to a close, and if it has not been altogether a cheerful one, and if the entrance into the new year is rather overhung by cloud, it is sufficient to look back a few years to the time previous to the formation of the Pharmaceutical Society, to mark the advance that has been made in the face of what might have been then deemed much more adverse circumstances, and there can be no doubt that if pharmacists as a body will cultivate the spirit so pre-eminent in the founders and early leaders of the Society there will yet be a bright future for pharmacy and its followers.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

ASSISTANTS' SECTION.

The second meeting of the session was held in Anderson's College, George Street, on December 15, at 9 o'clock p.m., Mr. Walter Paris, President, in the chair.

The minutes of the previous meeting having been read and confirmed, the President delivered an address in which he advocated the necessity of chemists being thoroughly conversant with their business in every detail. Although in his opinion the time for the proposed enforced curriculum had not yet arrived, as the present unremunerative condition of the trade neither warranted nor justified it, it would certainly be accompanied with many advantages, and should it be insisted upon, it would be the means of the establishing of schools of pharmacy in the principal towns of England and Scotland, to which the Pharmaceutical Society would, in all fairness, be entitled to give a certain amount of support. He sympathized with the local secretaries, having to act as prosecutors in cases of infringement of the Pharmacy Act, and hoped to see this remedied in the proposed amended Act. He advocated the maintaining of full prices of patent and proprietary medicines, regardless of any opposition or competition, and considered it beneath the semi-professional standing of pharmacists to place themselves on a level with their competitors. When the former found themselves with some dozens of dead stock, combined with the small profit they had forced themselves to supply them at, they would find it to their advantage to let the trade drift back to its proper channel. Counter prescribing was the only means by which chemists could contend with the gross intrusion on their business by medical men. He fondly hoped to see them compelled to keep a qualified assistant to manage their shops, in the revised Act, although no Government, he was afraid, would so far interfere with the liberty and convenience of the community as to legislate for this end.

Mr. G. S. Illingworth thought that the nostrum trade would sooner or later become extinct; meanwhile he would advocate that chemists should reduce the prices and run abreast with the competitors; although such a step might not bring sufficient remuneration, yet it helped to link the business together. Referring to medicine *v.* pharmacy, he considered that medical men were legally justified in opening shops, but hoped that by-and-by the law would compel them to employ at least one qualified assistant in each shop. The present system, which the majority of doctors adopted, of employing mere boys, and even girls, was (in his opinion) unsafe for the public, and a very grave intrusion upon the rights of the chemists. He could not avoid the conclusion that doctors who so conducted their dispensaries and shops not only lowered the dignity of their own profession, but minimized the tedious duties of the pharmacist in the public estimation.

The address was further discussed by Messrs. Blain and Gilmour, after which the usual vote of thanks was given to the reader and after the election of members, the meeting terminated.

Parliamentary and Law Proceedings.

POISONING BY CHLORODYNE.

Mr. William Carter, coroner for the Eastern Division of Surrey, last week held a lengthy inquiry, at South Lambeth, into the circumstances attending the death of Mr. Henry Allen, aged 59, lately residing at 2, Priory Place, who was poisoned by chlorodyne on Monday last. From the evidence of Mrs. Jane Allen and other witnesses it appeared that the deceased was a traveller in drugs, and for some time past had given way to intemperate habits. On Wednesday, in last week, he complained of feeling unwell, and he remained at home until Saturday night, when he obtained a bottle of chlorodyne. At an early hour of Sunday morning he got out of bed, and poured about 30 drops of chlorodyne into a tumbler of water, which he drank. He felt no better, and while Mrs. Allen was at church in the evening Allen again resorted to the chlorodyne, and obtained a few hours' rest. At half-past seven o'clock his wife was aroused by the deceased, who had gone into the dining room to take another dose. On returning to the bed room Mrs. Allen was alarmed by observing her husband with clasped hands murmuring a prayer. His breathing soon after became so stertorous that witness had to call in assistance, and Mr. Mackintosh, a surgeon, was sent for. The deceased rallied slightly after artificial respiration had been resorted to, but he died during the day from the effects of the poison.

Mr. Mackintosh was called, and said he was a registered surgeon. He had previously attended the deceased when he was suffering from the effects of alcoholism. In answer to the coroner, witness said he was of opinion that the deceased had died from the effects of an overdose of chlorodyne.

The jury decided "that the deceased's death had been caused by misadventure, through taking an overdose of chlorodyne."

THE SALE OF FOOD AND DRUGS ACT AND TARAXACUM COFFEE.

On Thursday, December 16, at the Dewsbury Borough Court, Alfred Pearson was summoned for an offence against the Sale of Food and Drugs Act in conection with the sale of a compound known as taraxacum or dandelion coffee.

Evidence was given as to the purchase of the "coffee," which was sold in packets bearing a statement that it was a compound of taraxacum or dandelion coffee and other wholesome ingredients not injurious to health.

Mr. Rimmington, the public analyst, deposed that he had examined the sample sent to him and found that the mixture was neither dandelion nor coffee. It contained a large quantity of chicory and a substance he had not been able to identify. The unnamed substance was not an extract of taraxacum.

On the part of the defence it was stated by the manufacturer, that the compound was a mixture of pure coffee, taraxacum, in the form of a concentrated extract, and burnt sugar.

After some deliberation the Bench decided to dismiss the summons.

Reviews.

AIDS TO THE CHEMISTRY AND TESTS OF THE PHARMACOPŒIA. By JAMES DAVISON, L.R.C.S.I., etc. Dublin: Fannin and Co. 1880.

The modern systems of curriculum education and syllabus examination call into existence a large number of little books of condensed information; the matter thus afforded must be not only correct but so worded as to eliminate the possibility of misconstruction, or else such books are worse than useless, for few attainments are more easy than to firmly fix erroneous impressions on the student's mind and few more difficult than to remove them.

The author's object, as indicated by the title, is good, and the prefatory remark that his notes are taken from standard works would lead the reader to expect something valuable to students of medicine and pharmacy; but perusal involves disappointment, for errors and misleading statements are frequent; and lucidity and instructiveness are sacrificed for brevity. On almost every page may be traced want of care. The author says, "all elements, with exception of hydrogen, may exhibit different degrees of quantivalence." The list of acidulous radicals contains "oxides," while "oxygen" appears with the basylous. "Alumen" occurs under the heading of metals. Phosphoric anhydride is mentioned and again spoken of as phosphorus pentoxide without a reference to their identity. Lotio nigra and lotio flava are said to be respectively Hg_2O and HgO *dissolved* in water. The equations illustrating the formation of permanganate of potash and arseniate of soda start with the manganate and pyroarseniate, leaving the student to guess how these bodies are formed from the materials used. Sb_2O_3 is said to be "made by acting on a solution of chloride of antimony with carbonate of soda." The formula of ferric nitrate is given as $Fe_2\,6HNO_3$, that of the acidulous radical of ferridcyanides as Fe_2Cy_6, while MuO_2 and $MuSO_4$ are represented as the formulæ for oxide and ulphate of manganese.

Brevity is the soul of wit, but it takes a master mind to communicate much information in short remarks. A student would not learn much when told that "bromine is made by passing chlorine gas into sea water," or that chlorate of potash is "made by passing chlorine into a solution of caustic potash," nor be much enlightened when he simply heard that a certain test solution is "used as a test" for a certain substance without knowing how or why.

Viewed as a whole, the arrangement of the book is good and the style generally clear, so that the author might by inserting more detail and by a more careful revision of proofs, produce in another edition a work really valuable to medical students; but students of pharmacy should begin with nothing less than the Pharmacopœia and standard handbooks on chemistry.

TABLES FOR THE ANALYSIS OF A SIMPLE SALT. By A. VINTNER, M.A. London: Longmans and Co. 1880.

This little work consists of four analytical charts such as may be found in or easily compiled from any treatise on practical analysis; and some six or eight pages of introductory matter describing the principles of the tests and the manipulation necessary for the use of the same.

The descriptive portion is not full enough for a beginner, and is superfluous for an advanced student, but it leaves little room for fault finding on the ground of correctness. It is a book scarcely calculated to be of advantage to those outside the author's own circle of students, as its value over numerous similar works only becomes evident when it is regarded as a collection of notes on a course of practical instruction already received.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[451]. Before the correspondence on the above subject closes, will you allow me to ask if the experience of any brother dispenser coincides with my own in the following particulars?

Having once on a time to dispense the prescription, "Calomel, ʒss. To be blown into the eye, through a quill, as directed,"—I supplied the calomel, which, having obtained from one of the first houses in London, I knew to be perfectly pure, and was surprised at my customer calling soon after to say that each time my calomel was used the child was caused the most acute pain, or to use his own words, "screamed with pain," whereas that obtained from a West-end house was borne without inconvenience. At the time, much to my client's dismay, I was unable to offer any explanation, but, on reflection, concluded that the calomel in ordinary use, though pure, has a crystalline character, which of course would be likely to irritate an already acutely sensitive surface. Since then, "Howard's" has always been used, which I suppose is prepared by precipitation, though whether better on that account for general pharmaceutical purposes I am not prepared to say.

A. P. B.

[479]. It is not possible to produce a colourless preparation at once in dispensing this prescription, as the combination of the iodine with the ammonia takes place

rather slowly, and a patient using the paint immediately after mixing would be likely to experience a discoloration of the skin from the free iodine which it contains. After the lapse of about a week almost all the iodine combines with the ammonia; the preparation turning gradually lighter in shade during the process, until it assumes a light-straw colour. It may then be safely used without fear of causing any stain on the skin. For details of the reaction "Cymro" may consult the answer to "Dartmoor" in the Journal for November 27, p. 445.

SPECIFIC GRAVITY.

[483]. G. B. thinks the bismuthi carb. open to question. He would have used the subnitrate, as he finds that is usually intended, when so ordered.

The subnitrate is the best known to medical men, many of whom are unaware of the carbonate or oxide being officinal.

[483]. Both "mag. carb. pond." and "bismuth. carb." were the wrong ingredients to use in your mixture. You should have used mag. calc. pond. and bismuth. subnit.

London ENDYMION.

[483]. "Bute" was correct in using mag. carb. pond. for magnesia, but wrong in using bismuthi carb., for when bismuth is written it is intended for bismuthi subnit.

"374."

[483]. "Bute" should have used "magnesia," B. P., *i.e.*, mag. calc. pond. and bismuth. subnit., B.P., the bismuth. alb. of 1864, which is generally understood to be meant when "bismuth" is ordered.

Hastings. J. M. J.

[483]. "Bute" was most decidedly wrong in using magnes. carb. pond. for magnesia. Magnesia is a B. P. preparation, and "Bute" will find on reference that it is prepared by heating magnes. carb. pond. in a crucible until all the carbonic acid is driven off; in fact until calcined magnesia (as we more commonly call it) is produced. He should have used magnes. calc. pond. Therefore, seeing that the British Pharmacopœia gives as a synonym for "bismuthi subnitras" the name "bismuthum album" (white bismuth), I should have used that preparation rather than the carbonate: whether bismuthum or bismuthum album were ordered I should use the same thing.

M.

[484]. The most probable reason for the explosion of this mixture is the liberation of carbonic acid from the mag. carb. pond. by the complex acid principles contained in the rhubarb.

SPECIFIC GRAVITY.

[484]. I should say the reason of the mixture dispensed by W. G. T. exploding must have been owing to the ext. taraxaci (which readily and imperceptibly decomposes) not being fresh; such a condition of an ext. taraxaci, liquefied in a mixture, would liberate an acid formed by fermentation, and would be acted upon by the carbonate in the form of magnes. carb. pond.

Sunderland. T. H. D.

[484]. The explosions may be accounted for by the theory that fermentation had set in, which was quite likely to be the case, more especially if mouldy ext. tarax. was used.

M.

[485]. "Cinchona Calisaya" was right in not filtering his mixture, and putting on a "shake the bottle" label. It cannot be dispensed without a deposit forming, which is a portion of the active principle of the tr. cinchonæ.

Sunderland. T. H. D.

[485]. On no account should this mixture be filtered Such a practice, though defensible in some very exceptional cases, indicates in this instance an incredible amount of ignorance. The cinchona alkaloids are thrown down by the ammonia and to filter them out is to remove the very essence of the mixture.

M.

[487]. This is a troublesome formula and I cannot understand a hair wash being formed; a hair cream would be a more suitable designation for it. My experience was as follows:—I rubbed down well the cocoa nut oil in a warmed mortar, then added the rum, a few drops at a time, until the whole was added, triturating well after each addition. This gave a thick creamy preparation.

Sunderland. T. H. D.

[487]. I should say it was impossible to prepare this as it stands. Could "Despero" not saponify the oil, previous to adding the rum? Of course this is contrary to the prescription, but it seems to be a case of choosing the lesser of two evils.

M.

[488]. The reaction is evidently the formation of sulphate of lead, and acetate of aluminum—which, if like most other acetates, will be very deliquescent, as follows:—

$$Al_2 3SO_4 + 3Pb 2C_2H_3O_2 = 2Al 3C_2H_3O_2 + 3PbSO_4.$$

Undoubtedly the best form of sending it out would be to mix it in a pint of water, and label "The lotion. To be used as directed. Shake the bottle."

M.

[488]. Pulv. aluminis, B.P., contains nearly half (47 per cent.) of its weight of water of crystallization, and when mixed with acetate of lead a double decomposition ensues, with formation of sulphate of lead and acetate of ammonium and aluminium. The water of crystallization being set free accounts for the pastiness observed by "Alpha," and therefore an equivalent proportion of dried alum (alumen exsiccatum, B.P.) must be used in dispensing these powders.

SPECIFIC GRAVITY.

[488] In reply to "Alpha," the reaction is as follows: —The acidulous radicle (sulphate) of the P. alumini liberates the acetic acid contained in the plumb. acet., hence the moisture.

Oundle. F. DAVIS.

[488]. "Alpha" will find the powdered alum and acetate of lead mix best, and quite efficiently for a lotion, with a bone spatula on paper, Rubbing the ingredients together in a mortar liberates (if I may use the term) the large quantity of water of crystallization alum possesses, which is sufficient to liquefy the acetate of lead, also possessing three molecules of water of crystallization, the latter substance being soluble in a little more than double its weight of water.

Sunderland. T. H. D.

[489]. This prescription should be dispensed as written with a "shake" on the bottle.

SPECIFIC GRAVITY.

[490]. "374" thinks that, as "plumbi acetas" was to be used in the form of a lotion, most probably the prescriber intended ungt. plumbi to be used.

[490]. Judging from the prescription I think "Ointment" would be justified in dispensing ung. plumbi acet. for ung. plumbi. Probably the prescriber meant a similar preparation to the lotion, but in the form of an ointment would be more convenient to use at night instead of continuing the application of the lotion through the night.

Sunderland. T. H. D.

[492]. "J. P. I."—"Sax. oleum purificatum" is the synonym for vaseline or petroleum jelly.

Oundle. F. DAVIS.

[492]. "Sax. oleum purificatum" is a synonym for vaseline, saxoleum being simply a variation of petroleum. The root meanings of the two words differ less than do our English words "stone" and "rock." M.

[493]. What do your correspondents understand is intended as the first ingredient in the following prescription?—

℞ Berberiæ . . . . ʒj.
Acid. Phosp. Dil. . . . . ʒiij.
Tinct. Aurantii . . . . ʒiv.
Aq. Destil. . . . . ad ℥vj.
Syrup. Aurant. . . . . ʒj.
M. Coch. ampl. ter dic ex aquâ sumend.

CALUMBO.

[494]. I had the following prescription given me to dispense a few days ago, but could not do so, as I was unable to get a preparation called by the doctor "ammon. quina carb." Will some reader kindly inform me if he knows of any such preparation?—

℞ Ammon. Quina Carb. . . . . . . ʒiiss.
Tr. Nuci Vom. . . . . ʒiss.
Ext. Ergot. Liq. . . . . ʒiij.
Eth. Sulph. Co. . . . . ʒij.
Inf. Quass. . . . . ad ℥vj.
M. ft. m.
Sig. ℥ss ter in die ex aquâ.

EDWARD COXHEAD HUTCHENS.

[495]. The following was dispensed by me lately:—

℞ Liq. Hyd. Perchlor. . . . . . . ♏ xx.
Potass. Iodidi . . . . gr. iij.
Tinct. Cinchonæ . . . . . . ad ʒj.
M. Mitte ℥ij.

Take one teaspoonful in a wineglass of water twice a day.

It was brought back with a complaint that when dispensed in London it was darker in colour and quite clear. Mine was thick. Can anyone explain the difference? My tinct. cinchon. is prepared strictly according to the B.P. TRANSFUGIO.

Notes and Queries.

[697]. I should recommend Mr. Jones to make infusion of gentian of Pharmacopœia strength, and to submit it to the greatest degree of cold he can command; I have found leaving it in the open air on a cold winter's night sufficient, but in warm weather artificial means must be resorted to, and this makes it of course more expensive. Fifteen-sixteenths of the infusion should be frozen the first time; this, after separating from the little liquid unfrozen, is melted and again frozen; this time very little extractive matter is left in the ice; the two liquids are mixed and made up to one-tenth the bulk of the original infusions with water, and then to one eighth with spirit. The resulting preparation retains all the aroma of the fresh infusion, and is much lighter in colour than the same preparation concentrated by heat. MAJOR.

Correspondence.

WHY DO NOT OUR YOUNG PHARMACISTS CONTRIBUTE MORE TO ORIGINAL RESEARCH?

Sir,—Speaking before the Leeds Chemists' Association, Mr. Louis Siebold laments the very slight improvement that has taken place in the educational position of pharmacists since 1868, the year in which the Pharmacy Act came into operation. He laments especially that those who pass the examinations of the Society should make them the end of their scientific career, the goal instead of the starting point. He says that the Pharmaceutical Society and Pharmaceutical Conference appeal almost in vain to the rising generation of pharmacists for help in original research or literary contributions. If this is so, what is the reason? Are all the advantages that the study of science offers proclaimed in vain before the eyes of the incredulous and unappreciative pharmacist? I fear this is so, and that the career offered is not sufficient to induce the cultivation of general and technical scientific knowledge to the extent that Mr. Siebold and many others would wish.

The business prospects and social position open to the majority of pharmacists in this country are not such as to induce them to consume the "midnight oil." The business position pecuniarily is not equal to that of an average grocer or draper, and the social position is about the same. The advantages of an assiduous cultivation of scientific pursuits in particular instances here and there may be considerable, but generally it amounts to this, that they constitute the fortunate possessor general referee for the neighbourhood in all matters concerning snakes, birds, plants, etc., filters that will not filter, and water that "there is something wrong with," and for which an analysis is required free of charge.* In fact the chemist in such a case becomes a sort of animated "inquire-within-upon-everything." He is a very useful man in his neighbourhood, but must not look for the commercial success of his neighbour the draper, or the professional distinction of the M.D. in the next street. His business does not contain within itself the potentiality of such success. Here I think may be found the reason why so few who pass the higher examinations continue their purely scientific pursuits—it does not pay. A low view, it may be said. Perhaps so, but I imagine it would be the view taken by most men similarly circumstanced. The whole body of pharmacists can show a fair proportion of its members who have obtained eminence in the scientific world, but the prizes of the profession are so few and so poor that they fail to be a stimulus to the members generally, and unless the chances of obtaining commercial success become greater than they are now, or the possibility of applying scientific knowledge usefully and advantageously be increased, I fear the level of scientific attainments in the general body of pharmacists will remain much as it now is. The general body of the members of a profession will never be found to be educated above the average requirements of the profession itself, and really what is becoming more necessary every day in a pharmacist is rather a memory that will retain the names and particulars of all the West-end and American nostrums, than a knowledge of pharmacopœia processes which are daily becoming more and more superseded. Other careers afford a better remuneration (I do not mean mere money value) for the same expenditure of capacity and labour, and other careers will give social distinction to scientific attainments, and some of our most promising students finding this out have deserted pharmacy for some more favourable sphere. Can they be blamed? Pharmacy is a useful and a respectable calling and it requires for its proper exercise some scientific knowledge and a superior code of ethics, but it has few prizes to offer. Many of its members follow scientific pursuits for the love of them, and they gain greatly in all the advantages which science and culture bring, they enter on a pursuit which ever leads them on to fresh pleasures, but it cannot be expected that the general body of its members should attempt a higher range of attainments than is necessary to fulfil the duties of their calling.

K. K.

ELEGANT DISPENSING.

Sir,—I fail to understand the meaning of Mr. Leay's letter in the Journal of the 18th, when he speaks of "elegant dispensing." It is not, I should imagine, elegance that is required to carry out the intention of the prescriber, but the purity of the ingredients with accuracy that is the most essential, combined with neatness in corking, capping, labelling, and wrapping, and for that I maintain every chemist has a right to be fairly remunerated.

302, *Mare Street, Hackney, E.* W. M. COVELL.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Kendall, Garside, Nesbit, Mackay, Fennell, Mee, Cartwright, Swinn, Parker, Langbeck, Local Secretary, Careful Reader, Eureka, Only a Junior.

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* Not long since I analysed some wall paper for a gentleman, discovering arsenic; when my bill went in containing an item of 5s. as charge for the examination, I received a lengthy letter expressing surprise at the charge and that I had not in the interests of science made the analysis gratis.

CAPE TEA.

BY HENRY G. GREENISH.

Through the kindness of Mr. Holmes, Curator of the Museum of the Pharmaceutical Society, a quantity of a drug used in the Cape of Good Hope as a substitute for tea, and called "Honig-thee," reached Professor Dragendorff in the spring of last year. As several similar tea-substitutes have been shown to contain theine or an allied principle, the examination of this drug for that alkaloid was, as Mr. Holmes remarked, a matter of some interest, and I willingly acquiesced in Professor Dragendorff's suggestion that I should undertake the same. This examination was followed up by a general investigation of the drug, the results of which are embodied in this paper.

This sample of Cape tea was followed by a second from Mr. Holmes, labelled "Bush Tea." As two specimens were contained in the Museum of the Pharmaceutical Institute I was enabled to compare four samples of this tea-substitute with one another.

I. *Honig-thee,* said to be derived from *Cyclopia genistoides* (nat. order *Leguminosæ*).

The drug consisted of stalks and leaves, bound together in bundles weighing about 300 grams each and measuring in length about 45 centimetres. The stalks were of a yellowish-brown colour, varying in diameter from 1 to 4 or 5 mm., bearing the leaves arranged spirally in groups of three. The latter are linear lanceolate, from 10 to 26 mm. long, about 2 mm. broad, and ⅓ mm. thick. The consistence was somewhat leathery, at the same time brittle; margins entire, rolled inwards so as almost to conceal the midrib; colour dark green. A few reddish-brown papilionaceous flowers about 12 mm. long, and 9 mm. broad, with a deep-toothed calyx, were also found in the drug. The odour, though not strong, was pleasantly aromatic; taste slightly bitter and astringent, not at all disagreeable.

II. *Bush Tea.*—Botanical source not stated.

The sample consisted of leaves with a few flowers. The majority of the former were from 10—15 mm. long, 2—3 mm. broad, margins entire, rolled inwards, but not so much so as in sample I. The leaf presents a broader and shorter appearance. The flowers are yellowish, about 13 mm. in length, 4 in breadth, calyx toothed, but the teeth about half the length of those in the foregoing sample.

III. A sample from the Martiny Collection of Drugs, labelled "Cyclopia genistoides." The external characters were similar to those of No. I., but flowers were absent.

IV. A sample from the Museum of the Pharmaceutical Institute, labelled "Cyklopia Vogelii, Cyklopia genistoides, de Bary, 'Cap-thee'" presented by Professor H. Köhler in Halle. The leaves agreed in appearance with those of sample II., but flowers were absent.

Samples I. and II., which contained flowers, were submitted to Professor Emeritus Alex. Bunge, of this university, with the object if possible of identifying them. Professor Bunge, to whom I take this opportunity of tendering my thanks, expressed his opinion that, so far as the fragments at his disposal allowed of determining, sample I. would probably have been derived from *C. longifolia* or *C. galeoides*; No. II. possibly from *C. brachypoda.* The two samples could not be referred to one species, nor was it probable that *C. genistoides* yielded either.

On referring to Rosenthal's 'Synopsis Plantarum Diaphoricarum' *C. longifolia, galeoides,* and *brachypoda* were found to be mentioned as yielding Bush tea, supporting, therefore, Professor Bunge's diagnosis.

Microscopical Structure.

I. *Cyclopia longifolia* (?) *Leaf.*

The transverse section of the leaf (fig. 1) shows a prominent epidermis consisting on the upper side of a single layer of large parenchymatous cells surmounted by a largely developed yellow cuticle. On the under side of the leaf these epidermal cells are much smaller and the cuticle much less developed, except at the point just opposite to the midrib, where they appear about the same size as those of the upper surface. Next to the epidermis is situated the parenchymatous tissue of the leaf, consisting of rounded cells containing chlorophyll.

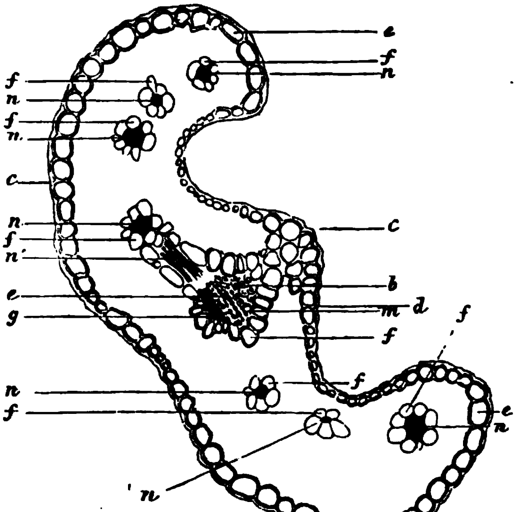

Fig. 1.—*Cyclopia longifolia* (?) *galeoides* (?).—Transverse section of leaf:—*e,* epidermis; *c,* cuticle; *m,* midrib; *n, n, n,* side nerves; *n',* side nerve branching from midrib; *b,* bast fibres; *d,* cambium layer; *e,* woody tissue: *g,* vascular tissue; *f,* cells containing red colouring matter (here removed by washing with water). For the sake of greater clearness the parenchymatous tissue of the leaf has been omitted in the wood-cut.

The midrib (fig. 2) is composed of a central portion of more or less thickened wood cells arranged in layers alternating with layers of thin-walled cells (parenchyma of the wood) and bounded on the upper side (*i.e.* on the side directed towards the upper surface of the leaf) by spiral and annular vessels, on the under side by several rows of thin-walled parenchymatous cells (bast parenchyma). This bast parenchyma contains probably sieve cells, but these could not be detected, owing perhaps to the extreme minuteness of the elements. Following these parenchymatous cells is a layer of more or less thickened bast fibres. Each nerve is surrounded by a single layer of large (on longitudinal section long, cylindrical) cells filled with a red colouring matter. This latter is soluble in water, and if the section be warmed with dilute sulphuric acid it assumes a deep purple tinge.

Treated first with iodine and then with solution of chloride of zinc and allowed to stand twenty-four hours, only the wood cells appeared yellow, the wood parenchyma, vessels, and bast fibres and cells assumed a violet-blue, the inter-cellular substance a pale yellowish tint. Potash coloured the section yellowish-green, the wood cells, vessels, and bast fibres transiently yellowish; the bast parenchyma remaining unchanged. The cuticle was slightly darkened in colour. With the naked eye a distinct fluorescence in green was observable in the alkaline liquid.

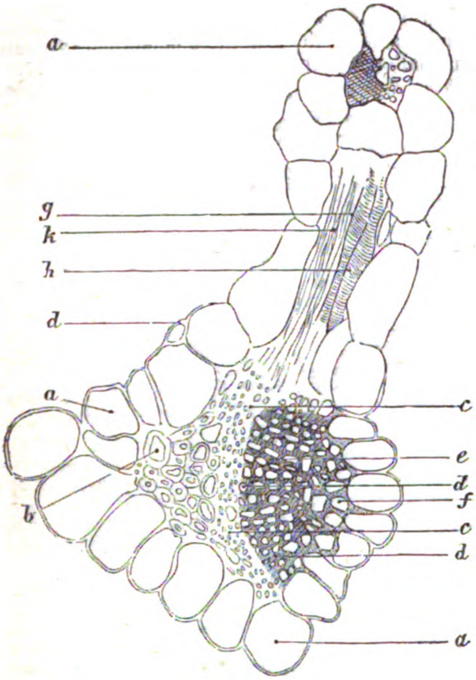

Fig. 2.—*Cyclopia longifolia* (?) *galeoides* (?).—**Transverse section through the midrib of leaf:—*a*, cells containing red colouring matter (removed by washing with water); *b*, bast fibres; *c*, cambium layer; *d*, parenchyma; *e*, wood cells of woody tissue; *f*, vessels mostly spiral and annular; *g*, nerve branching from midrib; *h*, the spiral vessels, and *k*, bast fibres, etc., constituting the same.**

The addition of ferric chloride to a section produced a greenish coloration.

Stalk.—The transverse section (fig. 3) showed similarly an epidermis with a largely developed yellow cuticle. Next to the epidermis are several layers of rounded parenchymatous cells containing a granular, partly colourless (? protoplasm), partly red substance. Within this parenchymatous layer are situated groups of bast fibres forming together a tolerably continuous ring, accompanied here and there by stone cells, singly, or in groups of two or three. These stone cells are thick-walled, and, as seen on the longitudinal section, of irregular shape.

Between the bast fibres and the cambium ring is a layer of small irregular thin-walled parenchymatous cells traversed by the medullary rays. In this layer occur groups of very small elements apparently produced by the division longitudinally of one of the parenchymatous cells.* The examination of the longitudinal section showed the presence of numerous sieve cells.

The wood consists of libriform wood cells interspersed with irregular groups of tracheids, both spiral and with ringed pores. It is traversed by medullary rays formed of a single row of somewhat thick-walled porous cells possessing an unusual vertical length. The pith is made up of large rounded parenchyma.

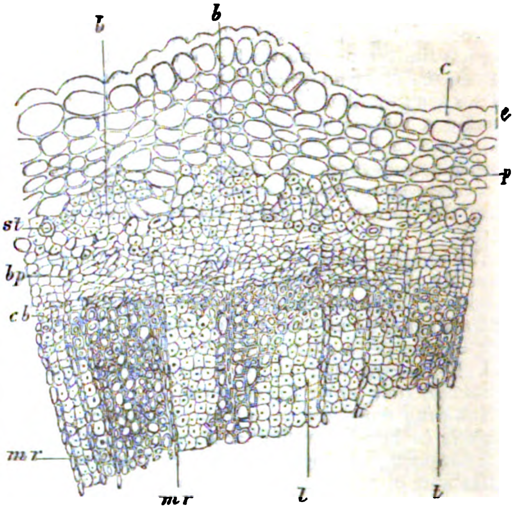

Fig. 3.—Transverse section of stalk of *C. longifolia* (?) *galeoides* (?)—*c*, cuticle; *e*, epidermis; *p*, parenchyma; *b*, bast fibres; *bp*, bast parenchyma (and sieve cells); *cb*, cambium layer; *st*, stone cell; *mr*, medullary rays; *l*, libriform wood cells; *t*, tracheïden.

In addition to the frequent occurrence of starch grains in the bark parenchyma, medullary rays, and pith, and the red granular substance in the bark parenchyma, the presence of well-formed sphærocrystals may be noticed, especially in the cells of the medullary rays. These sphærocrystals are insoluble in water, dilute hydrochloric acid and alcohol, but readily dissolved by a solution of potash. They are not coloured by iodine or by iodine and solution of chloride of zinc and probably consist of an organic acid or acid salt.

Iodine and solution of chloride of zinc coloured the bast fibres wine-red, which passed in the course of twenty-four hours to a violet. A similar coloration was noticeable in many of the cells of the wood, especially the libriform wood cells, and of these those situated near the bast; but the coloration was not confined to these, as the vessels bordering on the pith assumed a similar though not so intense tint. Nor did the cells show uniformity in colour, for while in the one case the whole section of the cell was coloured violet, in a second the interior remained yellow, in a third the interior assumed a violet tint, the exterior a yellowish, in a fourth the violet and yellow alternated with one another, thus rendering the lamination (Schichtung) very easily discernible.

The cells of the medullary rays and the intercellular substance remained after treatment with iodine and chloride of zinc yellowish.

II. *Bush tea. Cyclopia brachypoda* (?).

The transverse section of the leaf (fig. 4) is much longer and narrower than that of the preceding species. The microscopical characters are similar, but the cells containing the red colouring matter are neither so large nor so prominent. The parenchymatous tissue consists for the most part of somewhat narrow cylindrical cells arranged parallel to one another and at right angles to the surface of the leaf (known in German under the name of Pallisaden-parenchym).

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* See de Bary, 'Vergl. Anatomie,' p. 337, 347, fig. 156.

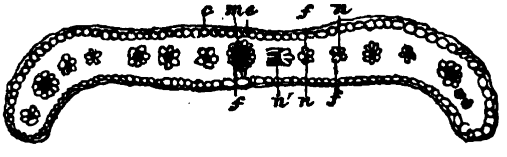

Fig. 4.—*Cyclopia brachypoda* (?).—Transverse section of leaf:—*e*, epidermis; *c*, cuticle; *m*, midrib; *n*, *n*, side nerves; *n′*, side nerves just branching from midrib; *f*, cells containing colouring matter (removed by washing with water). The parenchymatous tissue omitted for the sake of greater clearness.

III. *Cyclopia genistoides* (? *longifolia*), Martiny collection.

This leaf showed great similarity to No. I. and is possibly derived from the same plant. The microscopical examination did not reveal any characteristic difference.

IV. *C. Vogelii*, *C. genistoides* (?).

This drug is evidently not derived from the same plant as No. III. The transverse section is much longer and narrower and shows considerable resemblance with No. II. As was the case with the preceding sample, the absence of flowers rendered the botanical identification impossible, but it is not improbable that *C. brachypoda* yielded the sample under consideration. The microscopical characters do not call for any particular notice.

The specimen of "Busch Thee," stated to be derived from *C. genistoides* examined microscopically by Dr. Vogl, may possibly be identical with No. II., in which the cells containing red colouring matter (not mentioned by Dr. Vogl) are, in some cases, very inconspicuous. The measurements given by Dr. Vogl agree tolerably well with those which I have made in this sample.

(*To be continued.*)

THE ALKALOIDS OF JABORANDI LEAVES.*

The alkaloid of jaborandi, *pilocarpine*, has been investigated particularly by Kingzett,† upon the basis of the preceding labours of Gerrard,‡ Hardy,§ Drasche,‖ and others. Kingzett ascribes to the free alkaloid the formula $C_{23}H_{34}N_4O_4 + 4H_2O$, although these figures do not agree very closely with his results. He also obtained, after the crystallization of this alkaloid, a small quantity of a sticky substance which refused to crystallize, and which was not further examined. By the dry distillation of chloroplatinate of pilocarpine with excess of alkali, Kingzett obtained a volatile product which he considered identical with trimethylamine.

On the other hand, Poehl¶ has lately stated that he obtained, under these circumstances, a basic body which cannot be distinguished from coniine.

From the so-called false jaborandi, derived probably from a species of *Piper* (*Piper Jaborandi*, Vollosa?), Parodi obtained an alkaloid, easily soluble in amylic alcohol and benzin, but difficultly soluble in ether and dilute acids (?), which he called *jaborandine*, and for which he gave the formula $C_{10}H_{12}N_2O_3$.

Several investigators, for instance, Gerrard, Hardy, etc., have surmised that there may be *two* alkaloids in jaborandi. Hardy particularly speaks of two alkaloids, but no decisive results were obtained. A theoretical reason for the assumption of the existence of two different alkaloids in jaborandi has also been the discrepancy in reports regarding the therapeutical action of jaborandi leaves.

The investigations of the authors of the present paper, so far as they regard the therapeutic action of jaborandi and its alkaloids, are given at length in the *Archiv f. exp. Pathol. u. Pharmakol.*, 12. The principal result has been, that *pilocarpine* was found, in most respects, to be entirely analogous to *nicotine* in its effects.

In the present paper the authors give the results of the chemical investigations, which may be briefly stated to be the following:

Jaborandi contains, besides *pilocarpine*, a second alkaloid *which is easily produced from the former* and is present in many commercial samples of pilocarpine. It is essentially different from true *pilocarpine*, and corresponds in action entirely with *atropine*. This new alkaloid the authors propose to name *jaborine*.

1. *Preparation of pure Pilocarpine.*—Commercial salts of pilocarpine and preparations obtained by precipitating the crude alkaloid with phosphotungstic acid contain almost always small quantities of jaborine, the complete separation of which latter is by no means easy. Free jaborine is more readily soluble in ether, but less soluble in water, than pilocarpine; the chloroplatinate of the former is more easily soluble in alcohol than that of the latter; besides the jaborine salts are not crystallizable.

The authors tried to effect the *separation* of the *two* alkaloids in the following manner. The alcoholic solution of the impure salt of pilocarpine was precipitated with platinic chloride, the precipitate was thoroughly washed with alcohol, dried, and dissolved in boiling water. That portion of the platinum salt which first separated in the cold, in form of thin crystalline laminæ, was dissolved in water and decomposed by hydrosulphuric acid. The filtrate was concentrated, supersaturated with soda, and in single portions energetically shaken out with repeated quantities of ether. Pilocarpine, being with difficulty soluble in this menstruum, mostly remains in the aqueous solution, which contains then no more jaborine. By precipitating the acidulated solution with phosphotungstic acid, and decomposing the precipitate with barium hydrate, absolutely pure pilocarpine is obtained—but a considerable loss of substance is incurred.

The authors have subsequently received from Mr. E. Merck, of Darmstadt, who had placed the material for these investigations at the disposal of the authors, samples of a pilocarpine—now sold as *pilocarpinum purum*—which was free from jaborine.

The best test for the presence of jaborine in any preparation of pilocarpine is the physiological trial upon the frog's heart, as jaborine is capable, like atropine, to paralyse the cardiac plexus of the pneumogastrics.

The analytical examination of pilocarpine was mostly performed with the aid of the gold and platinum salts. The latter was prepared as stated above; from its solution in boiling water it crystallizes, by rapid cooling, in magnificently iridescent, thin, yellow laminæ; on slow cooling, however, in semicircular, warty, crystalline groups. It dries easily at 100° C., and contains no water of crystallization.

As the hydrogen determinations, in the course of the ultimate analysis of the salt, gave somewhat higher figures than theory required, the authors also analysed the gold salt, which was prepared from pure hydrochlorate of pilocarpine. In the course of this analysis they made an observation, which, so far, had not been recorded of gold double salts. Namely, if an aqueous solution of hydrochlorate of pilocarpine is precipitated with chloride of gold, a precipitate is obtained which, under water, assumes a handsome crystalline shape. This has the composition: $C_{11}H_{16}N_2O_2,HCl + AuCl_3$. On now dissolving this salt in alcohol and boiling for some time, it separates again on cooling, in nice crystals; but the composition now is: $C_{11}H_{16}N_2O_2 + AuCl_3$. That is by boiling with alcohol, the hydrochloric acid is separated from the double salt, and a new compound is formed, in which the chloride of gold may be regarded as acting the part of an acid, analogous to those compounds which mercuric chloride forms with bases. Upon the bases of their several analytical data, the authors arrive at the formula $C_{11}H_{16}N_2O_2$, for pure pilocarpine.

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* Abstract of a paper by Dr. Erich Harnack and Dr. Hans Meyer, of Strassburg, in *Liebig's Annal. d. Chem.*, 204, 67. Reprinted from *New Remedies*, November, 1880.

† Kingzett, *Pharm. Journ. and Trans.*, [3], viii., 255; *Journ. Chem. Soc.*, October, 1876.

‡ Gerrard, *Pharm. Journ. and Trans.*, [3], v. 825, 865; vi., 227, 965; vii., 255.

§ Hardy, *Pharm. Journ. and Trans.*, [3], v., 781; vi., 24.

‖ Drasche, *Zeitsch. d. Allg. Oester. Ap., Ver.*, 13, 283.

¶ Poehl, *Ber. d. Deutsch. Chem. Ges.*, 12, 2185.

Owing to the great similarity in action between pilocarpine and nicotine, the authors attempted to find a method of converting one into the other. Their close relationship appears to be proved also by the fact that jaborandi leaves yield, under certain conditions, basic substances which may be regarded as products of the decomposition of pilocarpine, and which are likewise obtained on decomposing nicotine—namely pyridine-bases. Such bases could be actually isolated from preparations of crude pilocarpine, obtained from E. Merck, which consisted of concentrated mother liquors and which possessed an intense odour of oil of tobacco.

By the dry distillation of pure pilocarpine with excess of alkali, the authors obtained trimethylamine, thus confirming Kingzett's statement.

On the other hand, by distilling the "crude pilocarpine" with excess of potassa, a small quantity of a volatile base distils over at 160° C., apparently identical with coniine. This accounts for the statement of Poehl. If "crude pilocarpine" is distilled by itself, no such body is produced, but merely the pyridine-bases pass over.

2. *Investigation of Jaborine.*—The existence of a second alkaloid in the commercial pilocarpine having been ascertained, the authors attempted its separation from the crude material placed at their disposal by Mr. Merck. This material consisted of concentrated mother liquors—derived partly from jaborandi leaves, and partly from the so-called false jaborandi (*Piper reticulatum,* and other species)—all of which were left behind after the crystallization of pilocarpine, and which appeared in form of a thick red-brown syrup, having the odour of oil of tobacco and a strongly alkaline reaction. The presence of pilocarpine, pyridine, and other impurities interfered with the separation of the pure base, and the further circumstance that the salts of the latter do not crystallize prevented the authors from obtaining the base in a state of sufficient purity to determine its ultimate composition. Nevertheless, it was prepared sufficiently pure to prove that its effects are completely identical in the animal organism with those of atropine.

The two best methods so far discovered by the authors for obtaining the new base are the following:

1. The alcoholic solution of the crude mother liquor, acidulated with hydrochloric acid, was precipitated in fractions with platinic chloride. (The chloroplatinate of jaborine is more soluble than that of pilocarpine.) The first portion of the precipitate, which soon coalesces to smeary, rapidly hardening, and (in water) insoluble masses, is rejected, the decanted liquid further precipitated, filtered, and the filtrate now completely precipitated. After again filtering, the alcoholic filtrate generally deposits, on standing, another small quantity of the jaborine salt. The latter and the last precipitation are then extracted with boiling water, and the filtrate concentrated *in vacuo* over sulphuric acid. Chloroplatinate of jaborine then separates either as a fine bright-yellow powder, or as a dark-red amorphous lumpy mass. Protracted washing with alcohol abstracts from this deposit a little colouring matter; but the whole of it cannot be so removed. By decomposing the platinum salt, both the free base as well as ordinary salts were obtained, but always in yellowish amorphous masses.

2. The crude substance was dissolved in water with the aid of hydrochloric acid, filtered, and the filtrate treated with solution of mercuric chloride, until the first milky cloudiness began to increase to a precipitate. By protracted agitation and subsequent filtration, a bright-yellow liquid was obtained, which, after removal of the mercury by sulphydric acid, was concentrated, mixed with caustic soda, and then shaken out with ether. The ethereal solution, on evaporation, leaves behind the jaborine as a colourless amorphous mass.

The composition of jaborine, so far as the authors are justified to conclude, must be closely approaching that of pilocarpine. But the most interesting fact is this, that *jaborine is easily formed from pilocarpine.* Even the mere concentration of acid solutions of pilocarpine is sufficient to cause the formation of small quantities of jaborine, which may be recognized by its physiological effects. The same happens when pilocarpine is heated with hydrochloric acid in sealed tubes. Still larger quantities are obtained by simply heating pilocarpine itself.

Langley* already observed that the application of *extract of jaborandi* produced irritation of the terminations of the pneumogastric nerve in the frog's heart; and that an application of *pilocarpine* produced their paralysis, just like atropine. At that time this observation appeared to be a paradox; but now the explanation is easy, namely, the extract of jaborandi must have been free from jaborine, and therefore produced the pure *pilocarpine* (nicotine) effect; during the process of preparing the alkaloid, however, some jaborine was formed, and contaminated the sample of pilocarpine he used. If both pilocarpine and jaborine are applied to the frog's heart at one and the same time, only the effects of the latter become evident, which consist in a paralysis of the cardiac plexus of the pneumogastrics.

The same observations have been made by the authors. They found that the commercial *Fluid Extract of Jaborandi* is free from jaborine; but on evaporating the alcoholic and acidulated solution of an extract, as for instance when attempting to separate pilocarpine, a notable quantity of jaborine will be formed.

The authors finally add that, while the presence of jaborine in the fluid extract, etc., cannot be with certainty detected by physiological experiments, the possibility is not excluded that small quantities of jaborine are contained, ready formed, in the leaves of jaborandi itself.

SEPARATION AND DETERMINATION OF ARSENIC.†

Emil Fischer finds that the method proposed simultaneously by Schneider and Fyfe for the separation of arsenic in toxicological examinations by distillation as trichloride is not generally used for the reason that in the ordinary cases the arsenic is gotten as arsenic acid, which is not effected without previous reduction. He finds, moreover, that ferrous chloride is a reagent specially adapted for this reduction, so that the arsenic can be readily converted into arsenious acid and then distilled as trichloride. Thus, by distillation with hydrochloric acid and ferrous chloride, the arsenic is quickly and completely converted into volatile trichloride, while all the other metals of the sulphuretted hydrogen group, including antimony and tin, remain behind in the liquid with the iron. The estimation of the arsenic in the distillate may be made either gravimetrically as trisulphide, according to Bunsen, or better, volumetrically, after neutralizing with potassium carbonate with iodine solution. The hydrochloric acid solution, from which the arsenic is to be distilled, may contain sulphuric acid, but not nitric acid. Metallic alloys are therefore best dissolved in hydrochloric acid, with addition of potassium chlorate. If nitric acid has been used it must be removed beforehand completely by evaporation with excess of sulphuric acid.

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* *Medicinisches Centralblatt,* 1877, 124.

† *Berichte,* xiii., p. 1778; from *Am. Journ. Pharm.*

PROPOSED AMENDMENT OF THE PHARMACY ACTS.

A Bill intituled an Act to further regulate the Sale of Poisons and to alter and amend the Pharmacy Act 1852 and the Acts amending the same.

Arrangement of Clauses.

Preamble.

1. Examiners for Scotland.

2. Bye-laws to further regulate examinations.

3. Claims for registration by notice and certificates to be made before 1st January 1883.

4. Repeal of Section 11 of Pharmacy Act 1852.

5. Limitation of the authority of executors and others to continue a business.

6. Certificates of death and expense of same.

7. Registrar may require information and penalties on default in regard to information.

8. Registered persons to sell medical prescriptions and sell poisons.

9. Penalties and application of certain penalties.

10. Labelling of patent medicines being or containing a poison and penalties on improper labelling.

11. Duly qualified keepers of open shops entitled to remedies in certain cases.

12. Penalties under Act not to exempt from other penalties.

13. Persons keeping open shops to be liable for their assistants etc. and interpretation of word "person."

14. Certain exemptions from serving on juries.

15. Act not to extend to Ireland.

16. Commencement of and short title of Act.

Preamble.

Whereas it is expedient for the safety of the public that all persons selling or keeping open shop for the retailing dispensing or compounding of poisons and medical prescriptions should possess a competent practical knowledge of their business And whereas for the purpose aforesaid it is expedient that the provisions contained in the Act passed in the 15th and 16th years of the reign of Her present Majesty intituled an Act for regulating the qualifications of Pharmaceutical Chemists hereinafter described as the Pharmacy Act 1852 and in the Acts amending the same should be amended Be it enacted by the Queen's Most Excellent Majesty by and with the advice and consent of the Lords Spiritual and Temporal and Commons in this present Parliament assembled and by authority of the same as follows:

Examiners for Scotland.

1. Whereas by the Pharmacy Act 1852 it is enacted that for the purpose of conducting Examinations in Scotland the Council of the said Society shall appoint fit and proper persons in Scotland it shall be lawful for the said Council to appoint for the purpose of conducting such Examinations any fit and proper persons whether such persons shall be in Scotland or elsewhere.

Bye-laws to further regulate examinations.

2. It shall be lawful for the Pharmaceutical Society of Great Britain from time to time by any Bye-law to alter or amend the regulations respecting examinations by dividing or sub-dividing the same and requiring and regulating intervals of time between examinations or any divisions of the same and by requiring and authorizing evidence or tests of knowledge and of practical experience on the part of the candidates and to regulate the notices to be given and the fees to be paid by candidates on the giving of notices for the passing of examinations or the several divisions of the same but the Council of the said Society may on application in that behalf allow the intervals of time or any or either of them to be shortened or waived in favour of any person or persons named in any resolution for that purpose.

Certain claims for registration not valid unless made before 1st January, 1883.

3. No claim for registration as a Chemist and Druggist made by notice accompanied by certificates of having carried on business before the passing of the Pharmacy Act 1868 shall be valid or effectual unless such notice be duly given prior to the 1st January in the year 1883.

Repeal of section XI. *of Pharmacy Act*, 1852.

4. Section XI. of the Pharmacy Act 1852 is hereby repealed.

Limitation of the authority of executors and others to continue a business.

5. Notwithstanding the provisions of section XVI. of the Pharmacy Act 1868 it shall not be lawful for any executors administrators or trustees of a deceased Pharmaceutical Chemist or Chemist and Druggist to continue the business of such Pharmaceutical Chemist or Chemist and Druggist for a longer period than three years unless by permission of the Council of the Pharmaceutical Society of Great Britain.

Certificates of death and expense of same.

6. Notwithstanding the provisions of section XI. of the Pharmacy Act 1868 every Registrar of Deaths in Great Britain shall on transmitting to the Registrar under the Pharmacy Act 1852 of every certificate of the death of any Pharmaceutical Chemist or Chemist and Druggist charge the cost of such certificate and transmission as an expense of his office.

Registrar may require information and penalties on default in regard to information.

7. The Registrar appointed or to be appointed under the Pharmacy Act 1852 and the Pharmacy Act 1868 may at any time and from time to time deliver or cause to be delivered at any open shop kept for the retailing dispensing or compounding of poisons whether as patent medicines or otherwise or medical prescriptions or purporting to be the shop of a Pharmaceutical Chemist or Pharmaceutist or Chemist and Druggist or Chemist or Druggist or whereat there shall be assumed used or exhibited any name title or sign implying that it is the shop of a person registered under the Pharmacy Act 1852 or the Pharmacy Act 1868 a notice signed by him requiring delivery to him within seven days thereof of a statement in writing of the name and address of every person then keeping the open shop and of the qualification of every such person so to keep open shop and thereupon the person or persons then keeping the open shop shall within such seven days cause to be delivered to the said Registrar a statement accordingly and in default thereof every person keeping the open shop and every person afterwards during continuance of the default found selling poison at or compounding medical prescriptions at or acting in the management of the business at the open

shop shall be liable to a penalty of £5 but nothing in this clause contained shall prevent any person from being liable to any penalty to which he may otherwise be subject and if any person wilfully makes or causes to be made a false or insufficient return he shall be liable to a penalty of £5.

Registered persons to sell medical prescriptions and sell poisons.

8. It shall be unlawful for any person (either alone or as a member of any partnership) to sell by retail or to keep open shop for retailing dispensing or compounding medical prescriptions or (whether as patent medicines or otherwise) poisons within the meaning of the Pharmacy Act 1868 unless he be duly registered as a Pharmaceutical Chemist or Chemist and Druggist or be an Executor Administrator or Trustee of a deceased Pharmaceutical Chemist or Chemist and Druggist acting within the exemption in relation to such Executors Administrators or Trustees made by section XVI. of the Pharmacy Act 1868 or a Medical Practitioner entitled to and acting within the exemption concerning certain Medical Practitioners made by section I of the statute passed in the thirty-second and thirty-third years of the reign of Her present Majesty intituled "An Act to Amend the Pharmacy Act 1868" provided nevertheless that nothing in this section contained shall extend to or interfere with the business of wholesale dealing in patent medicines nor with the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing or of any member of the Royal College of Veterinary Surgeons of Great Britain or person holding a certificate in Veterinary Surgery from the Highland and Agricultural Society in Scotland in dispensing medicines for animals under his care.

Penalties and recovery and application of certain penalties.

9. Every person acting in contravention of any section hereinbefore contained shall for each contravention be liable to pay a penalty of £5 and the same may be sued for and recovered in the manner provided by the Pharmacy Act 1852 for the recovery of penalties under that Act and all and every sum and sums of money which shall arise from any penalties so recovered for offences incurred under this Act or under the said Pharmacy Act 1852 or under section 15 of the Pharmacy Act 1868 shall be paid to the Treasurer of the Pharmaceutical Society of Great Britain and shall by him be applied to the purposes of the said Acts and this Act or either of them.

Labelling of patent medicines being or containing a poison and penalties on improper labelling.

10. On the preparation for sale (whether by wholesale or by retail) of any patent medicine or any article bearing a patent medicine stamp hereinafter comprised in the words patent medicine being or containing a poison within the meaning of the Pharmacy Act 1868 the person so preparing the same shall cause the box bottle or vessel in which the same is contained to be labelled with his name and address the name of the patent medicine and the word poison and he shall also cause the wrapper if there be only one or the outermost wrapper if there be more than one of the same to be so labelled and any person acting in contravention of this section shall upon a summary conviction before two justices of the peace in England or the sheriff in Scotland be liable to a penalty not exceeding five pounds for the first offence and to a penalty not exceeding ten pounds for the second or any subsequent offence.

Duly qualified keepers of open shops entitled to remedies in certain cases.

11. In case a duly qualified keeper of an open shop for the sale is exposed to a penalty in respect of a sale by retail of a patent medicine prepared for sale by another person by reason of the box bottle vessel or wrapper in which the same is contained not having been duly labelled with the name and address of the said person who prepared the same for sale the name of the patent medicine and the word poison he shall after having paid the same be entitled to be indemnified in respect of the same and any costs properly incurred by him in relation to the offence or conviction or his defence thereto by the said person who prepared the said patent medicine for sale or by any intermediate vendor of the same as he may elect and every intermediate vendor shall be entitled to be indemnified over by the said person who prepared the same for sale or any vendor intermediate between them as he may elect provided always that the person claiming such indemnity must prove that he purchased the said patent medicine not knowing it to be otherwise than properly labelled and sold it in the same state in which he purchased it and any person from whom such indemnity is claimed may prove that the conviction was wrongful or that the amount of costs awarded or claimed was unreasonable.

Penalties under Act not to exempt from other penalties.

12. No penalty under this Act shall exempt any person from being liable to any other penalty damages or punishment to which he would have been subject if the Pharmacy Act 1868 or this Act had not been passed.

Persons keeping open shops to be liable for their assistants etc. and interpretation of word "person."

13. All the provisions of the Pharmacy Act 1868 which apply to sales of poisons and all the provisions of this Act which apply to the preparation for sale of or to sales of poisons whether as patent medicines or otherwise or to medical prescriptions shall be deemed and taken to apply to every person on whose behalf the preparation for sale or the sale is made by any Assistant Apprentice or Servant whether such Assistant Apprentice or Servant shall be in the *bonâ fide* conduct of the business or not and such Assistant Apprentice or Servant shall be deemed to be the Agent of the person on whose behalf the preparation for sale or the sale is made provided always that nothing in this clause contained shall prevent any such Assistant Apprentice or Servant from being liable to any penalty to which he would otherwise be subject and in this Act and also in section 12 of the said Pharmacy Act 1852 and also in section 15 of the Pharmacy Act 1868 the word "person" shall include corporate bodies.

Certain exemptions from serving on juries.

14. Every person registered or who shall be registered under the provisions of the Pharmacy Act 1852 or of the Pharmacy Act 1868 as a Chemist and Druggist and who shall be in business on his own account shall be exempt from serving on all juries and inquests whatsoever.

Act not to extend to Ireland.

15. This Act shall not extend to Ireland.

Commencement of and Short Title of Act.

16. This Act shall come into operation on the 1st day of January 1882 and may be cited as the "Pharmacy Law Amendment Act 1881."

The Pharmaceutical Journal.

SATURDAY, JANUARY 8, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PROPOSED AMENDMENT OF THE PHARMACY ACT.

ALTHOUGH a variety of considerations, not difficult to be guessed at by those conversant with the present condition of pharmaceutical affairs, have induced the Council of the Society to continue in committee its deliberations as to the form of the Bill by which it is contemplated to bring about a suitable amendment of the present law, it will, we have no doubt, be satisfactory to the general body to learn that the publication of the result of those deliberations was unanimously agreed to at the late meeting of Council. In pursuance of that decision we have been furnished with a copy of the Pharmacy Act Amendment Bill, and are thus enabled to place it before our readers for their consideration.

As we pointed out some weeks ago, the attempt to amend pharmaceutical legislation is surrounded by difficulties, arising partly from difference of opinions among those engaged in the drug trade, and in no small degree from antagonistic influences from without. It is, therefore, especially desirable that the several clauses of the new Bill should be considered as much as possible in a catholic spirit as to the probability of their provisions being beneficial to the general interests of the trade, and that there should be on all hands a disposition to waive individual opinion if it can be shown that those provisions may be expected to have such a tendency. It is only in this way that one class of difficulties can be surmounted in the attempt to amend pharmaceutical legislation, and it is only by the unity of action on the part of the drug trade at large which may result from mutual concessions among themselves that there can be any prospect of dealing successfully with the other class of difficulties which will be encountered from without. For it must not be expected that an amendment of the Pharmacy Act, such as sketched out in the Bill agreed upon by the Council of the Pharmaceutical Society, will be passed into law without opposition. A perusal of the draft which appears in this week's issue will show that a challenge is thrown down to several opponents of those interests which the chemist and druggist is convinced ought to be protected. In one respect the introduction of this Bill into Parliament may be viewed as a resort to a still higher court of appeal than that of legal tribunals, viz., that of public opinion as expressed by the Parliament of the realm. The highest legal tribunal in this country has decided that the Pharmacy Act, 1868, does not apply to corporations, even when they consist of persons to whom it would apply individually, and this decision has in some degree made the Act a dead letter. The Council of the Pharmaceutical Society representing chemists and druggists throughout the country now pleads to Parliament that the law is in so far defective, and seeks that it should be amended in accordance with the spirit of the original enactment.

This is a step which means war to the knife with co-operative stores and their simulators, in regard to the practice of pharmacy. Clause 13 of the Bill provides in terse phraseology that the word "person," in section XV. of the Pharmacy Act, 1868, and for the future generally, shall include corporate bodies, also that all the provisions of the Pharmacy Act, 1868, which apply to sales of poisons shall be taken to apply to every person on whose behalf a sale is made by any assistant, apprentice or servant, whether such assistant, etc., be in the *bonâ fide* conduct of the business or not, since such assistant, etc., is to be deemed the agent of the person on whose behalf the sale is made, though still liable to any penalty to which he would otherwise be subject.

Again, in clause 8 it is provided that it shall be unlawful for any person, either alone or as member of a partnership, to sell by retail or to keep open shop for retailing, dispensing, or compounding medical prescriptions or poisons—whether as patent medicines or otherwise—within the meaning of the Pharmacy Act, 1868, unless he be duly registered as a pharmaceutical chemist or chemist and druggist, or be otherwise entitled to do so under section XVI. of the Pharmacy Act, 1868, or be a medical practitioner entitled to and acting within the exemption made by section I. of the Act to amend the Pharmacy Act, 1868.

These clauses strike at the root of the grievance under which chemists and druggists have lately suffered so much from loss of business by reason of the competition set up by unqualified traders. The protection that would be afforded to chemists and druggists if these provisions became law would be but a reasonable compensatory recognition of their compliance with the requirements of the law in submitting to examination and devoting time and money to acquiring the technical proficiency that is deemed to be expedient for the safety of the public. The business of a chemist and druggist is sufficiently an exceptional one to fully justify the claims made by the Legislature upon those who enter upon it, but it is an entire stultification of the principle upon which those claims are made to allow the business which they have made themselves competent to carry on to be usurped by associations of persons who have not done so. But though it is to be hoped such rational considerations of what is just to the chemist and druggist, no less than of what is expedient for the safety of the public, may prevail with Parliament when the Bill comes before it, we must not overlook the fact that the prevalent tendency to look upon protection in all cases with antipathy will operate in antagonism to the proposed measure. It will be especially necessary to make clear the necessarily intimate—or, we might almost say inseparable—connection between protection of the chemist and druggist in the exercise of his business and the requisition that he should possess a competent practical knowledge of that business. The possession of such knowledge is the only thing that makes him different from other tradesmen; the necessity of it is the only reason why his business is to be regarded as forming an exception to other kinds of trade, and a high standard of qualification is the only ground upon which he can seek exemption from the rule of those free trade principles which are appropriate enough to ordinary trade, though perhaps sometimes too extravagantly admired.

Thanks to the efforts and example of the Pharmaceutical Society in promoting the scientific education of those intending to enter upon the business of pharmacy, it can be shown that there has been an advance in this direction, and that there is a tendency to progress still further toward the general attainment of the object which the Pharmacy Act declares to be expedient. On this ground, no less than on that of justice, it may be urged upon the Legislature that the protective measures sought for by the Pharmaceutical Society in its Amendment Bill would contribute materially to securing the attainment of that object. They would, we believe, operate as an incentive to education and by removing the cause for complaint that the business of pharmacy is one too poor and unremunerative to admit of time and money being expended in study they would do much to raise the general position of the pharmacist in this country.

Let us hope that these reasons for according to the competently qualified pharmacist a fair chance of carrying on his business untrammeled by competition into which he cannot enter may be strongly urged upon the Legislature by those who will have the conduct of the Bill in Parliament, for if that be done we believe that they are sufficient to secure it a favourable reception.

Besides the difficulties already referred to, there is another which must be noticed, though it is probably not so serious. We refer now to the view which may be taken in some quarters of the 10th clause of the new Bill relating to the sale of patent medicines containing poisons within the meaning of the Pharmacy Act. This clause provides that such articles shall be subject to the regulations as to labelling and otherwise now in force as regards the ordinary sale of such poisons, and it makes the sale of a patent medicine—whether by wholesale or retail—containing a scheduled poison, without due labelling, an offence punishable by a fine not exceeding five pounds on the first occasion, and ten pounds on any subsequent occasion, upon summary conviction. This provision will no doubt be disapproved by the proprietors of patent medicines containing scheduled poisons, and possibly it may be opposed by them; but on the other hand it is to be remembered that in this particular public opinion is already in favour of the step that is proposed in the new Bill. We may add that communications have been addressed to the Council of the Pharmaceutical Society on this subject by the Privy Council and by other authorities, and in view of the great number of fatal accidents that have occurred from the misuse of secret preparations containing poison there is no question as to the propriety of enforcing some precautionary measures.

In the 11th clause of the new Bill provision is made for indemnifying a qualified keeper of an open shop who may have been exposed to a penalty for the sale of a patent medicine containing poison, but not properly labelled, provided he can prove that he purchased the article not knowing it to be otherwise than properly labelled, and that he sold it in the same state in which he purchased it. This provision throws the entire onus of properly labelling patent medicines containing scheduled poisons upon the maker of them, and as the clause deals specifically with the preparations containing poison and sold as patent medicines, it is an important amendment in the interest of the public. According to clause 8, the sale of such patent medicines is restricted to legally qualified keepers of shops.

Among the other provisions of the new Bill we may mention that relating to jury service, from which it is proposed to make all registered chemists and druggist exempt when carrying on business on their own account, this provision being general as regards both England and Scotland. Widows are left as they have been under the present Act, but there is a provision that the executors, administrators or trustees of a deceased pharmaceutical chemist or chemist and druggist shall not continue to carry on the business for a longer period than three years, unless by permission of the Council of the Pharmaceutical Society, so that in cases where an extension of this time is appropriate it could readily be obtained.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of this Association will be held on Thursday, January 13, at 8·30 p.m., when a paper will be read by Mr. W. H. SYMONS, F.C.S., on "Starch and Starches."

CHEMISTS' ASSISTANTS' ASSOCIATION.

A MEETING of the above Association will be held at the rooms, on Wednesday next, January 12, at 9 p.m. Mr. A. P. LUFF, F.C.S., F.L.S., will read a paper on "The Chemical and Physical Properties of Blood."

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, January 5, 1881.

MR. THOMAS GREENISH, PRESIDENT,

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present—Messrs. Andrews, Atkins, Bottle, Butt, Churchill, Frazer, Gostling, Hampson, Hills, Radley, Richardson, Robbins, Sandford, Savage, Squire, Symes, and Williams.

The minutes of the previous ordinary meeting were read and confirmed, as also those of the Special Meeting held on December 14.

THE BOARD OF EXAMINERS.

The Secretary read a letter from the Privy Council, approving of the pharmaceutical chemists appointed last month by the Council to act as Examiners during the present year.

The following, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Dunlop, Thomas.
Knight, Thomas.
Knight, William Tomkinson.
Lees, David.
Morgan, William.
Slater, William Martin.
Wood, Robert.
Wright, Alfred.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Christopherson, Fred	Ipswich.
Dunlop, Thomas	Govan.
Evans, John	Oswestry.
Lewis, David	Manchester.
Morse, Charles Henry Stafford	Cambridge.
Newbury, Samuel	St. Leonards-on-Sea.
Phillips, James Wilson	Newport, Mon.
Wright, Alfred	London.
Wyatt, Charles Frederick	Chatham.

Chemists and Druggists.

The following registered chemists and druggists who were in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Ganbert, Stephen	London.
Morris, George	Wednesbury.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Alexander, George	Liverpool.
Davies, Hugh	Machynlleth.
Evans, Thomas	Burnley.
Litten, Henry	West Ham.
Pearce, Thomas Ellery	Tavistock.
Tookey, Edwin James	Birmingham.
Welch, Alfred Edward	Great Yarmouth.

ASSOCIATES.

The following having passed their respective examinations, and tendered their subscriptions for the current year, were elected "Associates" of the Society.

Davies, Owen	Llanelly.
Evans, Thomas	Llandyssul.
Hartley, Thomas	Haslingden.
Higgs, Alfred Henry	Bristol.
Hill, Richard Mainprise	Scarborough.
Kemp, Herbert William	Horncastle.
Ross, Andrew Leighton	London.
Shipman, Joseph James	Chesterfield.
Stewart, William	Helensburgh.
Wynter, Ernest Charles	Seaford.
Willet, John Algernon	London.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Aplin, Isaac Weston	Yeovil.
Bacon, Edward	London.
Barber, Daniel Stone	Dursley.
Batchelor, William	Stalybridge.
Baxter, William Smith	Bradford.
Bell, John Conyers	Hull.
Blidberg, Anders S. Frederic	London.
Brown, Charles	Barking.
Burroughs, George Henry	Seaforth.
Butterfield, Frederick Victor	Thirsk,
Clarke, Harry Ward	Richmond.
Cook, Richard John	Southsea.
Cross, Charles Henry	Lancaster.
Davis, Frederick	Oundle.
Dawson, John Harper	Fife Keith.
Delarue, Edward Ludlow	London.
Dunn, George Stewart	Landport.
Ensor, John Thomas	Birmingham.
Evans, David	Newcastle Emlyn.
Gaskin, John Henry	Wolverhampton.
Greenall, Thomas Holdsworth	Ashton.
Haines, George Richard	London.
Hanson, Christopher	Buckhurst Hill.
Heale, Henry	London.
Houfe, Robert William	York.
Hughes, Daniel	Holywell.
Ingle, George	Bradford.
Jones, Henry	Landport.
Jones, Morgan Isaac	Aberdare.
King, Richard Henry	Bradford-on-Avon.
Knibb, William	Nottingham.
Lawrence, Samuel	Oban.
Lawson, Albert Edward	Shrewsbury.
Lewis, Thomas	Newport, Mon.
MacCreath, David	Newton Stewart.
Miles, Charles	Dorchester.
Millbright, George James	Shrewsbury.
Morrall, Edward Ernest	Bridgnorth.
Morrison, Forbes	Glasgow.
Nicholls, Reginald E.	Lee.
Rogers, Frederick Hughes	Northwich.
Rowsell, Philip Foale	Teignmouth.
Shallcross, Joseph Richard	Tunstall.
Simpson, William	London.
Skinner, Robert	Liverpool.
Smith, William	Louth.
Stafford, Owen	Hyde.
Timbury, Alfred Jefferies	Leominster.
Tirrell, John, jun	Hanley.
Tyler, Charles Skelton	Cambridge.
Verity, Harry	Leeds.
Watson, John Winder	Tunstall.
Wilkes, Thomas James	London.
Williams, John Thomas	Dowlais.
Williams, William Lloyd	Buckley.
Wilson, Samuel	St. Helens.
Winter, Joseph	Lancaster.
Woolley, Samuel Walter	Stamford.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The name of the following person, who had made the required declaration and paid a fine of one guinea, was restored to the Register of Chemists and Druggists:—

George Woolldridge, Royal Naval Hospital, Malta.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee, including a recommendation that sundry accounts be paid, was received and adopted.

BENEVOLENT FUND.

The minutes of this Committee included a recommendation of the following grants:—

£10 to a registered chemist and druggist, aged 66, and unable to attend to business from ill-health.

£10 to the widow of a registered chemist and druggist.

£10 to the widow of a registered chemist and druggist, having five children dependent upon her.

£10 to the widow of an associate.

Five other cases were deferred for fuller information.

The report and recommendations were received and adopted.

LIBRARY, MUSEUM AND LABORATORY.

Librarian's Report.

The Librarian's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
November .	Day . .	274	16	5	11 nearly.
	Evening .	148	13	1	7 nearly.

Circulation of books.	Town.	Country.	Total.
No. of entries . . .	201	146	347

Carriage paid . . . £2 16*s.* 0½*d.*

One of the missing volumes, the Chemist and Druggist for 1866-7, had been returned to the Library.

The following donations to the Library had been received:—

Royal College of Veterinary Surgeons, Register, Charters, etc., 1880. From the COLLEGE.

American Pharmaceutical Association, Proceedings at Fifth Annual Meeting, 1856.
From Dr. B. F. DAVENPORT.

Bernardin (M.), Classification de 100 Caoutchoucs et Gutta-perchas, etc.,. 1872[-5].
From the AUTHOR.

Pharmaceutisches Central-Blatt, 1833-44. 12 vols.
From E. G. SCHWEITZER, Esq.

Mesue (J.), Opera, etc., 1602.
From M. GUSTAVE DORAT, per Mr. E. B. STAMP.

Meyer (H.), Über des Milchsäureferment, und sein Verhalten gegen Antiseptica, 1880.

Scheibe (E.), Beiträge zur Kenntniss und Darstellung der Borcitrate.

Schuppe (N. C.), Chemische Untersuchung der Samen von Pinus Cembra.
From Professor DRAGENDORFF.

The Committee recommended that the usual letter of thanks be sent to the respective donors.

The Committee also recommended the purchase of the following books:—

Darwin (C.), Power of Movement in Plants, 1880.

Markham (C. R.), Peruvian Bark, 1880.

Messer (F. A.), British Wild Flowers by Natural Analysis, 1880.

Riche (A.), Manuel de Chimie Médicale et Pharmaceutique, 3me éd., 1881.

The Committee had also ordered that the Library and Museum be closed for the usual period at the Christmas vacation.

Curator's Report.

The Curator's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
November .	Day .	265	25	3	10
	Evening	72	8	0	3

The following donations to the Museum had been reported, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Specimens of Liquid Aloes, Dragon's Blood of *Dracæna schizantha*, Baker, Gum of *Pterocarpus Draco*, and five other unnamed gums and gum-resins from Socotra.
From Professor I. BAYLEY BALFOUR.

Specimens of the galls of *Quercus Valonia* and of a species of *Tamarix*; of the barks of *Byrsonima spicata*, *Clusia rosea*, *Diospyros Sapota*, *Persea Lingue* and *Virola sebifera*.
From Professor BERNARDIN, of Melle-lez-Gand.

Microscopical Slides of a new Adulterant of Dandelion coffee. From Mr. F. M. RIMMINGTON.

An application had been received from the Leicester Chemists' Assistants' Association for additional specimens of materia medica.

The Committee recommended that such duplicates as could be spared be sent.

The Committee had considered an application from the Bristol Pharmaceutical Association, and recommended that the Curator be instructed to forward such articles as he can supply from the Museum, and to furnish the Committee with a list of those he is unable to supply.

The Professors had attended and reported favourably of their respective classes.

The report and recommendations were received and adopted.

HOUSE.

The report of this Committee stated that estimates had been ordered to be obtained for tablets in the Lecture Theatre, to contain the names of the Prizemen and Scholars, and one in the Hall to record legacies and donations to the Benevolent Fund. The Committee were of opinion that the minimum amount recorded should be £50.

Mr. **WILLIAMS** thought it was an open question whether it would not be wise to make the minimum amount which should confer the privilege of having the donor's name placed on the tablet, a smaller sum. He thought twenty guineas would be high enough, and that with regard to legacies, the names of all donors should appear, irrespective of the amount.

Mr. **SAVAGE** thought twenty guineas was low enough to begin with.

Mr. **BUTT** asked if the record was to be confined to a gift at one time.

Mr. **ROBBINS** thought it should not.

Mr. **WILLIAMS** said it was desirable to encourage donations as much as possible, and therefore the figure should not be put too high, and should be allowed to be cumulative.

Mr. **ANDREWS** said his own opinion was that the limit should be ten guineas.

Mr. **BUTT** asked if it was intended to limit this honour to individuals, or to include firms.

Mr. **WILLIAMS** thought it would hardly do to include firms. A firm's voting privilege ceased in ten years; it was only in the case of individuals that the right lasted for life.

Mr. **RICHARDSON** did not see why there should be any distinction between a firm and an individual. The object was to stimulate people to give money for the benefit of their poorer brethren, and the Council should do all in its power to augment the Fund. He thought that all donations of twenty guineas, whether from firms or individuals, should be placed on the proposed list, and that the sums should be cumulative, so that if a person or persons gave ten guineas one year and ten guineas five years afterwards when the twenty guineas was made up, his or their name should be added to the list. He would therefore move—

> "That any person or firm giving twenty guineas, in one or two sums, towards the Benevolent Fund as a donation, the name of such person or firm be placed upon the tablet in a suitable situation in the house for that purpose."

Mr. Savage seconded the motion, which he thought seemed reasonable.

Mr. Williams asked if no distinction was to be made between an individual and a firm.

Mr. Richardson said no; firms had this disadvantage, that though they gave ten guineas, they only had an interest in the fund for ten years, whereas an individual became a life governor.

Mr. Williams remarked that a firm did not die, like an individual; it might go on for ever.

Mr. Symes said if a firm composed of four persons gave twenty guineas, the individual members only gave five guineas each. Therefore, while he would make the proposed arrangement as broad as possible, he did not think firms and individuals should be placed on the same footing. It would not be unreasonable to double the amount given by a firm, and he would therefore move as an amendment, that if an individual gave twenty guineas, or a firm forty, his or their name should be placed on the proposed tablet.

Mr. Butt seconded the amendment.

Mr. Frazer said there were some cases in which a firm consisted of one individual only. He had known such cases, in which benevolent societies had preferred to have a donation in the name of the firm, as carrying more weight.

Mr. Squire agreed with Mr. Symes. If a gentleman wished to have his name appear as an individual, he could do so by giving twenty guineas, but if he wished the name of his firm to appear he must give forty.

Mr. Robbins thought it was the general opinion of the Committee that it was not desirable to fix the same amount for firms and individuals. It would not be fair to an individual that three or four persons engaged in a firm should have their names exhibited, by subscribing the same amount collectively as he did individually.

Mr. Richardson said he had no objection to withdraw his motion in order to ensure unanimity, though he was still of opinion it would be better to make no distinction. There were small wholesale firms which would subscribe twenty guineas, but could not afford forty.

Mr. Hills hoped the motion would not be withdrawn. The object was to get as much money for the Fund as possible.

Mr. Hampson thought it undesirable that a firm should rank exactly as an individual in the matter. It was just possible that some firms might choose this as an advertizing medium, and that was an additional reason why they should give a larger amount than an individual to gain this privilege.

Mr. Savage thought the difficulty might be met by firms nominating one of their members to represent them. He knew cases in which that was done.

The President said Mr. Williams had done good service in bringing this matter before the Council, but at present he thought it would be better to refer it back to the Committee, which would bear in mind the views expressed, and bring it on again in a more matured form.

Mr. Symes thought it would be a pity to lose the benefit of all the discussion which had taken place, and go over all the same ground again. He would move his amendment in the following form:—

> "That sums given as cumulative donations to the Benevolent Fund, amounting as a whole to not less than twenty guineas by an individual or forty guineas by a firm, entitle the donor or donors to have his or their name placed on the proposed tablet for that purpose."

The Vice-President asked, with regard to the effect of the cumulative amount, whether a man who subscribed a guinea a year for twenty years would be entitled to the glory of a place on the tablet.

Mr. Williams said he thought a man who was so careful and persevering would deserve to have his name recorded.

Mr. Robbins said in some societies a man was made a governor by a certain donation, and a vice-president by a larger sum, and had some other title on giving a still larger donation. It would be well to offer some inducements to men to increase their donations. There might be a second tablet for larger donations.

Mr. Butt thought one tablet had better be filled up first.

After some further discussion the amendment was put and carried, and then passed as a substantive motion.

It was also resolved, on the motion of Mr. Williams, seconded by Mr. Andrews,—

> "That the names of all persons bequeathing legacies of whatever amount to the Benevolent Fund be placed on the tablet."

The Secretary stated that, from the commencement of the fund up to the present time, there had been twelve donations of twenty guineas in one sum, ten donations of twenty-five guineas and three of fifty guineas.

The report and recommendations of the Committee were then adopted, subject to the foregoing resolutions.

A Late Annuitant.

Mr. Richardson wished to mention the case of a former annuitant who had been suspended from the list and had recently died. There was a feeling in Leicestershire that the man had not been fairly dealt with, and though he had done his best to remove that impression, it still remained to some extent.

The President said he had had two or three interviews with the person alluded to, and it seemed impossible to remove him from the state of dirt and filth in which he lived. On the last occasion on which he visited him there was such an intolerable stench in his room that he did not think anything would have induced him to enter it again.

Mr. Hampson, as a member of the Benevolent Fund Committee, said it might be as well to state that after the annuity in question was granted, the Committee found that it had been somewhat under a misapprehension in granting it. It was found that the applicant was renting a place in the country which was simply a lumber room, while he lived in London.

Mr. Richardson said he was quite satisfied with what had been stated by the President. He only wished it to be stated publicly that this man had not been badly used.

The Vice-President thought in mercy to the dead the Council had better not go further into details.

Mr. Williams said if there was any impression abroad that the Council had not done its duty, it was very important that it should be thoroughly removed.

Mr. Robbins thought enough had been said about the subject. The Council had already spent a great deal of time over this case on previous occasions.

Mason's College, Birmingham.

The President read a letter from Mr. Southall, saying he was desired by the Medical Council of Mason's College to make application for a copy of the *Pharmaceutical Journal* as published. He had also received a private letter from Mr. Southall asking him to support the request.

Mr. Symes moved, and Mr. Churchill seconded, a motion—

"That the Journal and Transactions of the Society be sent regularly as published to the Mason's College, Birmingham."

The PRESIDENT suggested that the 'Historical Sketch of Pharmacy' and the Catalogues of the Library and the Museum, and also the back numbers of the new series of the Journal should, if possible, be sent.

This was agreed to, and the motion as amended was passed unanimously.

REPORTS OF COMMITTEES—*continued.*

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor giving the details of cases placed in his hands. Other cases of alleged breaches of the Pharmacy Act, which had been brought to the attention of the Secretary, were also reported.

The report and recommendations of the Committee were received and adopted.

REPORT OF EXAMINATIONS.

December, 1880.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major, (8th)	7	2	5
" (15th)	7	4	3
	— 14	— 6	— 8
Minor, (8th)	19	7	12
" (9th)	28	12	16
" (15th)	22	13	9
" (16th)	27	11	16
	— 96	—43	—53
Modified, (8th) . . .	1	1	0
	111	50	61

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (15th)	2	2	0
Minor, (15th)	12	7	5
	14	9	5

Preliminary Examination.

Certificates received in lieu of Society's examination:—

University of Oxford	2
University of Cambridge	2
College of Preceptors	4
Royal College of Surgeons of England . .	2
	10

AMENDMENT OF REGULATIONS FOR EXAMINATIONS.

The VICE-PRESIDENT moved:—

> "That the alterations in the wording of the Regulations of the Board of Examiners recommended by the Board at its meeting on December 16 last be adopted."

The object of this was simply to make more clear the present regulation. In the case of candidates producing certificates from any of the other bodies which were taken in lieu of the Society's Preliminary examination, it was the Board of Examiners which had to approve these certificates; but it occurred occasionally, although very seldom, that a candidate brought such a certificate to the clerk in the office, for the first time, at the same time as he tendered the fee for the Minor examination. The object was simply to make it clear that the certificate for the Preliminary must be deposited a certain time before the fee for the Minor examination could be taken and the name entered for the examination.

Mr. ATKINS asked if the Board of Examiners was responsible for the Preliminary examination. He was under the impression that that was a matter settled between the College of Preceptors and the office.

The VICE-PRESIDENT explained that the whole of the examinations from beginning to end were placed in the hands of the Board of Examiners, and it was responsible for them. It was simply as a matter of convenience that the Preliminary was deputed to the College of Preceptors.

The motion was seconded by Mr. BOTTLE and carried unanimously.

The alterations referred to in this resolution are shown in the following paragraphs, in which the words to be omitted are placed between brackets, and the words added are printed in italics:—

In the Section relating to the "Preliminary Examination."

"* Certificates of having passed the Local Examinations of the Universities of Oxford, Cambridge, Durham or Edinburgh, the Examination of the College of Preceptors, or those of any legally constituted examining body previously approved by the Council, provided Latin and Arithmetic be included in the subjects, are accepted in lieu of this examination, and must be forwarded to the Registrar, with the fee of two guineas, for the approval of the Board of Examiners. *These certificates must be approved by the Board of Examiners before the candidate is eligible to enter his name for the Minor Examination.*"

In the Section relating to the "Minor Examination."

"Candidates for this Examination must have [passed the First or Preliminary Examination, and have] attained the full age of twenty-one years. *They must have passed the First or Preliminary Examination, and have been registered as Apprentices or Students.*"

In the Section relating to the "Major Examination."

"Candidates for this Examination must have attained the full age of twenty-one years. *They must* [and] have passed the "Minor" Examination *and been registered as Chemists and Druggists* at least three months previously.'

THE HANBURY MEMORIAL FUND.

The PRESIDENT said it would be recollected that two years ago a sum of money was collected to form what was called the Hanbury Memorial Fund, for the purpose of giving a gold medal every two years for high excellence in the prosecution of original research in the natural history and chemistry of drugs; the persons appointed to award the medal being the Presidents for the time being of the Linnean Society, the Chemical Society, and the Pharmaceutical Society, the President of the Pharmaceutical Conference, and one pharmaceutical chemist to be nominated by the last mentioned two presidents. The present year would be a very favourable time for awarding the first medal, as in August there would be a good many foreign pharmacists in this country on the occasion of the International Pharmaceutical Congress. He would therefore ask the Council to take steps to carry out the idea of the founders of the fund.

The VICE-PRESIDENT moved accordingly—

> "That the Hanbury Medal be awarded during the present year and that the President be requested to communicate respecting the award with the Presidents of the Linnean and Chemical Societies and the President of the British Pharmaceutical Conference."

Mr. HILLS seconded the motion, which was carried unanimously.

GRANTS TO PROVINCIAL ASSOCIATIONS.

Mr. WILLIAMS then moved the following, of which he had given notice:—

> "That the Library, Museum and Laboratory Committee be requested to revise the conditions and regulations under which grants may be made to pharmaceutical associations in the provinces."

He said when an application was made some time ago for an award of money to a local institution, all who heard it were convinced that those who made the application had either forgotten or were not at all acquainted with the regulations which existed for making such awards. On referring to the regulations, he found that when they were originally framed, they were declared to be of a temporary nature;

the idea being that there were a number of young men throughout the country who were very anxious to obtain educational assistance which would enable them to pass the examinations. This was justified to some extent, but latterly, the scheme seemed to have fallen almost into abeyance, and he thought, therefore, it would be well to refer the matter to the Committee to amend the regulations, and bring them more into accordance with the present condition of things.

Mr. Savage seconded the motion.

Mr. Hampson was extremely surprised to find such a motion put forward, because there had been no complaint of the working of the regulations. He believed the regulations were ample; no fault had been found with them. Whenever an application had been made they had been found to work satisfactorily, and to reopen a question of this kind without any real cause being shown was unadvisable and unnecessary. Almost any application could be received under the present regulations, and grants made under them.

Mr. Richardson thought it was in consequence of some observations he made last year that this motion had been placed on the agenda paper, and he would say in answer to Mr. Hampson that the slight discussion had been of benefit, for in a very few weeks after it occurred an application came from Leicester for a series of specimens for their little museum down there. If the Council was prepared to make these grants it was better to give as much publicity to the fact as possible. Since these regulations were made there had sprung up all over the kingdom local associations, which had their little museums or libraries and educational media, and it was very desirable that it should be known that the Society was prepared to assist them by sending specimens suitable for educational purposes. He was happy to know that the Curator made it one of his great objects to provide specimens of this kind.

Mr. Hampson asked if the present regulations had been found in any way inapplicable.

Mr. Richardson: Not at all. But he thought it quite possible they might be improved.

Mr. Frazer agreed with Mr. Hampson that the present regulations were ample; all that was required was their re-publication. If they were re-published, and so made known to the present generation, he thought it would meet the whole case.

The Vice-President urged Mr. Williams to withdraw the motion for the present. It was scarcely in accordance with usage that a committee should be appointed to revise regulations without some indication of the direction in which that revision should take place. At the present moment he must agree with Mr. Hampson that there had been no complaints of the working of the regulations now in force; and his disappointment had been—having taken a prominent part in the matter at the outset—not at the way in which applications had been received, but at the paucity of the applications themselves, which showed an amount of apathy with regard to professional improvement which he was not prepared for. Another reason for postponement was this. It was possible the Committee now sitting to consider the relation of education to the examinations might report at a not far distant date, and possibly there might be in that report matters which might materially enhance the desire on the part of the local chemists to centralize themselves into associations and more emphatically to further the cause of professional education. If that should prove to be the case it might give such a stimulus to the educational movement in the provinces that it might be found desirable to modify the conditions in some definite directions.

Mr. Symes supported the view of the Vice-President. It did not follow that the regulations were bad because people were ignorant of them. He did not know either, that the Museum was overdone with such an abundance of specimens that they need be anxious to thrust them on people who did not care about them. The day might come when the regulations would be found inadequate, and he should then be prepared to support their revision; but when the Committee had already quite as much work as it could do, he did not see why it should have unnecessary work cast upon it.

Mr. Savage thought Mr. Williams was quite right in suggesting that if renewed publicity were to be given to these regulations they should be carefully revised, but he had no objection to the matter being postponed.

Mr. Williams said he was willing to leave the matter in the hands of the Council; it did not press in any way.

The President said he did not remember any single case coming before the Committee which the regulations had failed to meet. But he did think it desirable that the regulations should be published, so that the local institutions should see that they could get assistance from the parent Society.

Mr. Atkins agreed that the one great want in this matter was a desire in the country for educational assistance. He should like to know if, when a local society went into liquidation, any specimens it had received were returned.

The Secretary said he remembered one case in which a money grant had been made, and the Society collapsed. In that case part of the money was returned, and was carried to the Benevolent Fund.

Mr. Williams said he would withdraw the motion in response to the general feeling of the Council.

The Pharmacy Act Amendment Bill.

The Solicitor attended the Council at two o'clock to advise on this matter.

The President said he presumed the discussion would take place in committee.

Mr. Symes thought it should be in open Council.

Mr. Williams moved that the discussion be taken in committee.

Mr. Bottle seconded the motion.

Mr. Richardson said he should oppose the motion. He thought the time was come when the whole of the proceedings might take place in open Council.

Mr. Symes believed the time had now arrived when the Bill should come before the chemists and druggists throughout the country, so that they might know what was being done. They had been long patiently waiting, and it was now the duty of the Council to put the matter more or less before them. The ideas contained in the Bill had already been handed over to the Trade Association for consideration; but that body, of course, could not publish them because they were communicated as a matter of courtesy and as a private and confidential matter. The time had arrived when the Bill must be introduced. The Vice-President had given notice of a motion, which he hoped would be carried, which would place it in a fair way of progress, and to attempt to pass a Bill which would be binding on all chemists and druggists throughout the the country, without giving them the opportunity of considering it, would be an insult to them which he hoped the Council would not be a party to.

The President suggested that the Council should not go over the whole Bill clause by clause, but that any member who had any objection to any clause, or any amendment to propose, should do so. Therefore, it would be better to publish the Bill *in extenso*, as finally agreed to, rather than a discussion upon it.

The Vice-President said he should have been disposed to think the Council had better finish the discussion on the proposed Pharmacy Act as it had been begun, in committee, had not a certain fact occurred between the last meeting and the present, which it seemed to him removed it altogether from the hands of the Council. He had seen in the Journal notice of the fact that another body had been discussing the partly framed amended Pharmacy Act, and since any set of men outside the Council had been almost invited to express opinions about it, he saw no further occasion whatever for keeping it from the rest of the trade. He should therefore oppose the motion for going into committee. He had, at the present moment, in his position as Vice-President, no comment to make on what the President had thought fit to do; but as what he had thought fit to do had taken the whole matter away from the first lines which had hitherto appeared on the face of the draft, "Private and Confidential," it was no use blinking the matter, and the Bill had better be discussed in open Council, and let the world know the result.

Mr. Squire said Mr. Symes had alluded to this Pharmacy Bill having been handed over to another association by the President. It did occur to him, when he first saw it, that the paper came to him as private and confidential, and he did not feel that he had any right to hand it over to anyone not a member of the Council; he was, therefore, astonished to find that it had been discussed by another body.

Mr. Atkins said he should have no hesitation in voting for the most public discussion of this question if the effect were simply to bring in the deliberative power of the whole body of chemists and druggists; but itwas not simply the chemists as a body who would be called upon to discuss it, it would become public property, and would be debated by those who had interests opposed to their own. If it were the general feeling that that should be done, he would not oppose it; only let it be thoroughly understood.

The President said he accepted the entire responsibility of sending a copy of the Bill to the President of the Trade Association. He considered it was too late to ignore the existence of that body, numbering probably five thousand members, and having the support and confidence of a large portion of the chemists of the kingdom. The trade was on the eve of a struggle, and to divide its forces just on the eve of the battle would, he thought, be extremely imprudent and dangerous. He was perfectly certain that the Society could carry no Bill unless it had the support of the Trade Association, and it was but justice to the chemists and druggists of Great Britain to give them an opportunity—not, at that early period, individually, but through the Association—of discussing the amendments which had been proposed. He had considered it a matter of duty on his part to send the copy of the Bill in response to the expressed wish of the President of the Association.

Mr. Frazer quite sympathized with the views expressed by the President, as to sending the Bill to the representative of the Trade Association; but he also thought that the discussion of the Bill should be ended, as it was begun, in committee. As one who opposed, almost without exception, every one of the new propositions, he should like it to go through the whole kingdom why he stood in that position; he did not want to come under cover of the Council. But he thought it would not be wise to discuss in public these delicate and long reaching questions, as they would then come before other bodies than their own, with different views and different interests. With that view he would suggest that the Bill be discussed in committee, but that, whatever conclusion was arrived at, the Bill in its ultimate form should then be published, so that the constituents throughout the country might know the conclusions at which the Council had arrived.

Mr. Hampson said he had always been in favour of publicity in the work of the Council as far as possible, and he was sorry that he could not quite agree with Mr. Symes. He thought it was advisable the Council should complete its work in committee, and when it had decided on the form the Bill should take, let it be published as Mr. Frazer suggested. The Council knew the reason why it had been thought desirable by the President (he thought wisely so) to confidentially take the Trade Association into counsel in the matter. In doing so he had not given the Bill that publicity which the Vice-President had represented. It was sent in confidence, and he believed full confidence might be reposed in that body. He entirely endorsed the President's view with respect to the position of that Association. The Pharmaceutical Society represented the trade to a certain extent, but the other body represented the trade also, and what was wanted at the present moment was perfect unity; unless there were unity and concord the Council might as well not attempt to carry anything. He believed it was entirely with that idea that a copy of the Bill had been sent; but he thought it would be unwise to discuss it clause after clause openly. Let the Council decide on what was wanted, and then let the Bill be printed. The Council wanted to proceed with the work this session, and the act of the President had no doubt facilitated such a course, for it was by united action only there would be any chance of carrying the Bill.

Mr. Williams said allusion had been made to a copy of the Pharmacy Bill having been sent to the Trade Association, but he observed that this Bill now before him was headed "Private and Confidential." He wished to know whether it was a copy of this Bill that was now about to be considered, or of some other, which had been sent, because he had only seen the Bill in its present form on the previous Friday evening.

The President said it was not that Bill.

Mr. Symes said that when the minutes were read, as there was a deal of business to do, he had not interposed; but he noticed then a reference to a communication from the Trade Association, requesting the Council to supply it with a copy of the Bill. He heard nothing about that at the last meeting.

Mr. Williams said that was at the adjourned meeting of the Council, and no resolution was come to upon it.

Mr. Symes asked if it was considered by the Council.

The Vice-President said the Secretary had better answer that question.

Mr. Symes said if it had due consideration it deserved a resolution being passed with regard to it. The Trade Association was no small body; he did not stand there as an advocate of the Trade Association, but as a Member of the Council; but it was a body the Council could not afford to divide itself against in such a crisis as the present, and if that application did not receive the due consideration it deserved he could only repeat that he thought the President acted very wisely in doing that which he had done, whether it was regular or irregular. He should like to know from the Secretary whether that request for a copy of the Bill did receive consideration.

The Secretary said perhaps the better plan would be to go through the actual correspondence which had taken place.

The President said the application was for thirty copies of the Bill. It was read just at the moment when the Council was breaking up.

Mr. Symes said he supposed it was smuggled through at the end, like many other things.

The Vice-President objected to that interpretation altogether. He would not say it was not introduced towards the end of the meeting; it might have been; but there was a distinct understanding that a Bill not being framed—the Council not being agreed on the Pharmacy Act Amendment Bill—it could not be handed over to any other hands as the decision of the Council.

Mr. Symes wished to ask if a reply to that effect was sent.

The Vice-President said that having been present on the occasion referred to, when, he believed, Mr. Symes was not, he was under the impression that the decision was that, under the circumstances of the case, the request could not be complied with; but when the proper time arrived, the body referred to should be treated with the utmost courtesy with which it was possible for one body to treat another. But nobody could think of complying with such a request then, any more than at the end of the first meeting at which the Bill was discussed. It would have been simply absurd to hand over the first sketch of an idea to another body for discussion, and accordingly, the Secretary had sent a reply which he believed embodied the impression of the whole Council at that last meeting. He was surprised that the discussion had come up in this tone, because there was no implied slur or disrespect to any other body in saying, "We cannot supply you with that which we have not got." The Council had not come to a conclusion, and after the discussion to-day had finished, in all probability the motion of which Mr. Butt had given notice would be agreed to. He certainly should not object to it, and he did not think anyone else would.

Mr. HAMPSON said there was one thing to be borne in mind with respect to this matter. He understood that Parliament met to-morrow, and the Council was in this position, that the trade yet knew nothing formally about the Bill. Such being the case, it seemed a great anomaly that the consent of the trade should be asked to it. A sort of *via media* had been found through the wisdom which gave a copy confidentially to the Trade Association. He thought it was undignified to continue this discussion. Let the Council get to work on the Bill and decide in committee what it should be, and then let it be published as quickly as possible.

Mr. RICHARDSON agreed with Mr. Hampson that this discussion was very irregular, and would have come better under the notice of motion given by Mr. Butt. He quite acquitted the President of any offence in presenting the president of a kindred society with a copy of the Bill. It was an act of courtesy which he was perfectly justified in doing, and he exonerated him from any blame in the matter. He looked upon that Association with very different eyes to some of his brother councillors. He believed it was doing a great deal of good. He did not see that it arrogated to itself any position antagonistic to the Pharmaceutical Society. It was a large Chemists' Trade Protection Association, and in that sphere could do an immense deal of good and materially assist the Society in the larger sphere as legislators for the whole trade. Therefore, it ill behoved the Council to show any antagonism on the one hand or any fear on the other. He had no doubt that the communication would be treated confidentially by Mr. Barclay, but he thought the Council might discuss this question openly.

Mr. ANDREWS suggested that the Council might put itself in order by having the minutes of the last Council meeting read. The Vice-President had referred to a discussion having taken place whether a copy of the Bill should or should not be sent. Now he had no recollection of that discussion; on the contrary, several gentlemen were leaving the room, and some one said there was not a quorum.

The VICE-PRESIDENT said he did not use the word "discussion."

Mr. ANDREWS said he thought the Vice-President said the matter was taken into consideration.

The VICE-PRESIDENT: So it was.

Mr. ANDREWS said he was a member of the Trade Association as well as of that Council; but if he thought there was any antagonism between the two he should cease to belong to the Association, because he was a pharmaceutical chemist before anything else, and a lover of the Society. He was convinced that the Trade Association only wished to help that Society as fully as possible, and he thought the President did one of the wisest possible things under the circumstances, seeing how time was passing, in acting as he had done.

Mr. CHURCHILL said he was present at the Special Meeting of the Council which had been referred to, and he was under the impression most distinctly that there was no resolution passed by the Council at the request of the Trade Association that a copy of the Bill, or more than one copy, should be sent. Nor could there be, because there was not a quorum, as he himself pointed out.

The VICE-PRESIDENT said that two assertions had been apparently put into his mouth which he had never made. He had not said there was a discussion or that a resolution was passed. There had been a request, which could not be complied with, and there was a general understanding that it should be complied with when it was possible.

Mr. BUTT said at the last meeting there was a letter read from the Trade Association in which the President of that Association applied for thirty copies of the Bill, when finally agreed upon. Those words were expressly mentioned, as would be seen by reference to the correspondence. It was decided by the gentlemen present that that application was premature; they could not send a copy of a Bill which was even then being altered, and which was looked upon as an imperfect measure. He believed that the copy which was sent to Birmingham was not even a copy of the Bill under discussion at the present moment. The co-operation of the Birmingham Society was most desirable, but to send an imperfect copy, which was not what the Council had now to discuss, was scarcely fair after the decision which had been arrived at by the majority of those present. As to the Bill being driven up in a corner at the last moment, that was, to a great extent, for want of having instructions sufficiently early. The instructions to frame a Bill were only given to the Committee on November 6, and he thought it had done the utmost it possibly could since then, and had got through a very fair amount of work.

Mr. ROBBINS said he was present at the last Council meeting, and his impression of what took place then was this. The Council had a Bill in print, which it had been discussing, and the President mentioned that there was an application from the Trade Association for thirty copies of the Bill. The general feeling expressed by those who remained until the end of the meeting was that such a request could not be granted; but his impression was that it was left to the President to send a single copy, or one or two if he thought fit.

Mr. GOSTLING said he happened to be present up to the very close of the last meeting, and he really must say, as far as his recollection served him, the subject did not receive any consideration at all. The letter was read, and several members of the Council felt it desirable to leave the room, and they were left without a quorum. He himself said to the President, "Under the circumstances, I think you will be perfectly justified in letting the Trade Association know how far we have got." He must, therefore, justify the President in the course he had taken, and must also take his share of the responsibility.

Mr. FRAZER thought the best thing the Council could do would be to ask for the reply which the Secretary had sent to the application of the Trade Association.

Mr. HAMPSON suggested that the Council should go on with the business.

Mr. SYMES said the question was whether the Council should go into committee or not. He had proposed that the discussion should be in open Council; but if it was felt by the Council desirable to discuss the matter in committee. As long as it was understood that the Bill should be published as it left the hands of the Council he had no objection. The only reason the discussion had taken that tone was because the Vice-President commenced by speaking in a condemnatory spirit of the President's action; but everything that had been said tended to show that nothing had been done contrary to constitutional practice. He himself was present at the meeting referred to, although he did not remain until the close, and, therefore, no official reply could have gone He simply wished again to say that whether the President had acted regularly or not, he had done the most wise thing, which would help the Council amazingly.

The PRESIDENT said what he did he did openly and stated in the presence of at least half a dozen, or it might have been more, before he left the room. It was his distinct impression that the letter from the Trade

Association did not receive any consideration at all that evening, and finding that the members were leaving, he stated distinctly that he should take upon himself the responsibility of sending to the President of the Association a copy of the Bill, and he telegraphed to him that night that he would receive a copy of it by the first post next day. What he had done was, he believed, in the best interest of the whole body of pharmacists.

Mr. **Frazer** said his recollection was opposed to Mr. Schacht's view of what took place. He had a distinct impression when he left the room, and he was perhaps almost the last man that did leave, that a copy was to be sent by the President.

The **Vice-President** said he should be sorry to be misunderstood in any way. As for the tone which had prevailed in some portion of this discussion he disclaimed being responsible for it, because he was exceedingly careful in measuring his words in the first observations he made, in which he was supporting Mr. Symes's proposal that the Council should discuss this matter in open Council rather than in committee, for the reason that, rightly or wrongly, it appeared to him to be no longer a private matter. So far he did not in any way introduce condemnation of the President's action, and stated distinctly that he did not feel competent to pronounce any opinion upon it. With regard to the question of whether he had misinterpreted what took place, he was exactly of the same opinion still, and he appealed from individual members, who might have preferences and opinions on the matter, to the only official present, namely, the Secretary, if he had a record that such was the conclusion as announced by Mr. Frazer, or if he was of opinion that a declaration on the part of the President was made publicly that he should do so-and-so with reference to the Trade Association. He could only say that he did not hear it. If the Secretary, the sole perfunctory person present, had it on his records, well and good. But it appeared he had taken a perfectly opposite view, as would be seen by the reply which he had sent in his capacity as Secretary, but which the Council declined to hear. Had it done so it would have been seen that the Secretary's interpretation of what transpired was very much what he had stated. In conclusion he begged to say that he had expressed no disrespect to the President. He purposely abstained from doing so.

Mr. **Symes** said he was willing to withdraw his amendment.

Mr. **Williams** said it was not an amendment, it was a distinct negative to the motion.

Mr. **Bottle** said that in previously seconding the motion for going into committee he had not spoken, because he thought it unwise to occupy time which could be more usefully spent in discussing the Bill, but he entirely endorsed the view of the President, who certainly told him what course he proposed to take. He distinctly said he had an application for thirty copies of the Bill from the Trade Association, that he did not see his way in the present position of things to send so many, and then he asked if he (Mr. Bottle) saw any objection to his sending a copy to the President or Chairman. He replied that he saw no objection to sending it as a matter of confidence, and he thought a more courteous thing could not have been done.

The motion for going into committee to discuss the clauses of the Bill was then put, and carried by a majority of 11 to 5.

The discussion in committee continued for about four hours.

On resuming,

Mr. **Symes** moved—

> "That the proposed Pharmacy Act Amendment Bill, as now decided on by the Council, be published in the *Pharmaceutical Journal* of Saturday next, and copies be supplied to the editor of the *Chemist and Druggist* and other journals interested in pharmacy, on application being made for the same."

Mr. **Hampson** claimed priority for a motion which he had framed before the Council resumed, to the following effect:—

> "That the Pharmacy Act Amendment Committee be entrusted with the draft of the proposed Pharmacy Bill, as now agreed to, and is hereby authorized to take all necessary steps to obtain its enactment, and that the Bill, when revised by the Solicitor, be published in the Society's Journal."

Mr. **Symes** seconded this motion.

Mr. **Gostling** thought the Council should see the Bill in print, with all the amendments, before it was sent to Parliament.

Mr. **Radley** said his idea was that the Bill should be printed and circulated, and that the Council should again consider it at its next meeting, with any suggestions which might arrive from the country in the meantime. He was very anxious that the country generally should have an opportunity of expressing an opinion upon it.

Mr. **Frazer** said he declined to leave the responsibility of sending a Bill to Parliament with any committee, or any solicitor, however much he might respect them. The Bill must be finally approved by the Council before it went to Parliament.

Mr. **Symes** said if the Council were to put the Bill away in a drawer for another month, and all the clauses were then to be discussed again with gentlemen making objections to which they would stick to the last, it was equivalent to shunting the thing altogether.

Mr. **Gostling** said the Council had made very good progress, and there was nothing gained by being in too great a hurry. He should like to see the Bill published in the Journal and in the *Chemist and Druggist*, and then the opinion of the trade would be elicited with regard to it, and the Council could go to Parliament with greater confidence.

The **President** said he must ask Mr. Hampson to make some alteration in his motion, as it was unduly pressing the Bill forward before it had been sufficiently considered by the persons interested.

Mr. **Hampson** said he would withdraw his motion and second that moved by Mr. Symes.

Mr. **Butt** suggested, in accordance with a notice of motion which he had given, the addition of the words, "and that thirty copies be sent to the Chemists and Druggists' Trade Association."

This was agreed to, and the motion as thus amended was carried unanimously.

The Late Mr. Baildon.

Mr. **Frazer**, wished before the Council broke up, to refer to the death of Mr. Baildon, of Edinburgh. It took place somewhat suddenly, and was unknown to himself until the night before last. His funeral was taking place that day, and it was with great regret that he was obliged to be absent from it. Mr. Baildon was one of the oldest and most esteemed pharmacists in Scotland. He began as manager to Mr. Butler as far back as 1827. His name had been associated with pharmacy in all its phases. He was one of the promoters of the Pharmacy Act in its extension to Scotland. He was a man of great integrity of purpose, a man of science, and one who was liked and esteemed by all who knew him. He himself had known him by name for fifty years, and for forty years personally, and the more he knew him the more he esteemed him. He was quite sure there would be but one feeling of regret amongst all present at his loss. Mr. Baildon never was a member of that Council, but all along had been a member of the Edinburgh Council.

Mr. **Williams** said that, having on more than one occasion had to visit Edinburgh in his official capacity, he had received the hospitality of Mr. Baildon, and was very much shocked and grieved to hear of his death. He was quite sure that every member of the Council would sympathize with the feelings of sorrow which must animate all the members of the Council of the North British Branch at losing a man for whom they all had so much respect and esteem.

The **President** said he was sure every member of the Council would sympathize with Mr. Frazer and his Scotch friends in the loss of Mr. Baildon. He was not only a loss to Scotland, but to pharmacy generally. He had known Mr. Baildon for a great many years, and his name had been associated more or less with the progress of pharmacy ever since he had known him.

Election of Members of Council.

Mr. **Frazer** said he would move the resolution of which he had given notice, although he was quite aware it was too late to get it carried, namely:—

> "That the Council consider it desirable that the Members of the Pharmaceutical Council should be elected according to a plan of district representation, and requests the Pharmacy Act Amendment Committee to form a scheme for the purpose of introduction into the Bill to amend the Pharmacy Act."

Mr. **Hampson** said he agreed with the principle enunciated in the resolution, but regretted to say it seemed impossible, as they had advanced so far in the preparation of the Bill, to include any properly prepared scheme in conformity with Mr. Frazer's wishes. No doubt Mr. Frazer wished the motion published so that at any future time when the Bill was again amended it might be included, but he was sorry to say it was now too late.

Mr. **Williams** said it must not be assumed that the Council would agree to it.

The subject then dropped.

Owing to the lateness of the hour the consideration of two notices of motion and other business was deferred until the next meeting of the Council.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The third meeting of the session was held on Tuesday, December 21, in the rooms of the North British Branch, Mr. W. Aitken, Vice-President, in the chair.

The minutes of the last meeting having been read and confirmed, the Chairman called upon Mr. C. F. Henry to open the affirmative in a debate, "Is a compulsory curriculum for chemists desirable?" Mr. Henry argued that the purposes for which pharmaceutical examinations were instituted would be more effectually carried out than at present were a curriculum made compulsory. One of the objects of these examinations was that chemists should be compelled to acquire certain knowledge, which would the better fit them for carrying on their business. No provision, however, had been made for the acquiring of this knowledge, and the result was that they had to employ the little time they had to themselves, after their day's work, to "cram" it up, to the injury of their health and the thwarting of the object of the examinations. The institution of a curriculum, which he defined as attending lectures on chemistry, botany and materia medica for one hour daily, would cheapen the cost of the present examinations, as a certain percentage in the ordinary class examinations for each subject might constitute a pass. Another advantage would be that candidates would only require to pass one subject at a time, and their minds would be relieved from the strain which at present existed, through all the subjects having to be passed in three or four hours. Then, like the lawyer and the physician, chemists would be entitled to call themselves professional men. At present they had no right to consider themselves as such, until the link which was wanting, viz., a curriculum, was established. In concluding, Mr. Henry said the words used recently by Dr. Husband in reference to sanitary officers of health applied equally to the case of chemists and druggists, viz.: "No well defined course of study is laid down, and candidates are left to pick up the special information required from books, or in any other way that chance may determine." The remedy suggested by Dr. Husband was also equally applicable, viz.: "That all candidates should be required to undergo a course of instruction," or, in other words, there should be a curriculum.

The Chairman then called upon Mr. J. D. Robertson to open the negative.

Mr. Robertson regarded a compulsory curriculum as unnecessary, impracticable and undesirable. Unnecessary because the present system of compulsory examination made it impossible for anyone who had not been educated to become a qualified chemist, and that there existed no good evidence to show that the great argument against the present system, viz., "cram," would be removed by a curriculum. Impracticable, firstly, from a master's point of view, on account of the revolution it would make in the hours of business, and secondly, from an assistant's point of view, because the salaries paid are not capable of affording much in the way of paying fees. Undesirable, not altogether on account of its being unnecessary and impracticable, but because of the want of evidence to show that it would tend to elevate the "trade" to a "profession." On the contrary, it might be the means of driving from the trade those who, having passed through this curriculum, found themselves adapted for higher occupation than selling pennyworths behind a druggist's counter, and would keep back those who could get better salaries in other trades without the terrors of a curriculum or examinations.

The affirmative was supported by Messrs. Boa and Hill, and the negative by Messrs. Hutton and Aitken. On putting the question to the vote, the affirmative was carried by a majority of seven.

A number of queries were then submitted and replied to, and a vote of thanks to the Chairman having been passed, the meeting was brought to a close.

OLDHAM CHEMISTS AND DRUGGISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The first meeting of this Association for the year 1881 was held in the Society's room at the Church Institute, Mr. Bambridge, President, in the chair.

The President, in his introductory address, gave an account of the progress of pharmacy during the past year, and exhorted the members to avoid the system of "cram" now so universally adopted and to study thoroughly whatever they took in hand. He then read a paper on "New Remedies," in which he spoke of the sources, uses and principal characteristics of the more important remedies which have appeared during the last few years.

The paper was illustrated by numerous specimens, and after a very interesting discussion, in which all the members present took part, the meeting terminated.

Parliamentary and Law Proceedings.

Poisoning by Chlorodyne.

On Saturday, January 1, Captain Taylor held an inquest at the Wakefield Borough Police Station on the body of a gentleman named Alfred Knight, twenty-two years of age, who, it was supposed, had committed suicide at a temperance hotel in Wakefield on the previous day by taking a large dose of chlorodyne.

From the evidence it appeared that at noon the previous Thursday the deceased had not left his bedroom, and was snoring or breathing so hard that he could be distinctly heard downstairs. Suspecting that all was not right the landlady called in a policeman about half-past one o'clock, and he burst open the bedroom door. The young man was found lying in bed, almost on his face, apparently in very good health and sleeping comfortably. Consciousness could not be restored and he died about a quarter to nine o'clock at night.

Dr. Hollings, who had made a *post-mortem* examination of the body, stated that he was satisfied that the deceased must have taken poison, as three or four ounces of a gruel-like liquid which he found in the stomach smelt very strongly of chlorodyne. A 2oz. bottle containing chlorodyne in a washstand drawer in the bedroom, and another small bottle, which had also contained chlorodyne, were found under the pillow of the bed in which the deceased had slept.

The jury returned a verdict to the effect that the deceased had poisoned himself with chlorodyne.—*Leeds Mercury.*

POISONING BY ACONITE.

Dr. Diplock, the Coroner for West Middlesex, held an inquest on Tuesday, at the Chelsea Infirmary, touching the death of Miss Amelia Wallsworth, matron at the Metropolitan and City Police Orphanage, at Twickenham.

From the evidence of Miss Daines, in the employ of the Post Office, it appeared that the deceased was formerly the assistant matron at the Chelsea Infirmary, and both witness and deceased were invited to be the guests of the matron, who had a few friends on Saturday last at the Infirmary. Deceased complained of a very bad cold, and Dr. Webster, who was present among the company, made a remark that aconite and camphor were recommended in the earlier stages of this complaint. He said "a drop on sugar, alternately with camphor." Witness slept in the same room as the deceased, and before going to bed the deceased took something in a tumbler and water. She also gave witness some, telling her it was good for the headache. Some time afterwards witness felt very restless, and had a strange sensation in her hands and arms, and finding the deceased in even a worse state, she spoke to her. Deceased said she felt as if she was swelling, and would get out of bed and ask one of the nurses to give her some coffee, and she accordingly left the room, and did not return, and witness never saw her again alive, and was dangerously ill herself.

Henry Kenney (after being cautioned by the coroner) said he was the messenger and hall porter at the Chelsea Infirmary. On Saturday night last the deceased came down to the hall and asked for the key of the dispensary. As she had formerly been a superior official he did not hesitate, but afforded her admission to the dispensary. She said she wanted aconite and knew it when she saw it, and after searching about for some time found a large bottle containing some liquid, and by her directions witness filled a phial from it.

By the jury: He had no authority to give out medicines, and was not authorized by the doctor to do so; all he did was to oblige Miss Wallsworth, who was very much respected while an officer of the Infirmary.

Dr. William Henry Netherclift, medical superintendent of the Infirmary, deposed that between two and three o'clock on Sunday morning he was called to the deceased, who was gasping for breath, with open mouth and protruding tongue. Her eyes were fixed on vacancy and the pupils were much dilated. He asked her what she had taken, and she gasped out "Aconite." Every possible thing was done for her; all, however, was unavailing, and death resulted from "aconite poisoning."

The jury returned a verdict of death from misadventure.—*Standard.*

POISONING BY AN OVERDOSE OF CHLORAL.

Mr. W. H. Sale, deputy coroner, has held an inquest at Old Normanton, on the body of Robert Eggleston North, 51 years of age, late a clerk in the employ of the Midland Railway Company. Deceased was said to be in the habit of taking various medicines which he obtained from different chemists in Derby. On the morning of his death, as he did not get up, the landlord went into the room and found the deceased partially undressed, with his head covered over with a blanket. The landlord thought he was asleep and left him. He went again in a few minutes to turn the clothes down from his left side, and putting his hand upon his shoulder found that he was dead. There was a bottle of brandy half full in the room, and a large number of medicine bottles.

Mr. Goodall, chemist, of St. Peter's Street, knew the deceased by sight as a customer. He produced three prescriptions which had been prepared for the deceased. One of these prescriptions was for a soothing medicine, and was prepared for the deceased's wife, but the deceased also took it. There was a quantity of chloral in the medicine. Deceased told witness that he suffered from sleeplessness. Witness cautioned him against taking too much chloral, once especially, but the deceased treated the warning lightly, as if he knew what he was about. A bottle of chloral mixture and a bottle of tonic mixture were supplied to the deceased from his shop about half-past seven o'clock on Wednesday evening. The chloral contained 180 grains, and a full dose would be 30 grains.

William Parker Williamson, an assistant to the last witness, stated that he supplied the deceased with the two bottles of medicine mentioned. The deceased then appeared to be as cheerful as usual. The empty bottle produced was similar in size and shape to that supplied, and had contained chloral.

Mr. H. F. Gisborne had made a *post-mortem* examination of the deceased, and was of opinion that deceased had died from the effects of an overdose of chloral.

The jury returned a verdict of "Found dead in bed; the deceased having died from an overdose of chloral inadvertently taken."

Obituary.

HENRY CRAVEN BAILDON.

The present year was not many hours old ere the sad intelligence reached us that death had again invaded the ranks of pharmaceutical chemists, and removed from his family and friends, Henry C. Baildon, of 73, Princes Street, Edinburgh, so long well known and widely esteemed.

Born in Coventry, Warwickshire, in the early part of the present century, Mr. Baildon was in his 74th year. When quite young, he came to Edinburgh as manager to Messrs. Butler and Co., of London, and succeeded them in the same premises where, for upwards of fifty years, he has carried on for himself a large and successful business.

Mr. Baildon was one of the Founders of the Pharmaceutical Society, and in the early days of difficulty and opposition gave very valuable assistance in establishing on a firm basis what has since become a most important institution. When the first Pharmacy Act of 1852 was being contended for, in and out of Parliament his exertions were unremitting. In particular, when it was proposed that a central examining board for the United Kingdom should be established in London, he took up a firm position, and along with others, threatened not only opposition to the Bill itself, but the establishment of a separate Scotch Society. The late Jacob Bell and those associated with him, who were working strenuously to carry out the contemplated measure, ultimately acknowledged the justice of this view of the case, and inserted a clause appointing a Board of Examiners for Scotland invested with the same powers and acting under the same regulations as the one in London.

Immediately after the passing of the Act, Mr. Baildon became a member of the Board, and continued to be an examiner for many years. He was also, until very lately, one of the Edinburgh Council, and assisted in the management of the affairs of the North British Branch. Elected President for 1853-54, he was again raised to that position in 1871-72. On the second occasion he was specially asked to occupy the chair, in order that the Pharmaceutical Society might be efficiently represented during the meetings of the Pharmaceutical Conference, which paid the city a visit in the autumn of 1871, and of which he was appointed a Vice-President. How well and ably Mr. Baildon fulfilled his duties, and how much the great success which attended the meetings was due to his unwearied efforts and kind consideration, is now a matter of fond remembrance to those who were associated with him in this work. It was during this meeting that he introduced the bark of the *Rhamnus frangula* to the notice of the profession, regarding the peculiar merits of which he read a paper. His communications to the usual scientific meetings of the Society were numerous, some of which, though printed in the Journal, may be here named:—"Paper with Reference to Eight Cases of Specimens presented by Mr. R. Jamie, Singapore," read April 4, 1874; "Paper on Goa Powder, from D. S. Kemp, Bombay," and a "Paper on Some Ancient Drugs," March 13, 1875; "A Supplementary Paper on *Rhamnus Frangula* Bark," August 7, 1874. In addition to his various papers, he was the author of an ingenious process for crossing banker's drafts with the view of preventing erasure or forgery. For this invention, which was highly successful, he secured two patents, and it is still widely applied in banking establishments. He also registered a most ingenious method of "nature printing" for ferns and other plants.

Mr. Baildon had, especially during the last ten or fifteen years of his life, been in the enjoyment of good health, and displayed, till within a few days of his death, the mental and bodily vigour and activity for which he was remarkable. Though he had complained more or less for some days, it was not till Monday morning (December 27) that he consented to the calling in of his physician, who declared him to be suffering from pleurisy. Although knowing the perilous nature of the complaint, Mr. Baildon's friends, trusting in the prompt measures taken for his relief, the tried skill of his medical adviser, and the excellence of his own constitution, were in great hopes of his recovery. On Saturday afternoon, however, without any warning to those attending him, he peacefully breathed his last. His youngest brother who had been long ill at Southport, Lancashire, only survived Mr. Baildon by a few hours. The double loss has plunged his family and friends into peculiarly deep affliction.

In this short and imperfect notice it is not easy to do justice to the character of such a man as Henry C. Baildon. Warm-hearted, kind, genial, and hospitable, in manners and disposition a perfect gentleman, we cannot but feel that in him the city has lost one of its most respected inhabitants and pharmacy one of its warmest friends and brightest ornaments, and in recording this accession to the long list of our departed celebrities, regret for our loss is only alleviated by the memory of the many acts of devotion to our Society and of kindness and courtesy in all the relations of life which will ever be associated with his name, and by the assured feeling that such an example is the most powerful incentive to others to go and do likewise.

JOHN STENHOUSE, F.R.S.

On the last day of the old year passed away Dr. John Stenhouse, F.R.S., in the 72nd year of his age. He was a native of Glasgow, where he received his first education. Afterwards he was a pupil of Graham and Liebig, and became an unwearied investigator in the domain of organic chemistry, his studies being a labour of love to him. In the catalogue of scientific papers, published by the Royal Society up to the year 1873, no less than ninety papers are enumerated, written by him at different periods. He has contributed not a little to the progress of pharmaceutical knowledge, in recognition of which he was, in 1856, elected an Honorary Member of the Pharmaceutical Society. Aloin, oil of cinnamon leaf, thymol, from the seeds of *Ptychotis Ajowan*, the crystalline deposit in essential oil of bitter almonds, and myroxocarpine, are a few of the substances he examined. Of the latter, a crystalline substance obtained from the white balsam of peru, a specimen exists in the Museum of the Society.

Dr. Stenhouse was a Royal Medallist of the Royal Society, LL.D. of Aberdeen, and one of the founders of the Chemical Society. On removing to London he was appointed Lecturer on Chemistry in St. Bartholomew's Hospital. In 1865 he succeeded Dr. Hoffmann as non-resident assayer to the Royal Mint.

Though labouring for many years past under severe physical suffering, yet he was not deterred from continuing his scientific investigations.

In private life, as a Christian philosopher, as a stern denouncer of scientific humbug, and as a kind and sympathizing friend, he is said by those who knew him best to have left behind him but few equals.

Review.

YEAR-BOOK OF PHARMACY: comprising Abstracts of Papers relating to Pharmacy, Materia Medica and Chemistry, contributed to British and Foreign Journals, from July 1, 1878, to June 30, 1880. With the TRANSACTIONS OF THE BRITISH PHARMACEUTICAL CONFERENCE at the Seventeenth Annual Meeting, held in Swansea, August, 1880. London: J. and A. Churchill. 1881.

Once more the opening year has brought a new "Year-Book," in the now familiar green covers, demanding a place upon the pharmacist's book-shelves as a valuable and portable *résumé* of a year's literature of the sciences allied to pharmacy. In this one instance, at least, the members of the Conference, who, as a rule, are so strongly opposed to co-operative dealing and its results, may congratulate themselves that co-operation is advantageous, as it places within their reach for a nominal sum a useful annual volume that was not previously provided by private enterprise.

The volume for 1880 is somewhat thicker than that for 1879, and as the extra pages are all to be found in the portion referred to in the first section of its rather verbose title as the "Year-Book," the immediate impression is that the increase is due to greater activity amongst writers; but a closer examination shows the true explanation to lie in the greater length of the abstracts, the number of titles being really less. The value of these abstracts, considering past experience of the Editor's work, now *va sans dire*. In one feature, indeed, that of arrangement, improvement is noticeable; and although this has not been carried to the extent advocated in these columns in some previous notices, the reader will find that where there are more than one articles upon the same or an allied subject in a section, they are fairly well grouped together. We confess, however, that we are still puzzled as to the relative value of the titles of the sections; being unable to comprehend, for instance, why the alkaloids of quebracho bark, the constituents of coto bark, and other alkaloids, glucosides and active principles, are included under "Materia Medica," whilst a larger number of similar substances are included under "Pharmaceutical Chemistry." This, however, is a minor affair, and by some may not be considered a blemish. The important point is that the abstracts appear to be clear and trustworthy. Mention should also be made of the ably written Introduction.

We cannot close this notice without an expression of regret that the printed list of members shows a diminution of four pages, or equal to nearly 250 names.

Correspondence.

SPIRITUS AMMONIÆ AROMATICUS.

Sir,—Responding to the editorial suggestion on p. 478, I should like to offer a few remarks on the above-named preparation.

Mr. Thresh's admirable paper incontestably proves that great variation in strength is met with in what is sold as sp. ammon. arom., B.P. (of preparations other than the sp. I do not intend to speak). Large manufacturers also seem to admit the difficulties of securing uniformity in its preparation by the process at present official in our Pharmacopœia. On the other hand, others, notably Mr. Corder and C. E., seem perfectly satisfied with the results they obtain by following more or less closely the official process. I must confess that my own experience, extending over some fifteen years, is not favourable to the retention of distillation in its preparation; for presuming that an alcoholic solution containing free and combined ammonia in certain definite proportions, and flavoured with aromatics, is what is required by the medical profession, then it appears to me that the process adopted is not one which would be likely to produce such. There is, I think, no question that mainly to this distillatory process are to be traced the principal causes of variation in strength, and not (as remarked by one manufacturer in an explanatory note at the foot of Mr. Thresh's paper) to the variable nature of the sesquicarbonate of ammonia of commerce. I do not altogether share the alarm of our friend, Mr. Martindale, in contemplating the balance between life and death being upset by a small excess or deficiency in the strength of a dose of sal volatile; but I entirely agree with him that such variation as we see is most discreditable to modern pharmacy.

Referring to Mr. Corder's communication, I should like to ask by what means, other than that stated in his letter, he is "certain" that he gets the proper quantity of ammonia. The Pharmacopœia gives us no indication of its intentions regarding the ammonia strength of sp. ammon. arom., and I can quite imagine a solution deficient in free ammonia throwing down a crystalline deposit when exposed to a low temperature. An increased specific gravity would be quite compatible with either an excess of water or of combined ammonia, or with a deficiency of free NH_3. My own experiments point to the fact that when the B.P. process is carefully conducted the product has a higher specific gravity than stated by that authority. It seems somewhat strange that while the B.P. gives a number of characters and tests, as well as the most explicit directions for the preparation and examination of sp. ætheris nitrosi, it leaves us almost without a guide in the preparation under notice.

This is a point that I think deserves consideration and a remedy in the next edition of the Pharmacopœia.

I am quite of the opinion of your correspondent, C. E., p. 527, that this subject is by no means "Threshed" out, but, as a practical pharmacist, I am sorry I cannot agree with him, either in his admiration for the official process or in his wholesale condemnation of any sample not made by that process. That it is possible to make a sp. ammon. arom. without distillation that will compare favourably with that made by the B.P. process, I am quite convinced, and with the advantages of less risk, greater uniformity in strength, and lastly, by a process which every pharmacist may himself carry out. I am quite aware of the imperfection of many of the published processes. By dissolving the ammoniæ carb. in the water and liq. ammon. fort., and then adding the solution so obtained to the spirit, a crystalline deposit of acid ammonium carbonate forms, which never completely redissolves, and the water added for this purpose is generally in excess of what is contained in the B.P. product, thus raising the sp. gr., while at the same time it is deficient in combined ammonia. One statement in C. E.'s letter has somewhat surprised me, as it no doubt has other practical pharmacists. He says, "Nor has there been any loss of ammonia or CO_2 during the distillation." Leaving out of the question for the present the first assertion, and taking into consideration the fact that he makes use of a glass retort for the purpose of his distillation, he cannot have failed to observe the brisk effervescence which takes place so soon as a temperature of 40°-45° is reached, and which continues visible until the mixture has reached its boiling point, when, of course, it becomes indistinguishable. I need not remind him that this effervescence is due to CO_2, and that therefore there must be a considerable loss of this gas, and it is just this liberation of CO_2 that is necessary before the ammonia salt can become soluble in the alcoholic menstruum. Roscoe,[*] speaking of acid ammonium carbonate, says, "Its solution when exposed to the air, as well as when heated above 36°, loses CO_2. . . . . It is not soluble in alcohol, but if the alcoholic solution be allowed to stand in the air, CO_2 is evolved, and ammonium carbonate is dissolved." If C. E. will take the proportions for sp. ammon. arom. ordered in the B.P., minus two-thirds or less of the water (one-third or less being presumed to be present in the finished product), and place them in a flask with a glass stopper having a groove filed in its side, and gradually heat by means of a water-bath, keeping the temperature steady at 50°-55°, he will see a continuous stream of gas given off as long as a particle of the original ammon. carb. remains undissolved, and if this temperature has not been exceeded, no loss of alcohol, aromatics or ammonia (free or combined) will be found to have occurred. If the essential oils be of good quality, the product when cold will be found to present characters but little differing from that prepared by the B.P. process. As I am at present working upon this subject, I defer suggesting a definite formula until my experiments are complete. Should it be decided to retain distillation as a means of preparing sp. ammon. arom. (a proceeding much to be deprecated) in the next edition of our Pharmacopœia, it may interest those of our brother pharmacists who are desirous, as far as possible, of carrying out for themselves the processes of the Pharmacopœia, to learn that it is by no means necessary to provide themselves with expensive luxuries in the shape of a steam-jacketted stoneware still and condensing worm; the ordinary tinware still with a Liebig's condenser of glass, which ought to be found in every pharmacy, being on the whole a more convenient and effective apparatus for the purpose; or simpler still, an ordinary tinware bottle, such as is used for oils, etc., requiring in addition only a bent glass tube (of as large a diameter as convenient) to connect it with the condenser. No metallic contamination will be found in the finished product, nor indeed in more than a mere trace in the residue remaining in the still. The pharmacopœial quantity or more may by these means be easily prepared at any time; using, as a source of heat, any of the excellent little gas stoves most commonly in use. I could say a great deal on the subject of extemporizing apparatus for pharmaceutical use, but must defer remarks on this subject to a future communication. I would strongly urge on all the desirability of carrying out as far as possible the home manufacture of the preparations used in pharmacy, not only as a means of profit pecuniarily, but still better, as affording means for efficient training of our pupils and assistants.

ALFRED E. TANNER.

A METHOD OF ESTIMATING CHICORY IN COFFEE.

Various methods are in use for estimating chicory in coffee, but in practice I have found the following method I proposed some time ago work very satisfactorily. First carefully examine the coffee under the microscope. Then take 10 grams of the coffee and boil it in 250 c.c. of water; then strain, and add diacetate of lead until a precipitate ceases to be formed, well stir and put aside to settle; if the coffee be pure the water above the precipitate will be perfectly clear, but if chicory is present the water will be more or less coloured according to the quantity present, which can be estimated by comparing the depth of colour, the same as the Nessler test for ammonia.

No doubt the foreign substance found by Mr. Rimmington was roasted figs. Damaged raisins are roasted and used with chicory to make the French coffee; these are easily detected under the microscope.

ALBERT SMITH.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Goodall, Barnes, Falkner, Count, Bland, Southall, Modlen, Starkey, Williams, Warrell, Grease, Percontator, J. T. H., H. W., A. B., M.

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[*] 'Treatise on Chemistry,' vol. ii., pt. i., p. 182.

CAPE TEA.

BY HENRY G. GREENISH.

(*Concluded from page* 551.)

The Examination for Theine was made as follows:*—Fifty grams of leaves and 50 grams of stalks cut small were exhausted by repeatedly infusing with distilled water on the water-bath. The deep brown-red filtrates were concentrated to a syrup and excess of calcined magnesia and powdered glass added. Thus treated the red-brown colour changed to a yellowish-brown, and the mass gelatinized, but soon became again fluid. It was evaporated to dryness, finely powdered, transferred to a bottle, and exhausted by repeatedly shaking with ether. The ether solutions were filtered off, the ether recovered by distillation, and the dried residue weighed. It amounted to 0·0150 gram or 0·015 per cent. A few minute colourless prismatic crystals were observed in the upper part of the flask, which on being tested with chlorine water did not yield the theine-reaction. A portion of the residue after digestion with ether disolved in water acidulated with sulphuric acid failed to give precipitates with the alkaloid-reagents, as also an infusion of the drug made with acidulated water. These tests prove the absence of an alkaloid in the *Cyclopia*.

Würthner† found in "Capthee" 0·13 per cent. of a substance which he took to be theine, but the quantity of which was, as I learn from Professor Dragendorff, too small to allow of all doubts as to its identity with that alkaloid being set aside. Professor Flückiger has also examined "Capthee" for theine with, as orally communicated to Professor Dragendorff, negative results.

Being led by the yellow colour of the stalks to suspect the presence of scoparin, which occurs in the nearly allied *Sarothamnus* and *Genista*, the examination for that substance was conducted as follows.

Three hundred grams of the cut stalks and leaves were exhausted by boiling for two hours with 1½ litres of water, the decoction filtered, evaporated to a small bulk, and allowed to stand twenty-four hours in the ice-cellar. It did not gelatinize, although finally evaporated to a very small bulk, thus proving the absence of any considerable quantity of scoparin. The concentrated decoction was diluted with water and excess of neutral acetate of lead solution added, which produced a voluminous brown precipitate; the filtrate was mixed with basic acetate of lead, which gave a second similar precipitate, somewhat lighter in colour. The filtrate from this precipitate neutralized with potash yielded a third bright yellow precipitate. Whilst working on these precipitates, it was observed that the filtrates on boiling with hydrochloric acid assumed a fine rose-red colour. This reaction was yielded more strikingly by the precipitates themselves. To isolate this substance the first precipitate (with neutral acetate of lead) was washed, suspended in water, decomposed by sulphuretted hydrogen and the filtrate from the sulphide of lead evaporated to dryness in the water-bath. The powdered extract was then boiled with absolute alcohol and filtered. On cooling a pale reddish substance was deposited which was filtered off, washed with alcohol and dried. The filtrate was mixed with ether, which caused the separation of pale red coloured flocks, which were collected on a filter, washed with ether, and immediately placed in an exsiccator. This substance was so hygroscopic that, on the evaporation of the ether, it ran to a clear dark red liquid which dried to a brick-red easily powdered mass. It was also obtained in ruby coloured scales, but all attempts at crystallization prove futile.

The filtrate from this precipitate yielded, on the further addition of ether, a second filtrate differing only from the first in being of paler colour. Nitrogen could not be detected in them.

The first precipitate dried over sulphuric acid was subjected to ultimate analysis.

0·5340 gram lost by drying at 110° 0·0355 moisture = 6·64 per cent.

0·1340 gram yielded 0·0005 gram ash = 0·37 per cent.

0·2282 dry substance calculated free from ash yielded on combustion with oxide of copper in a stream of oxygen—

$H_2O = 0·1093$ gram   H = 5·32 per cent.
$CO_2 = 0·4663$ „   C = 55·70 per cent.

0·2516 yielded—

$H_2O = 0·1283$ gram   H = 5·66 per cent.
$CO_2 = 0·5080$ „   C = 55·06 per cent.

	I.	II.	Mean.
C =	55·70	55·06	55·38
H =	5·32	5·66	5·49

These analyses correspond tolerably well to the formula $C_{25}H_{28}O_{13}$ which requires—

C = 55·97 found C = 55·38
H = 5·22 „ H = 5·49

Of the second precipitate—

0·2255 substance free from ash yielded—

$H_2O = 0·1165$ H = 5·73
$CO_2 = 0·4298$ C = 51·97 per cent.

The formula $C_{25}H_{28}O_{13}2H_2O$ requires—

C = 52·44 found 51·97
H = 5·59 „ 5·73

The small quantity of this precipitate at my disposal allowed of only one analysis being made.

The following method of procedure was attended by a better yield of this substance, to which we may preliminarily give the name of "cyclopin."

The aqueous decoction of 290 grams of the cut stalks and leaves was digested for several hours with precipitated and washed hydrate of lead, and filtered off from the voluminous yellowish-brown precipitate which had formed. This was washed by suspension in water and filtration; the filtrates were evaporated to a small bulk by distillation in a partial vacuum, and finally to a syrup over sulphuric acid under diminished pressure. The further treatment of this residue will be subsequently described.

The precipitate was suspended in dilute spirit (about 50 per cent) and decomposed by sulphuretted hydrogen, warmed to promote the subsidence of the lead sulphide and filtered. The deep red-brown filtrate was evaporated to a small bulk by distillation in a partial vacuum, filtered and finally brought to a syrupy consistence over sulphuric acid under diminished pressure This was then treated with absolute alcohol so long as a precipitate occurred. This was filtered off, washed with alcohol and dried. It will be described subsequently as "substance difficultly soluble in alcohol."

The alcoholic filtrate, measuring 200 c.c., was mixed with an equal volume of ether, the precipitate (I.) allowed to subside, filtered off, washed with ether and dried over sulphuric acid under diminished pressure. The filtrate was again mixed with 200 c.c. of ether and the precipitate (II.) similarly treated. The filtrate from this precipitate was mixed with 400 c.c. ether and the precipitate which formed (III.) similarly treated. Of these precipitate No. III. separated in pale reddish flocks, Nos. I. and II. somewhat darker. No. I. contained also an appreciable admixture of the substance difficultly soluble in alcohol.

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* Dragendorff 'Werthbestimmung.'

† *Pharm. Zeitschrift für Russland*, 1872, vol. xi., p. 712.

Further smaller quantities of these precipitates were obtained from the sulphide of lead by boiling with alcohol, filtering and precipitating with ether.

The ether alcohol filtrate deposited no crystals on exposure during a night to a temperature of—22° C. It was then evaporated by distillation. During this process a substance separated out in minute sulphur-yellow acicular crystals. It was filtered off, washed and dried; it proved to be insoluble in bisulphide of carbon, soluble in hot water and in alkalies, yielding with the latter a yellow solution with green fluorescence. By continuing the evaporation of the filtrate more of this interesting substance was obtained. It will be described subsequently as "cyclopiofluorescin." The ether-alcohol filtrate was finally brought to dryness; it still contained cyclopin, but it was not considered worth while attempting its further isolation.

Filtrate from Hydrate of Lead.—This was treated with absolute alcohol so long as a precipitate was formed, the latter filtered off, washed and dried. It formed a yellowish substance easily soluble in water. The aqueous solution gave with Fe_2Cl_6 a deep brown coloration, solution of gelatine and acetate of copper no reaction, solution of nitrate of barium a precipitate soluble in dilute nitric acid. Boiled with hydrochloric acid the pink colour characteristic of cyclopin made its appearance.

The alcoholic filtrate mixed with baryta-water yielded a bright yellow precipitate which a current of carbonic acid failed to free from barium. In these substances we probably have to deal with indifferent substances or peculiar organic acids, not precipitated by lead. The quantity at my disposal was not sufficient to allow of a closer examination.

Cyclopin.—Precipitate III. was free from nitrogen and yielded on combustion the following results:—

0·2116 gram substance dried at 110°, containing 0·0043 gram ash gave—

$H_2O = 0·1090$ H= 5·84 per cent.
$CO_2 = 0·4108$ C= 54·04 per cent.

It contains, therefore, rather more moisture than the sample first analysed and corresponds closely to the formula $C_{25}H_{28}O_{13}, H_2O$ which requires—

C= 54·41 found 54·04
H= 5·77 „ 5·84

I take these differences in composition to be chiefly due to the tenacity with which the substance retains moisture.

On boiling with a mineral acid (sulphuric or hydrochloric) the aqueous solution of cyclopin assumes a fine red colour, and deposits, on standing, red brown flocks. The filtrate boiled with Fehling's solution reduces the same, and (as shown in a subsequent experiment with the substance difficultly soluble in alcohol which undergoes a similar decomposition) contains a substance capable of passing into fermentation in contact with yeast. Cyclopin is therefore a glucoside. To determine the amount of sugar produced by its decomposition 0·4788 gram containing 0·0108 gram ash and 0·0336 moisture was boiled for three hours with 25 c.c. normal hydrochloric acid, allowed to cool, and the filtrate made up to 100 c.c. 25 c.c. boiled with a moderate excess of Fehling's solution[*] yielded 0·0830 gram CuO. In a second experiment 23 c.c. yielded 0·0790 gram CuO. The mean result is equivalent to, in 100 c.c., 0·1528 gram grape sugar = 34·31 per cent.

The decomposition-product, which we may call cyclopia-red, washed and dried weighed 0·1975 gram. The filtrate still contained a notable proportion in solution which, by evaporating a measured quantity, drying at 100°, weighing and deducting the sugar found, I estimated approximately at 0·093 gram, making in all, 0·2910 gram or 65·4 per cent. 0·1667 gram of this substance, which was free from nitrogen and contained but a trace of ash, yielded on combustion—

$H_2O = 0·0775$ H= 5·16 per cent.
$CO_2 = 0·3361$ C= 54·98 per cent.

corresponding tolerably well to the formula $C_{19}H_{22}O_{10}$, which requires—

C= 55·60 found 54·98
H= 5·36 „ 5·16

The decomposition of cyclopin on boiling with a dilute mineral acid may be represented by the following equation:—

$$C_{25}H_{28}O_{13} + 3H_2O = C_{19}H_{22}O_{10} + C_6H_{12}O_6.$$

This equation requires that 100 parts of cyclopin should yield 33·5 parts sugar and 76·4 parts cyclopia-red. I have found 34·3 per cent. sugar and 65·4 per cent. cyclopia-red.

Cyclopin is insoluble in benzol, ether, petroleum ether, chloroform and bisulphide of carbon, but very easily dissolved by water. In pure concentrated sulphuric acid it dissolves with a red-brown colour. Fröhde's reagent produces an intense violet-red, which, however, is not very permanent. The aqueous solution is coloured deep brown-red by potash and shows then a marked fluorescence in green. The neutral solution gave the following reactions:—

Fe_2Cl_6, dark olive-green colour, acidified by HCl, yellowish, made alkaline with AmHO, dark brown.
Cu2A, dirty brown precipitate.
Pb2A, a slight yellowish precipitate.
$AgNO_3$, a precipitate insoluble in HNO_3, soluble in AmHO.
Sol. of gelatine }
$HgCl_2$ } produced no change.
Sol. of tartar emetic }
$K_2Cr_2O_7$ with HCl, brownish-red coloration.

Dilute hydrochloric and sulphuric acids seem to be the only acids capable of splitting up the glucoside into its components. Phosphoric, acetic and tartaric acids produce no red colour when boiled with it.

Cyclopia-red differs materially from cyclopin in its difficult solubility in water. Freshly precipitated it is much more easily soluble in alcohol than after it has been dried. Ether dissolves but very small quantities; petroleum ether, chloroform and benzol still less. With caustic alkalies it readily yields deep wine-red solutions. Ferric chloride turns the aqueous solution brown, neutral and basic acetates of lead cause a cloudiness. The ammoniacal solution yields with chloride of calcium and alum solutions deep violet, flocky precipitates.

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[*] Titration was impossible owing to the very intense colour produced by the alkali with the small quantity of decomposition product still in solution.

Stenhouse[*] found that when a decoction of the leaves of *Cyclopia latifolia*, prepared with milk of lime, is subjected to distillation with MnO_2 and H_2SO_4 traces of quinone were evolved, whence he concluded that cyclopia contained a principle allied to, or identical with, the quinic acid of cinchona bark. I have applied this test to cyclopin as well as the other substances isolated, also to the aqueous extract itself, but failed to obtain evidence of quinone, although that body was readily yielded in a parallel experiment with quinic acid and quinate of lime.

In close relation to cyclopin may be mentioned the tannic acids present in cinchona and cinchona nova bark.

The formula for cinchonatannic acid appears to be not yet definitely fixed. It is described[†] as a very hygroscopic, light yellow, amorphous substance, easily soluble in water, spirit and ether, splitting up on boiling with dilute acid into sugar[‡] and cinchona-red, which latter, though almost insoluble in water, dissolves easily in spirit and ether. For this cinchona-red Schwarz[§] found the composition 53·6 and 55·4 per cent. carbon and 5·4 and 5·7 per cent. hydrogen, according to the manner of preparation. Rembold found 57·5 per cent. C. and 3·9 per cent. H. The cyclopia-red which I have analysed approaches more nearly to Schwarz's figures, viz., 54·97 per cent. C., 5·16 per cent. H., but the small quantity at my disposal did not allow of a second analysis. Both cinchonatannic acid and cinchona-red may be easily distinguished from cyclopin and cyclopia-red by the insolubility of the latter two in ether.

Like the foregoing, the tannic acid isolated by Hlasiwetz[‖] from false cinchona bark (*Cinchona nova*, s. *Surinamensis*) yields, on decomposition with dilute sulphuric acid, together with sugar, a red substance difficultly soluble in water,[¶] but differs materially from cinchonatannic acid in not precipitating gelatine and tartar emetic solutions. The formula assigned to it by Hlasiwetz, $C_{14}H_{18}O_8$, calculated to C_{26}, gives $C_{26}H_{32}O_{14}$, or cyclopin $+ H_2O$. The decomposition product, cinchonanova-red, possesses the formula $C_{12}H_{12}O_5$ (Hlasiwetz), which very nearly corresponds to $C_{19}H_{18}O_8$, or cyclopia-red minus $2H_2O$. Indisputably cinchonatannic and cinchonanovatannic acid stand in close relationship to cyclopin. The first-named is characterized by its precipitating gelatine and tartar emetic solutions, a property shared by cinchona-red and cinchonanova-red, but not by cinchonanovatannic acid, cyclopin or cyclopia-red.

The absence of this power of precipitating gelatine from its solution and the want of any marked astringent taste caused me to hesitate classing it with the tannins and giving it the name of cyclopiotannic acid, but in calling the decomposition-product cyclopia-red I think to indicate its relation with other substances (some of them undoubtedly tannins) which, on boiling with a dilute mineral acid, yield similar decomposition products (cinchonatannic acid, etc.).

The tannic acid isolated by Rochleder[**] from the bark and twigs of the horse-chestnut tree dissolves in ether, gives a precipitate with gelatine solution and on boiling with a dilute mineral acid yields a red decomposition-product which possesses the formula $C_{26}H_{22}O_{11}$ or $C_{26}H_{20}O_{10}$. Rhataniatannic acid and rhatany-red possess similar properties. Catechutannic acid is likewise soluble in ether and precipitated from its aqueous solution by gelatine. Tormentilltannic acid yields a red decomposition-product without perceptible formation of sugar.[*]

Substance difficultly Soluble in Alcohol. — This formed a pale red, easily powdered substance, readily soluble in warm water, with difficulty in alcohol. Dried over sulphuric acid it contained 1·43 per cent. moisture, dispelled at 110°, and 4·83 per cent. ash, principally phosphate of calcium. It was free from nitrogen.

0·3208 dry substance (containing 0·0157 ash) yielded on combustion—

H_2O 0·1482 gram H = 5·40 per cent.
CO_2 0·5655 gram C = 5·56 per cent.

This corresponds to the formula $C_{25}H_{30}O_{16}$, which requires—

C = 51·19 found 50 65
H = 5·11 „ 5·40.

On decomposing by boiling with dilute acid 0·4907 gram, containing 9·17 per cent. moisture and 6·08 per cent. ash, equivalent, therefore, to 0·4158 gram dry substance free from ash, yielded suger 0·1182 gram = 28·4 per cent. and decomposition-product approximately 77·9 per cent. This decomposition-product washed and dried contained 0·28 per cent. ash.

On combustion with oxide of copper in a stream of oxygen, 0·2351 gram dry substance, containing 0·0006 gram ash, yielded—

H_2O = 0·1060 H = 5·02 per cent.
CO_2 = 0·4377 C = 50·90 per cent.

0·2760 gram, containing 0·0007 gram ash, yielded—

H_2O = 0·1205 H = 4·86 per cent.
CO_2 = 0·5187 C = 51·36 per cent.

	I.	II.	Mean.	$C_{19}H_{22}O_{12}$.
H =	5·02	4·86	4·94	4·97
C =	50·90	51·36	51·13	51·58

As seen, the analyses correspond to the formula, $C_{19}H_{22}O_{12}$. The following equation may therefore represent the decomposition:—

$$C_{25}H_{30}O_{16} + 2H_2O = C_{19}H_{22}O_{12} + C_6H_{12}O_6.$$

This equation requires that 100 parts of the glucoside should yield 75·4 decomposition product and 30·7 sugar. I have found 77·9 and 28·4. Considering the difficulties which stand in the way of the estimation of the decomposition product, these figures must be regarded as tolerably satisfactorily agreeing.

Comparing the formula for this decomposition-product with that of cyclopia-red, it will be seen to differ only in possessing O_2 more. This difference is accompanied by a corresponding difference in the formula of the mother-substance, and if that be written $C_{25}H_{28}O_{15},H_2O$ this parallelism becomes at once evident, and here we may find the reason why in the first instance three molecules of water are combined, in the second only two, the third being present in the mother-substance itself. In accordance with the formulæ, I have, for brevity's sake, called these substances oxycyclopin and oxycyclopia-red.

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[*] *Ann. Chem. Pharm.*, xxvii., 257.

[†] Husemann, 'Pflanzenstoffe," 1871, p. 846.

[‡] Rembold, *Ann. Chem. and Pharm.*, cxliii., 270.

[§] Quoted by Rembold, *loc. cit.*

[‖] Husemann, *loc. cit.*, p. 846.

[¶] Rembold, *loc. cit.*, p. 273.

[**] Husemann, 'Pflanzenstoffe,' p. 733.

[*] Husemann, *loc. cit.*, p. 698.

The reactions of oxycyclopin are very similar to those yielded by cyclopin, but the green fluorescence so distinct in alkaline solution of the latter is with oxycyclopin imperceptible.

The Cyclopiofluorescin consisted of pale sulphur-coloured masses, seen under the microscope to consist entirely of slender needle-shaped crystals, and containing no nitrogen, sulphur or ash.

0·2150 gram dry substance yielded on combustion—

H_2O = 0·0930 H = 4·80 per cent.
CO_2 = 0·3419 C = 43·36 „

0·2000 gram yielded—

H_2O = 0·0878 H = 4·87 per cent.
CO_2 = 0·3290 C = 44·86 „ *

	I.	II.	Mean.	$C_{14}H_{18}O_{12}$.
C =	43·36	44·86	44·11	44·44
H =	4·80	4·87	4·83	4·76

The mean of the two analyses agrees with the formula $C_{14}H_{18}O_{12}$.

This body is difficultly soluble in cold water, more easily in boiling. In alcohol and ether, cold or hot, almost insoluble, in solutions of caustic alkalies readily with production of a yellow solution with fine green fluorescence, recalling that shown by uranium glass.

Moistened with pure concentrated sulphuric acid it dissolved with a yellow colour, Fröhde's reagent was likewise coloured yellow. In contact with concentrated nitric acid the yellow colour is changed instantly to a dark almost black tint, which turns gradually brownish.

In aqueous solution the following reactions were shown:—

Fe_2Cl_6 dark green. Heated passes to a red-brown.

HNO_3 (concentrated, and in considerable quantity), deep red, passing to yellow.

Pb2A
Pb2APbO } cloudiness.

Cu2A dirty greyish precipitate, increased on boiling.

$K_2C_2O_7$ and HCl, dark brown red.

It is not volatile without decomposition.

To the cyclopiofluorescin is due the green fluorescence which is observed when a section of the leaf is moistened with caustic potash.

The residue of the drug after treatment with water was macerated several days with absolute alcohol, filtered, the tincture evaporated to a small bulk and diluted with water. A precipitate occurred which filtered off, washed and dried, formed a dark coloured mass. It was almost entirely dissolved by ether and chloroform, yielding dark green solutions containing chlorophyll and a soft resinous substance, probably also small quantities of fat. The substance insoluble in chloroform and ether was dissolved by alkalies, forming a red-brown solution, and probably belonged to the class of phlobaphenes; possibly it contained cyclopia-red.

The filtrate, after precipitation with water, contained cyclopin and a substance which in alkaline solution showed a dark green fluorescence. The quantity at my disposal was not sufficient to induce me to attempt their isolation.

If the residue, after extraction with alcohol, be macerated with dilute solution of potash, a dark brown infusion is obtained, which does not fluoresce, and which, when acidified, throws down a flocky brownish precipitate. Its examination I was compelled to defer.

To obtain an insight into the quantitative composition of the leaves and stalks for the purpose, partly, of allowing of a comparison with ordinary tea, the following few experiments were made:—

I. Moisture and Ash.

0·8780 gram powdered leaves lost at 110° C. 0·1795 gram = moisture 20·44 per cent. On incineration 0·0325 gram ash was left = 3·70 per cent.

1·8655 gram stalks yielded moisture 0·1385 gram = 7·42 per cent., and ash 0·0150 = 0·80 per cent.

The ash consisted principally of carbonates of potash and lime, with traces of sulphates, chlorides, phosphates and iron, together with a little silica.

II. Substances Soluble in Water.—10 grams of leaves were digested with 100 c.c. of water for twelve hours on the water-bath, then allowed to stand thirty-six hours, frequently shaken, and finally the evaporated water replaced.

10 c.c. left residue 0·3165 = 31·65 per cent., and contained ash 0·0120 = 1·20 per cent. Organic substances dissolved by water 30·45 per cent.

10 grams of stalks were similarly treated. 10 c.c. left residue 0·1635 = 16·35 per cent., and contained ash 0·0080 = 0·80 per cent. Organic substances dissolved by water 15·55 per cent.

III. Metarabin (?).—1·8958 gram leaves after maceration with water, were treated for thirty-six hours with 100 c.c., 0·05 per cent. solution of soda. This proving too weak, the residue was macerated for thirty-six hours with 100 c.c. 0·5 per cent. solution of soda. 20 c.c. of each filtrate were mixed together, acidified with acetic acid and precipitated with 120 c.c. alcohol. The precipitate, after twenty-four hours' standing, collected, washed with alcohol, dried and weighed, incinerated, and the ash weighed and deducted, gave metarabin (?) 0·0247 = 6·51 per cent.

The estimation of nitrogen was attended by the following results:—

0·866 gram dry leaves yielded N. 0·01988 = 2·29 per cent.

1·026 gram dry leaves after extraction with water yielded N. 0·03066 = 2·08 per cent. (calculated on dry leaves).

0·5008 gram dry leaves after extraction with water and soda solution yielded N. = 0·01498 = 1·62 per cent.

0·4575 gram dry leaves after extraction with water and soda solution yielded N. = 0·01400 = 1·65 per cent.

0·8365 gram dry stalks yielded N. = 0·00595 = 0·71 per cent.

0·9142 gram dry stalks after extraction with water N. = 0·006510 = 0·59 per cent.

Very small quantities of nitrogen therefore pass into aqueous solution, and the "tea" so made must be almost entirely destitute of any nourishing property.

The following table shows the Cape tea compared with ordinary tea, as far as the above experiments allow:—

		In Percentage.	
		Tea from *Thea*.	Tea from Cyc opin.
Moisture	from	8·0 to 12·0	20·4
Ash	„	4·5 „ 5·5	3·7
Substances soluble in water	„	30·0 „ 33·0 (seldom exceeded)	30·4
Total Nitrogen . .	„	4·15 to 6·72	2·29
Mucilaginous substances	„	5·3 „ 6·4	!

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* In respect to the percentage of carbon, these two analyses do not show a satisfactory agreement. Want of material unfortunately prevented me from repeating the combustion.

As is seen, the substances dissolved by water show a close agreement, while the total nitrogen in ordinary tea is far in excess of that in Cape tea.

Before concluding, I must express my regret that the small quantity of material at my disposal prevented me carrying the investigation further.

Even when material is abundant, such substances as cyclopin, uncrystallizable, hygroscopic and easily decomposed, are difficult to obtain in the pure state, and I do not think that in the foregoing analyses that has as yet been satisfactorily attained. The formulæ assigned to the various substances isolated and equations for their decomposition have been given with the object of showing their approximate composition, and allowing of a comparison with other similar bodies. Should the substances be subsequently obtained in a greater state of purity, alterations in these formulæ and equations will probably be found necessary. In two instances I have been obliged to content myself with one combustion (cyclopia-red and oxycyclopin). So far it is certain, that Cape tea (*Cyclopia longifolia?*) contains—

(1). A glucosidal substance similar to cinchononovatannic acid, and undergoing, when boiled with dilute mineral acid asimilar decomposition, yielding a substance bearing a close resemblance to cinchononova-red.

(2). A crystalline substance which in alkaline solutions possesses a green fluorescence.

(3). That a third substance analogous to cyclopin (probably an oxidation product) may be obtained, undergoing a similar decomposition.

Should an opportunity present itself, I trust to be able subsequently to continue the investigation of these substances, which, with larger quantities at my disposal, and in a greater state of purity, would undoubtedly yield interesting results.

Dorpat, Russia.

CHEMICAL MECHANICS.[*]

BY C. DE MARIGNAC.

On witnessing the calorific effects which accompany the act of chemical combination, chemists have at all times sought to determine the relations which exist between these two classes of facts; on the one side, affinity, considered as the cause of all chemical combination; and, on the other side, the heat produced when this combination takes place.

A century ago, Lavoisier explained this relation, by assuming that simple bodies are only known to us in a state of union with a certain quantity of caloric, which is set at liberty when these bodies enter into chemical combinations. Having his attention more exclusively attracted to the phenomena of combustion, he attributed this too exclusively to oxygen. Later, it was admitted for all the elements.

The brilliant discoveries of Davy, on the chemical decompositions effected by the galvanic current, gave rise to the electro-chemical theory, proposed by this scientist, and afterwards adopted and modified by Ampére and Berzelius, which caused heat and affinity to be looked upon in an entirely new light. According to this theory, affinity is merely the reciprocal attraction of the opposite electricities, which exist in either a free or a polarized state in the elements which tend to combine, and the heat observed in chemical combinations results from the mutual neutralization of these electricities.

When chemists abandoned the electro-chemical theory, they returned to the system previously adopted, admitting at the same time, the pre-existence of caloric in all the elements. But, about this time, an important revolution took place in the physical sciences; heat and electricity ceased to be considered as material fluids, combined more or less intimately with ponderable bodies, and came to be regarded as modes of motion. The discoveries of Mayer, of Golding, of Joule, had demonstrated the mechanical equivalent of heat. This new doctrine necessarily modified the ideas entertained by chemists concerning the origin of the heat and the electricity evolved in chemical reactions, and led them to consider these manifestations as complementary to one another, and as resulting from the loss of molecular impetus attending the act of combination.

Vast erudition, and long bibliographical researches, would be necessary, to follow this change of doctrine, and to apportion to each scientist the share which he had in it. We may, however, cite the memoir of M. Henri Sainte Claire Deville (1860), and those of Babinet (1866).

A Danish chemist, Mr. Thomsen, whose labours have greatly contributed to the progress of thermo-chemistry, published in 1853 a series of memoirs,[*] in which he explained the principles of this new science. Without deriving them explicitly from the mechanical theory of heat, he expresses the basis on which they rest in terms which recall this theory. He founds them on the two following principles:—

1st. The intensity of chemical energy in a given body is constant when the temperature is invariable.

2nd The totality of the heat given out in a chemical reaction is the measure of the chemical energy brought to bear in this reaction.

The chemical energy of a body, or, what is identical, its capacity of developing heat, is what Mr. Thomsen calls its thermo-dynamic equivalent.

Mr. Thomsen has since tried to show that all the laws of thermo-chemistry subsequently established by M. Berthelot, were derived from the second of these principles. It is true that they may be considered as consequences of it, but only by including conditions and restrictions which are not found in the statement of this principle. The best proof of this is that fifteen years later,[†] when Mr. Thomsen attempted to establish an agreement between his principles and the manner in which bases and acids are divided in a mixture of salts, he had to introduce a new force, avidity, which is an inherent property of these bodies, and in which it is difficult to find anything different from chemical affinity under another form, independent of that which is measured by the heat given out in combinations.

It is in reality to M. Berthelot that the honour belongs of having stated with perfect precision the fundamental principles of thermo-chemistry, and, above all, of having shown, by a prolonged and numerous series of experiments, that these principles are sufficient to account for all chemical reactions.

Gifted with an eminently philosophical spirit; deeply versed in mathematics and in the physical sciences; trained to the most extended researches by his labours on chemical synthesis, this scientist was better able than anyone else to accomplish the task to which he has devoted himself, which is to show the application of the principles of mechanics to the formation of organic compounds, and even to chemical reactions generally.

For this, it was not sufficient merely to determine the heat given out in chemical reactions. A not less important portion of the labours of M. Berthelot has been the study of the conditions under which such reactions take place, and more specially the study of the chemical equilibrium which results from two contrary reactions, which are reciprocally limited. This happens in the formation of ethers, in decompositions and inverse recombinations produced by electricity, etc.

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[*] Being a Review of Berthelot's "Essai de Mécanique Chimique, fondée sur la Thermo-Chimie," published in the 'Archives des Sciences Physiques et Naturelles.' From the *Journal of the American Chemical Society*.

[*] *Pogg. Annal.*, 88, 349; 90, 261.

[†] *Pogg. Annal.*, 136, 65; also *Archives*, 1869, 36, 301.

Through the study of these subjects, the author was led to new and important results in a branch of chemical mechanics, already intimated at the beginning of this century by Berthollet, under the name of chemical statics. He has shown that the theory of Berthollet, by which we are enabled to foretell chemical phenomena from the mere knowledge of the physical conditions of insolubility and volatility, has no foundation, except when there already exists a previous equilibrium, which constantly tends to renew itself. But the permanency of this equilibrium, and even its existence, are dependent on a still more general condition, which had never before been pointed out, and which has been defined in the principle of maximum work laid down by M. Berthelot.

These researches have taken sixteen years—since 1864. The results have been given in numerous memoirs, published in the *Annales et Chimie et de Physique.* M. Berthelot acknowledges the great help he has had from the labours of his predecessors: Hess, Graham, Andrews, Favre and Silbermann, and in the numerous series of numerical determinations of the quantities of heat given out in combinations, made by Mr. Thomsen, which are generally remarkable for their accuracy.

The subject is not exhausted, and will not be for many years, but M. Berthelot thinks that the time has come for him to state the laws and general principles, the search of which has led him to this long series of experiments, and to show in what manner the ideas recently acquired on the theory of heat allow us to bring the whole of chemistry, that is, the formation and reactions of organic as well as of mineral substances, under the same principles of mechanics which govern other branches of physics; whence the title of 'Essay on Chemical Mechanics founded on Thermo-chemistry,' given by the author to the work which we are reviewing.

In his introduction, M. Berthelot states the three fundamental principles of thermo-chemistry and chemical mechanics, viz:—

I. *Principle of Molecular Action.*—The quantity of heat given out in any reaction is the measure of the sum of the physical and chemical work accomplished in this reaction.

This principle gives the measure of chemical affinities.

II. *Principle of the Calorific Equivalence of Chemical Transformations*, or, in other words, *Principle of the Initial and Final State.*—If a system of simple or compound bodies, taken in determinate conditions, suffers physical or chemical changes capable of bringing it to a new state, without giving rise to a mechanical effect exterior to the system, the quantity of heat given out or absorbed by the effect of these changes, depends solely on the initial and final states of the system; it is always the same, independently of the nature and sequence of intermediate states.

III. *Principle of Maximum Work.*—Every chemical change accomplished without the intervention of a foreign energy, tends toward the production of the body, or system of bodies, which gives out the greatest quantity of heat.

The prevision of chemical phenomena is, by this last principle, brought down to the purely physical and mechanical idea of the maximum labour accomplished by molcular action.

The following principle, deduced from the preceding, is applicable to a multitude of phenomena:—

Every chemical reaction, which may be accomplished without the help of a preliminary action, and apart from the intervention of any energy foreign to the bodies present in the system, will necessarily take place if it be attended with evolution of heat.

The two first principles, above given, had not heretofore been stated in such precise terms, but it may be said that they had been implicitly admitted by the previous investigators in thermo-chemistry. It was, however, M. Berthelot, who first called attention to the principle of maximum work, which is the basis of chemical statics.

In the statements made above, we may note the particular care taken by the author in distinguishing, in the calculations of reactions, the heat given out by chemical reactions, properly so called, from that due to change of state, and which is derived more specially from physical energies, such as the liquefaction of gases, the solidification of liquids, changes of volume and of specific heats of gases, of liquids and solids; changes of tension in vapours, and of fluidity in liquids, of crystallization and of crystalline form in solids; also various modifications of the amorphous state.

It is indeed only on the condition of keeping account of all these circumstances, and of eliminating the share of all these physical causes, that we are able to ascertain that the heat given out in a reaction is the exact measure of the affinities brought into play.

The first volume of M. Berthelot is specially dedicated to chemical calorimetry, which is the study of the quantities of heat given out in chemical reactions. It forms the exposition and confirmation of the first two principles stated above.

These principles cannot be demonstrated *à priori.* They are founded on a hypothesis, in itself very probable, that the imperceptible molecular motions developed in chemical reactions obey the same laws as the motions of mechanical motors, which may be seen and measured. The accuracy of this hypothesis can only be established by long series of experiments, and by the constant conformity of the results obtained with those foreseen by theory.

The first volume is divided into three books. The first book develops the rules and general methods of chemical calorimetry. The author reviews the various reactions, combinations of elements, formation of salts, etc. He gives the calculations for each case, also gives rules for taking into account all the physical actions which intervene in these reactions, and shows, by numerous examples, the agreement of experience with fundamental principles established by him.

One chapter is devoted to the quantities of heat which come into play in the reactions which take place in living beings. Another chapter treats of the variation of the heat of combination as influenced by temperature.

The second book contains descriptions of experimental processes and of calorimetric apparatus, for the determination of the quantities of heat given out in chemical reactions, of specific heats, and of the heat due to changes of state.

The great experience of the author gives a special interest to this description of the methods and apparatus used by him, in which he has succeeded in uniting simplicity with accuracy, and in which he has tried to eliminate or, at least, to reduce as much as possible, the corrections made necessary by the influence of exterior causes.

The third book is devoted to numerical tables. It includes numbers obtained by experiment, representing the quantities of heat given out or absorbed during physical or chemical changes of state which these bodies undergo in the operations of our laboratories. It therefore contains, besides results of thermo-chemical experiments, all the data relating to specific heats, and to changes of state (latent heats). It forms an extensive and exceedingly useful compendium of the labours of all the scientists who have studied these questions. We also find in this portion very interesting discussions on numerous theoretical questions suggested by the examination of the results. We may cite more specially those which relate to specific heat.

M. Berthelot states that the specific heat is the only physical property by which simple gases differ from compound gases. This property, however, is sufficient to establish between these two groups such an important difference, that it is impossible to suppose that any of the gases, now considered as simple, results from the union of several other elements, such as we admit them at the present time, or from the condensation of several equivalents of the same element. This union or condensation must be understood to be comparable to that which gives rise to compound bodies, such as are now known to us. Simple gases differ from all compound gases formed with condensation, by the constancy of their specific heat, while for these last, the specific heat increases rapidly with the temperature, and always exceeds in a notable manner, at all temperatures, that of simple gases. They also differ from compound gases, formed without condensation of their elements, such as hydrochloric acid and carbonic oxide (corresponding to four volumes, according to the system of notation of the author), whose molecular specific heat is equal to that of simple gases, and also remains constant at all temperatures, by the fact that the molecular volume always corresponds to one equivalent for these compound gases, while it represents two or four equivalents for all the known elements.*

In the chapter relating to specific heats of solid bodies, occur very interesting observations on the law of Dulong and Petit,† and on the relations which exist between the specific heats of compound bodies and those of their elements.

The second volume of the work of M. Berthelot, is specially dedicated to establishing the bases of chemical mechanics.

The object at which the author aims is the highest that science can propose to itself. Instead of confining itself to the individual description of the properties, the preparation and transformations of chemical species, science must endeavour to discover the laws governing these transformations; the causes and proximate conditions which determine them. The complete solution of this problem of chemical mechanics is not yet possible, and will not be possible for many years. To solve it, we should know, in every reaction, the masses of the particles brought into play, their relative positions, the proper motions of each particle, the exact nature, and the laws which govern the forces which react on each other. Most of these data are wanting, and even if they were known, it is doubtful if any method of calculation would allow us to solve such a complicated problem.

However, some portions of the problem may be attempted. Since a long time, all that relates to the proportions in which combinations take place is known by the laws of definite proportions, of multiple proportions, and of equivalents. As to the prevision of reactions, we have only had the laws laid down by Berthollet at the beginning of this century. These only apply to special cases and meet with frequent exceptions. M. Berthelot replaces them by a more general law, by which the prevision of the reciprocal actions between simple and compound bodies is reduced to the determination of the thermic properties of the reacting bodies. We may by this new law foresee the reciprocal actions of compounds towards one another and towards simple bodies, when we know the quantities of heat given out in the formation of each compound. This new law is no other than the third principle of the author, which has already been stated, the law of maximum work.

Whence the division of this volume in two parts:

The first treats of what may be called chemical dynamics. It is the study of combination and decomposition, and contains definitions of the opposing actions, on one side, of chemical forces, and on the other side, of calorific, luminous and electric energies, which determine the phenomena. In this way, the conditions are laid down which determine the existence and the stability of combinations for each separate body.

The second part is the study of the final state which results from reciprocal actions between simple and compound bodies; this is chemical statics. In this part comes into action the principle of maximum work, which is as remarkable for its simplicity as for its generality. It brings everything down to the knowledge of two things: the heat given out by the transformations, and the stability which belongs to each compound.

The author demonstrates the existence of this principle, by the discussion of the general phenomena of chemistry; afterwards, he develops the application of it to the reciprocal actions of the principal groups of substances, such, for instance, as take place between elements and binary compounds; the reciprocal displacement of binary compounds, and specially of hydracids, when opposed to one another or to water; the reciprocal displacements of acids in salts, and, finally, saline double decompositions.

It may be easily understood that it is impossible to give, in a review of this kind, a clear idea of a work of such importance and of such vast extent. We have only tried to give an idea of the subjects treated in it. The theories of M. Berthelot are well known, as they have been developed by him for the last sixteen years in a series of papers which have been read by all chemists. Nevertheless, the present work forms an important epoch in the history of chemistry, and shows the necessity of transforming its methods. In the future, it will not be sufficient to state the reactions of which a body is susceptible, as if they were mere experimental data. It will be necessary to derive them from the general principles, of which these reactions are consequences. Doubtless, the edifice of chemical mechanics, whose foundations have been laid by M. Berthelot, cannot be considered as complete. Sixty years ago, the laws which govern chemical proportions were established, and nevertheless, the numbers which represent equivalents have frequently to be rectified. We may expect that those which express the quantities of heat of combination, or transformation, will also require change, more especially, as many of them cannot be determined directly by experiment, but result from complicated calculations in which a great number of reactions have to be taken into account.

There are, moreover, many theoretical questions of the highest importance, the solution of which is at present beyond our reach.

If the heat given out in the combination of two bodies is the immediate consequence of the loss of momentum which comes from the union of their particles, and if it measures at the same time their mutual affinity, what then is the first cause of affinity? Is it a special force as was once believed? Or is it the concordance in the vibratory motions of the particles?

Those combinations which are attended with evolution of heat are the only ones which can take place directly; but they do not always take place spontaneously. Many of them must be determined by an exterior cause, such as heat, light, electricity, but these agents do not give to the elements an energy of which they have already an excess. How then do they act?

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* This difference is not so much in the specific heats themselves, as in the relations of molecular volumes to equivalents. In this respect, the reasoning of M. Berthelot does not seem to me unobjectionable. It would be so if the determinations of equivalents rested on fixed rules. But, as he himself acknowledges (introduction, page 21), "equivalents are only determined within an approximation of a multiple," it would only be necessary to change the multiple which has been chosen more or less arbitrarily, for a given body, to change the relation between its molecular weight and its equivalent, which the author regards as characteristics of simple and compound gases. As an instance, it is not clear why M. Berthelot considers the molecular of carbonic oxide, C_2O_2 (four volumes), as representing one equivalent. In the combinations of this gas with oxygen, chlorine and sulphur, it would appear that this quantity rather corresponds to two equivalents.

† Although we acknowledge, with M. Berthelot, that the law of Dulong and Petit, when applied to solids, is not rigorously exact, and that it cannot serve, in an absolute manner, for the determination of atomic weights, still we believe that he exaggerates the exceptions which it suffers, and that it must be taken into account in the case of elements whose physical properties are very similar, as in the case of metals whose fusion points are not very far apart.

These questions, and many others which will come up, cannot fail to exercise for a long time to come the sagacity of chemists. At any rate, an important step has been made towards their solution when it has been shown that the physical and chemical energies which come into play in chemical reactions follow the laws of rational mechanics.

MECONIC ACID.*

BY D. B. DOTT.

Meconic acid is commonly taken as an example of a tribasic acid, the silver salts especially being instanced as proving from their composition the fact of its tribasicity. Dittmar and Dewar ('Proc. Roy. Soc. Edin.,' 1867) endeavoured to decide the question of the basicity of the acid and came to the conclusion, contrary to the usual opinion, that meconic acid is dibasic though triatomic; but their experiments, as they themselves appear to admit, were not conclusive. It may be noticed that only two ethyl ethers of meconic acid have been prepared, and that with aniline and morphia only dibasic salts are produced. Hydromeconic acid, which is formed from meconic acid by the action of sodium-amalgam, yields, likewise, only dibasic salts. These facts militate against the generally received view of the basicity of the acid.

It is, however, the supposed composition of the silver and lead salts of meconic acid that has mainly led to the belief in its tribasic nature. In Watts' 'Dictionary,' and in other works on chemistry, triargentic and triplumbic meconates are described. The triargentic salt is said to be produced by adding nitrate of silver to a neutral solution of ammonium meconate; or by boiling the bibasic salt with water. Wackenroder appears to have been the first to furnish this information. Similarly, by adding acetate of lead to neutral solution of ammonium meconate, the triplumbic salt is said to be thrown down.

I have prepared and analysed these salts in manner as described, and with results which do not bear out the conclusions generally accepted. It would be superfluous to detail all the experiments performed. Suffice it to say regarding the silver salts obtained by precipitation from acid and neutral solutions, that they were of very variable composition, no two precipitates containing the same proportion of silver, and none attaining the percentage required by the triargentic salt. The silver was estimated by igniting the salts, after drying at 110°—120° C. The percentage obtained varied from 35·03 to 55·81. A quantity of argentic meconate was boiled in water for a few hours, then dried and found to contain 56·45 per cent. of silver. Another precipitate boiled for twenty-four hours gave a yield of silver equal to 60·73 per cent. A portion of the same boiled with water for forty hours gave 88·87 per cent. silver.

$$Ag_3C_7HO_7 = 62{\cdot}18 \text{ Ag per cent.}$$

From these results it is evident that the precipitates obtained as above have not the composition of definite salts, but must consist of mixtures. It is also manifest that the meconate of silver when boiled with water gradually suffers decomposition until almost nothing but argentic oxide is left. Of course by stopping the process at the proper time a substance would be obtained yielding the proportion of silver required by a tribasic meconate, but it would be fallacious to conclude that it was anything but a mixture.

The lead salts prepared by precipitation gave a proportion of plumbic oxide varying from 56·21 to 64·77 per cent.

$$Pb_3(C_7HO_7)_2 = 65{\cdot}91 \text{ PbO per cent.}$$

Stenhouse states that he obtained basic meconates of lead, one of them yielding as much as 74·7 per cent. of PbO. I think it likely that it is just this tendency of meconic acid to form basic salts that has given rise to the belief that the acid is tribasic. In the present state of our information, the evidence is in favour of the dibasic nature of meconic acid.

THE MIGRATION OF EUROPEAN ANIMALS TO AMERICA AND OF AMERICAN ANIMALS TO EUROPE.*

BY PROFESSOR E. W. CLAYPOLE, B.A., B.SC. (LONDON),
OF ANTIOCH COLLEGE, OHIO.

The present paper is a sequel to one that appeared in this Society's Report for last year.† I then set forth some facts, more or less well known already, regarding the wholesale migration of European plants to America, and their naturalization here, and the striking failure of American plants to migrate to Europe and to establish themselves there; at the same time suggesting one among several forcible causes which in part explain a fact at first sight so strange.

Having been requested again to contribute to these pages, it seemed to me that a somewhat similar sketch of what has been taking place in another field might not be without use or interest. The occupation of American soil by European weeds and European men is not the only occupation that has taken place. Another invasion of this Western World, to most persons even less conspicuous, has been going on at the same time, and now this country is peopled with a European fauna hardly less numerous than the European flora, to which last year I called attention.

Not that the larger wild animals of Europe have come over and taken possession of American soil. This would be as difficult, I had almost said as impossible, as that European trees should do the same. The obstacles previously mentioned, which stand in the way of the introduction of the forest trees of Europe, equally oppose the introduction of the larger wild animals. But as European weeds have freely crossed and settled here, so have the smaller members of the European fauna—the animal weeds, if I may coin the expression—squatted on Canadian and American soil and obtained citizenship here. In other words, the so-called New World is almost as much a home for European insects and vermin as for European weeds.

Especially is this true of the more injurious and annoying portion of the group. The list is a long one of insects, which, though not native to the continent, have crossed in the trail of man, and stand prepared to steal from the farmer his hard-earned crops as they stole them when both were yet at home in the old country.

It is more than probable that many readers will be surprised to learn that some of the creatures to which reference will be made are not natives of the Western World. They are so common, so familiar, so widespread, and many of them so destructive, that most persons never doubt their home or ancestry, and consider them as truly indigenous as the opossum, racoon and rabbit.

The European fauna gives us more decided proof that its larger members could run wild here if they had the chance than did the European flora. The pig (*Sus scrofa*) was one of the first domestic animals introduced. Wherever the white man settles, this companion of civilization settles with him. But the pig soon escaped from his control, took to the woods and bred there in great numbers, so that about the beginning of this century they might be found wild in many of the Midland States. Their later complete disappearance is due to man. They still abound in many Southern and Western States. The horse (*Equus caballus*) and the ox (*Bos taurus*) were introduced by the Spaniards in the early days of their intercourse with the New World. Escaping, as the hog, these animals too have run wild and multiplied until the plains of Mexico and South America seem naturally the home of the mustang and wild cattle. But though the horse is not a native of this continent, it is both curious and interesting to note that North America can lay claim to his ancestors. The tertiary beds of the Western States have yielded to the labours of Professor Marsh the story of his family ever since the time when he was represented by a fox-like animal, whose five toes all reached the ground and were serviceable for walking, whereas by gradual retrenchment of these organs the horse now stands upon the tips only of middle fingers and toes, the other digits being reduced to mere rudimentary appendages or having altogether disappeared.

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* Abstract of paper read before Royal Society of Edinburgh, January 3, 1881.

* Reprinted from the 'Fourth Report of the Montreal Horticultural Society,' 1878.

† Reprinted in *Pharmaceutical Journal* [3] vol. x., pp. 404 and 464.

Besides these the European black rat (*Mus rattus*), the genuine old Tory rat of England, came over in the "Mayflower," or earlier still, with Jacques Cartier, and creeping ashore along the mooring hawser, crawled out stealthily to see to what kind of country he had come. Finding it a goodly land, with plenty of corn and nuts and few rats, he squatted on it at once with his fellows, and obeyed the command to increase and multiply. In a short time the cellars, granaries and warehouses of Canada and New England teemed with this irrepressible European pest, and the same deadly feud sprang up between him and man as had existed in the Old World from time immemorial. He occupied the whole country as fast as the white man, or perhaps a little faster, going apparently somewhat in advance of him, until North America seemed a perfect rat-paradise, with plenty of food, plenty of room, and few enemies except man.

But the Tory rat had his day—he had his day and ceased to be. The Whig rat—said to have come over to England in the same ship that brought over William of Orange—gradually spread over the whole of the British Isles, fighting down, eating out, or mingling with the old black rat. So complete has been the change that now the so-called Norway or Hanover rat, the brown rat (*Mus decumanus*), is master of the situation, and the black rat, like the Celt before the Saxon, retired to certain fastnesses, such as the Whitechapel docks, where from some natural advantage or other cause, he still holds his own, like the Celt in Wales and Cornwall.

In process of time it came to pass that the Whig or Norway rat also crossed the Atlantic, and took up his abode on these Western shores. Here he found the country occupied just as it had been in England by the rat of opposite political opinions, and the struggle between Whig and Tory, so well known in the political history of the United States, was enacted on another scale, and a lower zoological level, but with similar results. An observing friend of mine, who had moved from Connecticut to Ohio forty years ago, assures me that he has twice outwested the brown rat. On his arrival in this (S.W.) part of the State, the brown rat was unknown, and the ground was entirely possessed by the black rat. Soon after his coming here the former appeared, and the latter in a short time completely disappeared. After a residence of some years this gentleman removed to Illinois, and in so doing again passed beyond the range of the brown rat. But in a few years it followed him, and the same dispossession again occurred. The brown rat invaded the State, and drove the previous occupant still further west. In this way State after State has been overrun, so that it is impossible to doubt that ere long the whole sub-domain of Canada and the States will be as thoroughly held by these vermin as are the subterranean portions of human dwellings in the Old World.

Not as a friend of the rat, certainly, for the two seldom live together, but as an accompanying nuisance, the common mouse (*Mus musculus*) also came over from Europe, and is now as mischievous and annoying here as there. Judging from past experience, these two bid fair to become as cosmopolitan in their distribution as the white man whom they so constantly accompany, and on whose labours they feed and thrive.

Of later importation, and rather designedly than accidentally introduced, is the English sparrow (*Passer domesticus*). This inhabitant of Europe owes his presence to his well-known insectivorous habits. Buffon estimated that a pair of sparrows during the breeding season destroy 4000 caterpillars a week. In this way they greatly assist in keeping down the insect pests of Europe, and have conferred similar advantages on many parts of this country where they have been introduced. "It supports equally well severe cold and extreme heat." Not being migratory, its insect hunting practices continue all the year round, and the full benefit, therefore, is secured. The sparrow is a bold, somewhat intrusive bird, used to city life, city manners and city smoke, and quite capable of holding his own against most other birds of his own size. But in some places where it has been introduced and has done immense good by keeping down or exterminating some of the most destructive of our insect foes, such for instance as the canker worm, these benefits have been forgotten, and the benefactor denounced as a nuisance, not, by the way, an uncommon occurrence amongst men. He is charged with driving away other birds, with making a constant noise which cannot be called musical, and with other heinous crimes deserving capital punishment. Many of these charges are unjust, and could his accusers have their way, the sparrow would soon be avenged by the mischief which his insect food, if uneaten, would do. Says Mr. Galvin, forester to the City of Boston:—

"The introduction of the sparrow was immediately attended with benefit almost beyond calculation. The trees on the Common were infested with a nasty yellow caterpillar which destroyed the leaves and buds of the elms and others. These insects increased very rapidly, in spite of all that my men could do to destroy them, and at the south end the elm trees were eaten every June by swarms of canker worms. Both these pests have been pretty nearly exterminated. But for the sparrow, however, they would return. I believe that the wages of all my men could not compensate Boston for the loss of the sparrow.

"I say, without hesitation, the sparrow does not molest or interfere with any other bird. All summer he is with the robin and bluebird, and I have never witnessed any animosity myself, nor have any of my men. The robins were more numerous on the Common last year than ever before. The chip sparrows have also become very numerous, and may be seen feeding with the sparrows on the same bit of bread. Before the sparrows came there were no bluebirds. Now they are quite common, and often treat the sparrows very badly and break up their nests. The sparrows of course show fight, but the bluebirds are always too strong for them."

I have given this long extract, somewhat condensed, in the hope that it may lead some to remember that the destruction of a benefactor, when a part of his benefit has been enjoyed, is the sure way to bring back the evil he has in part removed. It is killing the goose that laid the golden eggs.

At the same time it is quite possible and would accord with the analogy pointed out in this paper that, in other situations and outside of the cities, this bird may sometimes so increase as to become mischievous. Many of the complaints, however, concerning them must be received with great caution, for even when they are charged with destroying buds, these buds may contain insects, and the little fruit they eat is only a tithe of what they save. Other devices than their destruction may be resorted to, as in England, to protect fruits, etc., from their attacks. The Rev. J. G. Wood says, in his 'Natural History':—

"In every case where the sparrow has been extirpated there has been a proportionate decrease of the crops from the ravages of insects, as in Maine and Auxerre (France)." Let us pause before yielding to the hue and cry now raised in some quarters against the English sparrow. Though at rather undue length on this point, I may add the following: A friend of mine in this neighbourhood, desirous of seeing more birds about his farm, and finding that the canker worm was attacking his white elm and apple trees, bought a dozen young English sparrows at Cleveland, about the year 1872, for 18 dollars, a price which would create some stir among English boys. Nine of them died, leaving three, a cock and two hens. Next year these Mormons built two nests and reared the young. By the end of the following season the family numbered thirty. Not a canker worm has since been seen on the premises. The sparrows were seen devouring them wholesale. They live with the other birds, building in the same cot with the martins, who will sometimes drive them off and break up their nests. The bluebird and chip sparrow are very friendly with them, and no damage has been done in the garden. One American robin or blue jay will do far more mischief among fruit than fifty English sparrows.

But it is time to pass on to the more immediate subject of this paper—the insect immigrants from Europe. Let me mention first a few the date of whose arrival is unknown, but which probably accompanied some of the earliest settlers.

Among the minor plagues of life, especially to the housekeeper in this country and in Europe, but almost infinitely worse here than there, is the ubiquitous house fly (*Musca domestica*), only inferior to the mosquito as a torment, and far his superior in abundance around the habitation of man. To whom the Western World is indebted for this addition to its fauna, we shall never know. Probably he stole a passage on the "Mayflower" to New England, accompanied John Smith to Jamestown, and Jacques Cartier to the banks of the St. Lawrence. He has been here so long and increased so rapidly that scarcely a house on the continent is free from his unwelcome presence. In spite of constant war waged against these summer pests, their rate of multiplication is so rapid that they swarm in millions in every town and hamlet, and every effort to destroy them, or even to reduce their number, seems hopeless.

Here we may allude to the flesh fly (*Musca vomitoria*), and the blue-bottle fly (*Musca Cæsar*), both old enemies of the clean, but firm friends of those who live in dirt, and among the offal of their food. Both of these, like the house fly, have acquired by possession such inalienable rights that a stranger would be likely to suppose America to be their native land, and Europe the country of their adoption.

The angoumois moth (*Butalis cerealella*) is one of the most destructive foes of the grain after it is stored in the granaries of France. It eats out the floury part, leaving a mere shell. It became common about the beginning of the last century in North Carolina, whence it spread into Virginia, Kentucky, and Ohio, and is occasionally found in New England. It is sometimes very abundant, and very destructive. This insect "abounded in exhibits from various countries" at the Centennial Exhibition of 1876.

It is quite possible that not a few noxious species will be found to date their introduction to the Centennial year, though the Commissioner appointed to report on this subject says:—

"Most of the species obtained in the building have been already distributed over the globe by the ordinary channels of trade, and nothing is to be apprehended from the addition of a few hundred thousand specimens to the incalculable millions of the same kind now domiciled among us." The species found, which have not been previously observed in the United States, will be innocuous. "I may therefore announce with moderate certainty that no evil result will occur to our agricultural interests, from any introduction of foreign insects by means of the exhibits."

The grain weevil (*Calandra granaria*) is even more destructive to grain than the foregoing. It is not uncommon in granaries where this beetle is numerous to find nothing left of a heap of wheat except the husk. Moreover, all kinds of corn seem to be acceptable to this destroyer, which has also crossed the Atlantic and commenced its ravages in the granaries of America. After the wheat has passed through the mill it becomes the prey of the meal worm (*Tenebrio molitor*) often a great nuisance to the housewives of Europe, and now thoroughly naturalized here. It feeds chiefly on damaged flour.

Turning to the orchard, the tiny apple tree bark louse barely visible to the naked eye, in many places, and in some years does more harm to the apple tree than any other of its insect foes. It swarms in the orchard and the millions of little beaks are engaged in sucking from the trees their very life-blood. The effect soon appears in the sere and falling leaf, and later in the death of the tree. For this, too, we are indebted to Europe, where, however, its ravages are insignificant compared with those which it commits in this country. The Northern States and Canada West are the districts in which it most prevails, and where the greatest mischief is done.

(*To be continued.*)

THE CONFERENCE TESTIMONIAL TO PROFESSOR ATTFIELD, F.R.S.

The final meeting of the sub-committee was held at 17, Bloomsbury Square, on Wednesday, January 5, 1881. Mr. G. F. Schacht in the chair. The Honorary Secretary reported that the address having been formally presented at the Swansea meeting of the Conference, the selection and binding of the books had been left in the hands of Dr. Attfield. Owing to absence from his house for a time, and other causes, he had been unable to complete his selection until the middle of December. The following letter was read:—

"Ashlands, Watford, *December* 17, 1880."

"Dear Mr. Secretary,—I can now report that the Conference books have all been delivered, the last batch coming to hand within a few days of the time at which they were promised by the binder. They look lovely in their bright and varied tints; the editions are those which combine usefulness with elegance in the happiest manner; in short, the Conference present has been placed on my shelves in a form most pleasing to me and mine. I need not say how glad, indeed proud, I or Mrs. Attfield would be to show them to any member of the Conference who could favour us with a call at Ashlands.

"Yours faithfully,
"JOHN ATTFIELD."

The following statement of account, duly audited, was presented by the Honorary Secretary and Treasurer, and passed:—

	£	s.	d.
Dr.			
To subscriptions	192	4	0
Cr.	£	s.	d.
By paid E. Bumpus for books	163	9	0
" " W. Hooper for address . . .	5	5	0
" Postage	10	15	0
" Printing and Stationery	12	15	0
	192	4	0

Audited and found correct,

January 3, 1881. E. N. BUTT.

The Pharmaceutical Journal.

SATURDAY, JANUARY 15, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PROPOSED PHARMACEUTICAL LEGISLATION IN FRANCE.

At the present time, when the subject of pharmaceutical legislation may be expected to occupy a prominent place in the minds of most of our readers, it will not be out of place to lay before them a sketch of what is being done in the same direction amongst our French neighbours. Although we are accustomed to think that the position of the pharmacist in France is much more satisfactory than it is at home, and though there is in some respects good reason for that opinion, the fact is that discontent prevails among our neighbours across the channel to a very great extent, and that there are many of them who hope to see a reform of the laws that regulate the practice of pharmacy.

For some time past an amendment of the law has been looked for in France, and quite recently a "*projet de loi*" has been submitted to the consideration of the Conseil d'Etat, the main features of which we now propose to mention.

Among the conditions for the exercise of the business of pharmacy it is declared that no Frenchman is to be at liberty to practise pharmacy or to keep open shop to prepare, sell, hold in stock or supply any medicine, unless he possesses the diploma of a pharmacien obtained in France, and unless he has conformed with the formalities prescribed by law. That being the case, however, pharmacists may, without distinction of class, establish themselves and carry on their business in any part of the Republic.

The pharmacist must not carry on his business anywhere but in his own shop, and he must not do so in more than one shop. He must not carry on in his shop any other business but that of the trade in drugs and medicines, and in general any of the articles which appertain to the healing art. He is to have his name written outside his place of business, upon his labels, and upon his invoices. Moreover, he must indicate by a special label the preparations intended for external application, and, lastly, he must habitually reside at the place where his business is carried on.

The association of unqualified persons under a general title for carrying on the business of pharmacy is prohibited.

At the death of a pharmacist, his widow and heirs may carry on the business for one year only, with the aid of an assistant at least twenty-two years of age and approved for that purpose by the Ecole de Pharmacie, and under the supervision of a pharmacist also approved in like manner.

The association of a pharmacist and a medical practitioner in business is prohibited, as well as the simultaneous practice of medicine and pharmacy. Medical men may, however, supply medicines to neighbours, if requested, in cases where there is no pharmacist keeping open shop within a distance of eight kilometres from the dwelling of the patient but they must not keep an open shop.

Pharmacists are not to supply or sell medicines without the prescriptions of medical men or of those who have the right to sign an order of the kind. They may, however, sell upon the demand of customers simple medicines and innocuous compounds contained in a list that is to be appended to the Codex.

Except in cases where medical men specially indicate to the contrary, pharmacists are always to conform to the formulæ of the Codex in making their preparations and compounds. Every pharmacist is to provide himself with a copy of the most recent edition of the Codex, and with all the supplements as they may be published. As appertaining to this provision the sale or advertisement of any remedy not comprised in the above category is prohibited. The sale of any medicinal preparation under any other name than that indicated by the Codex is also prohibited.

The prefects throughout the country are required every year to draw up a list of the pharmacists of each class established in their departments, stating the name and surname of each, the date of their qualification, and their place of residence.

No persons but pharmacists or others duly authorized may sell or supply any preparation, simple or compound, intended for human use and to which medicinal or curative properties are ascribed, nor may they advertise them for sale in any way. At the same time simple medicines in general use may be freely sold if their application is unattended with danger, and when their nomenclature is in accord with the conditions determined by the Government.

Any person who considers he has discovered a useful remedy, and is desirous that it should be used, is to forward the formula for its preparation to the Ministry of Agriculture and Commerce, when it will be submitted to a permanent Codex Committee, which will determine whether it shall be added to the Codex. All persons who are inventors or proprietors of remedies of which the composition is secret, having had previous authority to prepare, sell, or supply those remedies, must proceed as stated above, and in default of so doing within three months of the passing of the law the authorization under which they have acted will be cancelled.

Public establishments, hospitals, and commercial or industrial societies, having many persons employed in them, may keep a pharmacy, but solely for their own use, and upon condition that it is managed by a pharmacien having a diploma. Such establishments may not, without the sanction of the local authorities, sell or supply outside of their own circle any kind of medicine; these pharmacies are not to be open to the public.

In places where there is no open pharmacy within a distance of eight kilometres the prefect may, at the instigation of the Board of Health of the arrondissement, take steps to authorize suitable persons to sell and supply certain medicines of simple preparation and usage or of necessity in cases of pressing danger. Such an authorization is to have no further effect whenever a pharmacist is regularly established within the distance above mentioned.

The wholesale trade in simple drugs and pharmaceutical products is to be free, but there is to be an express prohibition of the supply of drugs or any pharmaceutical preparations by wholesale dealers to consumers.

In future the certificates accorded to herbalists are to be done away with, but those fresh or dried medicinal plants which may be freely sold without danger will be enumerated in a schedule.

There is to be one inspector of pharmacies, at least, in each department. He is to be appointed by the Ministry of Agriculture and Commerce, upon the recommendation of the prefects, and is to be selected from among the pharmacists of the first class. Every year, at least, he is to make an inspection of all pharmacies in his district, whether open or not to the public, those of medical men or other persons specially authorized to sell certain medicines, and those of persons dealing in medicinal or pharmaceutical materials, or carrying on any industry connected with the manufacture of preparations advertised to possess medicinal or curative properties. Further inspections may also be made as often as may appear desirable to the inspector or the local authorities. The cost of these inspections, varying from six to eight francs a year, is to be borne by the persons subjected to them.

The inspectors are to report any observed infringements of the law, and if requisite they may call in the aid of the police or magistrates of the locality.

Besides the infliction of certain penalties for infringement of the law the tribunals are to have power to order the closing of pharmacies that exist contrary to the provisions of the law.

This proposed amendment of the law regulating the exercise of pharmacy in France affords several points of interest as compared with the state of affairs in this country and the contemplated New Pharmacy Act Amendment Bill. It has been considerably criticized already in some of the French journals, and on a future occasion we may take an opportunity of showing the opinion that is held of its provisions among French pharmacists.

THE CHEMISTS' BALL.

We need scarcely remind our readers that the Chemists' Fifteenth Annual Ball is to be held at Willis's Rooms, King Street, St. James's, on Wednesday next, the 19th inst. Application for tickets should be made to members of the Committee, a list of whom will be found in an advertisement on another page, or to the Honorary Secretary, Mr. John F. Savory, 143, New Bond Street.

CONTINENTAL JOURNALS.

It is announced that the *Pharmaceutische Zeitschrift für Russland*, the organ of the Pharmaceutical Society of St. Petersburg, which has hitherto appeared once a fortnight, will with the commencement of a new volume be published weekly. It is also to have a new Editor in Herr Edwin Johanson. We are also informed that from the beginning of the year the *Correspondenzblatt des Vereins analytischer Chemiker* will appear as the "*Repertorium der analytischen Chemie für Handel, Gewerbe und offentliche Gesundheitspflege, Organ des Vereins analytischer Chemiker.*"

SCHOOL OF PHARMACY IN ALGIERS.

In a recent consular report it is mentioned that by a decree dated June, 1880, there has been established in Algiers a preparatory school of medicine and pharmacy, with chairs of anatomy, physiology, pathology, clinical medicine, obstetrics, toxicology, natural history, pharmacy and materia medica, hygiene and therapeutics.

CHEMICAL SOCIETY.

A meeting of this Society will be held on Thursday evening next, January 20, when the following papers will be read:—"On some Hydrocarbons present in Resin Spirit," by H. E. Armstrong, F.R.S.; "Determination of the Relative Weight of Single Molecules," by E. Vogel; "On the Oxidation of Organic Matter in Water," by Arthur Downes, M.D.; "Analysis of Queensland Soils," by Professor Liversedge.

We understand that at the last Inns of Court Lecture examination the prize for the highest marks in all subjects was obtained by Mr. R. W. Giles, late of Clifton.

The Annual Dinner of the Pharmaceutical Society of Victoria took place on the 18th of November last when the sixth toast on the list was "The Pharmaceutical Society of Great Britain and kindred "Societies."

Pharmaceutical Society of Ireland.

EVENING MEETING.

The first Evening Meeting of the Pharmaceutical Society of Ireland, for the session 1880–1, was held on Tuesday, January 4, 1881, at the King and Queen's College of Physicians, Kildare Street, Dublin. The chair was taken by Mr. James E. Brunker, A.M., T.C.D.

There were two communications brought before the meeting, the first was from Mr. John P. Harold, M.P.S.I., "On a Commercial Sample of Citric Acid." The sample, some crystals of which were exhibited to the meeting, had been analysed by Mr. Harold, who found that it was free from tartaric and sulphuric acids and lime (the impurities likely to be present); but its physical appearance, having reference to the British Pharmacopœia, was abormal, the crystals possessing a distinct blue coloration, which indicated, in his opinion, the addition in its manufacture of some blue colouring matter, possibly with the object of improving its appearance, just as ultramarine is sometimes added in the preparation of sugar. The blue colour was considered to be possibly due to the addition of Prussian blue.

The President, Professor Tichborne, observed that he had never seen a sample of the kind before.

The second communication was by Professor Tichborne, LL.D., F.C.S., "On some Peculiarities of Mineral Waters as imported." Dr. Tichborne described the properties and composition, according to his recent analyses, of several of the purgative, saline, and antacid mineral waters. He stated that he had found lithium was an ingredient in a large number of the alkaline waters. Recently, he discovered that metal in Carlsbad spring, in which, although it had been hitherto frequently analysed and written about, strange to say, the presence of lithium had escaped observation. He now found it in the water, well marked and in quantity amounting to 1 grain per gallon.

An interesting discussion followed, in which Dr. Montgomery, Messrs. W. N. Allen, G. H. Grindley, and the Chairman took part.

The meeting then adjourned.

MEETING OF THE COUNCIL.

January 5, 1881.

Present—Professor Tichborne, President; Dr. Aquilla Smith, Vice-President; Messrs. Allen, Bennett, Brunker, Collins, Doran, Draper, Grindley, Hayes, Hodgson, Oldham, Pring and Simpson.

The minutes of last meeting were read and confirmed.

The Registrar read a letter from W. B. Kaye, Esq., Clerk to the Privy Council, relative to appointment of Examiners, and enclosing copies of the *Dublin Gazette*.

A letter was read from Dr. R. W. Harley, thanking the Council for having appointed him an Examiner, and apologizing for not replying before, owing to illness.

A letter from Mr. J. P. Harold, M.P.S.I., was then placed before the meeting, calling the attention of the Council to a prescription label (which he enclosed) of a well known wholesale firm, the issue of which he believed to be a breach of the Irish Pharmacy Act.

The President said he had had an interview with Mr. Harold relative to the matter, and had advised him not to bring it forward; but Mr. Harold did not take his advice, therefore the letter came before them for their consideration.

Dr. Smith said that the section of the Act which was alleged to be infringed was not mentioned in the letter. He therefore proposed—

> "That the Registrar be directed to inform Mr. Harold in reference to his letter he has not stated the particular section of the Act, the violation of which he complains."

Mr. Doran seconded the motion.

Mr. Hodgson asked if it was a family receipt that had been compounded, and said if so, the firm referred to had a perfect right to make it up, but had no legal power to compound physicians' or surgeons' prescriptions, as one of the partners was not a pharmaceutical chemist or apothecary.

Mr. Hayes remarked that the Council did not know what private arrangement might exist between the partners.

The President said no legal arrangement could exist.

Mr. Oldham pointed out that there was no evidence as to whether a physician's prescription had been compounded or not.

The motion was then put and passed.

A letter received from the firm reported at last meeting to the Council as improperly using the title "pharmaceutical chemist" was read, expressing regret that the Act should have been infringed, and asking permission to use up the labels at present printed, and undertaking not to use the title in future.

After some discussion it was proposed by Mr. Allen, seconded by Mr. Bennett, and passed—

> "That the Council having no power to condone a breach of the Act must request the firm to conform to the law."

Mr. Brunker in proposing his motion—

> "That the Committee appointed for the purpose of considering proposed amendments of the Pharmacy Act (Ireland) be requested to place themselves in communication with a similar Committee appointed by the Pharmaceutical Society of Great Britain, with a view to co-operation between the two Societies upon points of common interest to both"—

said, amendments were proposed to be made to the Irish Pharmacy Act about a year since, and as the English Society was at present entertaining somewhat similar propositions, he thought it would be desirable to place themselves in communication with it, and that, should they do so, they would be received with friendliness by the English Society. He referred to Mr. Kinninmont's remarks, published some time since in the *Pharmaceutical Journal*, and advocated all proposed amendments should be tending towards the protection of the public. He suggested there should be a public prosecutor, who should be compelled to prosecute upon a sworn information, as at present very few were willing to come forward to mention breaches of the law. He thought that a community of feeling might exist between the two Councils which would for their mutual advantage.

The Vice-President remarked that the motion did not commit the Council to anything, and suggested that there should be some fund to remunerate the public prosecutor, for in Scotland the public prosecutor would not take up a case, as there was no fund from which he could be paid. He would second the motion.

The President considered that the English Society would think well of their placing themselves in communication with them.

The motion then passed unanimously.

Robert Montgomery, L.A.H.D., M.R.C.S.E, was duly elected a member of the Society.

A letter read was from Dr. J. W. Moore asking the Council to change the hour for the Preliminary examination to suit his convenience.

The Registrar to inform him that the Council could not alter the hour.

For membership—

Mr. John Isaac Bernard was proposed by the President, seconded by Mr. Brunker.

Mr. Solomon Donovan was proposed by Mr. Oldham, seconded by Mr. Hodgson.

Mr. Brunker called attention to the "Weights and Measures Act," now in force in Ireland.

Mr. Grindley said he had called upon the inspector, who had shown him the standards, but not those of apothecaries' weights. The inspector informed him hat notice would be given when he was ready to receive weights or measures for verification.

The report of the Examination in Arts, held January 4 and 5, was laid before the meeting. Sixteen candidates presented themselves, of whom twelve passed.

The meeting then adjourned.

Provincial Transactions.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A lecture was delivered in the rooms of the above Association, on Wednesday evening, January 5, by Mr. R. Winfrey, upon "The Halogens." The lecturer, who illustrated what he had to say by numerous interesting experiments, observed that these important elements, viz., chlorine, bromine and iodine, were called halogens, because they will combine directly with bases without forming acids, producing substances like sea salt. Glancing at these elements, it was very easy to see that in many respects they are very similar, and are by most writers on chemistry classed together and studied collectively. Chlorine was discovered by Scheele in the year 1774; he described the mode of producing what he termed dephlogisticated muriatic acid, a term which was strictly in accordance with the then established theory. Before the discovery of chlorine and its use as a bleaching agent linen goods were retained by Dutch bleachers nine months; they can now be bleached in England in as many weeks. Chlorine decomposes and destroys the most stable organic colouring matters, indigo being converted into a brownish substance, the blue colour of which cannot be restored. The presence of moisture is essential to these changes, for dry chlorine will not even affect litmus. The lecturer observed that chlorine did not exist free in nature, but was found chiefly as a constituent of common salt; it is not abundant in vegetables, but is found in every animal excretion; as it is soluble in water and heavier than air it is best collected by displacement. The lecturer prepared chlorine by various methods, explaining the reactions by equations. Passing to bromine, which was discovered about 1826, by a chemist named Balard, he observed that this element also existed in sea water, but its chief source was from certain springs in Germany, and it was obtained by evaporation of the spring water and subsequent distillation with black oxide of manganese and sulphuric acid. The lecturer showed several experiments illustrating the properties of bromine and the methods of preparing the various salts of this element used in pharmacy. Turning to iodine he observed that this element seemed to be beneficial to many marine plants, which seemed to have the power of abstracting it from the sea water and storing it up in their tissues, for it is from this source that all the iodine of commerce is obtained. Animals seemed to possess this power also, for cod liver oil, contained a considerable percentage and so did sponges. It is chiefly extracted from the *Fucus palmatus*, which is collected on the shore, dried, placed in pits, and all the vegetable matter burned off, a fused mass called kelp being left. The iodine existing as iodide of sodium is distilled off much in the same manner as with bromine. Iodine is only soluble in water 1 in 7000, the best solvents for it being solutions of its own salts. One of the most characteristic properties of iodine is the formation of blue iodide of starch, the best and general test for iodine. The lecturer concluded, noticing the properties of these three elements. At ordinary temperatures chlorine was gaseous, bromine liquid, and iodine solid. Solution of chlorine being exposed to light was rapidly decomposed, that of bromine slowly, and that of iodine scarcely affected. Chlorine was very soluble in water; bromine 31 in 1000; iodine 1 in 7000.

A vote of thanks to Mr. Winfrey brought a very interesting evening to a close.

LIVERPOOL CHEMISTS' ASSOCIATION.

The sixth general meeting of the thirty-second session was held at St. George's Hall, on Wednesday evening, December 22, together with the Literary, Scientific and Art Societies of Liverpool, as an associated *soirée*, under the presidency of his worship the Mayor of Liverpool (Alderman W. B. Forward).

The *soirée* was formally opened in the small Concert Room, at 7 o'clock, by the Mayor, who paid a high compliment to the various learned societies of the city, for the valuable work they were doing.

At half-past seven o'clock, Professor Silvanus P. Thompson lectured in the small Concert Hall on "Waves of Sound and the Photophone." The lecture was illustrated with experiments and drawings of instruments shown on a large sheet of canvas by means of a lantern and the limelight, managed by Mr. Knott. Professor Thompson said that this latest discovery was due to the genius of Professor Alexander Graham Bell, the distinguished inventor of the speaking telephone. The aim of the telephone was the transmission of sound and speech to a distance by means of currents of electricity; the aim of the photophone was the transmission of speech to a distance by means of beams of light. In the course of his lecture he explained the phonograph and astonished the audience by experimenting with it, the words "Prosperity to Liverpool," and "Hip, hip, hurrah, the phonograph is a marvellous invention," being loudly repeated by the instrument. He explained and gave illustrations of how sound was generated in the photophone by beams of light. In concluding his lecture Professor Thompson suggested that in Liverpool, in establishing a University College, they should not forget the science of which he had been treating, and that there should be a chair of experimental science, from which he thought the college would derive strength.

The lecture was succeeded at nine o'clock by the concert by the Liverpool Vocalists' Union and the Societa Armonica, which was highly appreciated.

In the Civil Court, at 9 o'clock, Mr. J. Swan, F.C.S., delivered a lecture on his new system of "Electric Lighting for Domestic Use," and gave practical illustrations. The Mayor occupied the chair, and there was a crowded attendance. So much interest was taken in the lecture that it was delivered in two parts, so as to admit of two audiences. Mr. Swan, in the course of his lecture, said that while the production of electricity depended upon the galvanic battery the economical use of the electric light was out of the question. It was only since the discovery by Faraday of electricity developed by magnetism and motive power that electricity had become sufficiently economical to make electric lighting generally a practical thing. Since that change in the aspect of the case the question of how best to apply the electric current for the purpose of electric lighting had become one of great public interest. Until the present time the great difficulty had been to produce a small and steady light. No difficulty had been felt in producing large masses of light, but such a light as was required for domestic purposes was still a desideratum. He hoped to show them that a great advance had been made in this direction. In conjunction with Mr. Stearn he had been able to construct a lamp on the principle of incandescence, which enabled them to divide the electric light to any extent without loss of economy. The light produced by his lamp was absolutely steady and mild, and totally different from the electric light with which persons were famliar. The incandescent carbon was entirely secluded from contact with the air, and therefore there was not the slightest deterioration of the atmosphere with the lamp, such as occurred when gas was consumed. The lamp was also economical, since they found that the light—equal to that produced from 150 to 250 candles, and divided among as many lamps as might be necessary—could be produced by the expenditure of one horse-power. The lamps were durable, and so simple in use that any servant maid could replace one in its holder if one happened to be broken; moreover, they were of such a simple character as not to be expensive, when the occasion arose for their replacement. He hoped before long that electric lighting of that description would be extensively used in the homes and places of business in Liverpool. A number of lamps of the description given by Mr. Swan in his lecture had been placed in the court, and they were instantly lighted during the lecture. Mr. Swan also exhibited an electric safety lamp for use in mines. This lamp emitted a very brilliant light. The lamp was moveable, and the light was shut out from contact with the outer air, so that if it was in an explosive atmosphere no danger could follow. The lamp was exceedingly strong, and so constructed that if it received a blow the light would be extinguished before the lamp was broken.

Dr. Hicks lectured, in the Grand Jury Room, on the "Hydroid Zoophytes of the District," and Mr. Birchall in the Crown Court, on "English Castles and Baronial Halls," while the various smaller rooms were devoted to a variety of interesting and instructive purposes. The Great Hall was, however, the principal attraction of the evening on account of the various exhibits which were therein displayed, consisting of scientific instruments, works of art, models, antiquities, etc.

On behalf of the Chemists' Association the following gentlemen and firms exhibited various specimens and objects of interest:—Dr. Campbell Brown, Messrs. Thomas Garside, F.C.S., A. H. Mason, F.C.S., Peter Spence, Alexander Wall, F.C.S., F.I.C., Evans, Sons and Co., Sumner and Co., and Symes and Co.

In this Hall there was also an excellent and most comprehensive display of microscopes and microscopic objects, arranged under the superintendence of Mr. I. C. Thompson, F.R.M.S.

At intervals during the evening Mr. W. T. Best gave several performances on the large organ, and refreshments were served in various parts of the building.

The *soirée* concluded at about 11 o'clock, and everyone seemed highly pleased with the evening's entertainment.

Although the weather was most unfavourable, about 4000 persons attended.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The third meeting of the session was held in the Manager's Library, Anderson's College, 204, George Street, on January 5, at 9 p.m. The Vice-President, Mr. Robert Brodie, was called to the chair.

After the reading of the minutes, in consequence of the small attendance of members, probably due to the meeting being held in a holiday week, it was resolved that the reading of a paper on Botany, by Mr. Gilmour, should be postponed, and that the meeting should be adjourned until February 2.

SUNDERLAND CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The general meeting of the above Association was held at the rooms, corner of William Street, on Monday evening, January 3. The President, Mr. T. Walton, in the chair.

The President congratulated the members upon the satisfactory state of the Association at present. Although the attendance had not been so good as it might have been, principally on account of several of the members leaving the town, yet those who had attended had been doing good work. The laboratory had been fitted up and was a great help to those who attended the chemistry class, and the materia medica class had been a great success. Several very good papers had been read, and the conversazione had succeeded beyond expectation. The President then thanked the officers and members for their aid during the session, and wished the Association a prosperous year.

The Secretary then read the report for the half-year, and afterwards, the election of officers took place with the following result:—

President, Mr. T. Walton; Vice-Presidents, Mr. C. Ranken and Mr. J. J. Browell; Secretary, Mr. J. T. Humphrey; Treasurer, Mr. J. Peacock; Librarian, Mr. A. Whitfield.

It was determined that the above gentlemen should also form the Committee.

Parliamentary and Law Proceedings.

POISONING BY CARBOLIC ACID.

An inquest was held on Tuesday, before Mr. Clarke Aspinall, coroner of Liverpool, on the body of Nicholas Garrahan, a night watchman in a foundry. According to the evidence, deceased, while slightly the worse for drink, went on duty about six o'clock, and shortly afterwards he was found by one of the apprentices lying on his face. A bottle was lying near containing carbolic acid, and the medical evidence showed that death was caused by this poison. Carbolic acid was kept in the foundry for disinfecting purposes.

The jury returned an open verdict.

Obituary.

Notice has been received of the death of the following:

On the 16th of November, 1880, Mr. Edward Gilbert, Chemist and Druggist, Bandon Road, Old Ford Road, London. Aged 68 years.

On the 29th of November, 1880, Mr. Samuel Waterhouse Preston, Chemist and Druggist, Marchmont Street, London. Aged 72 years.

On the 13th of December, 1880, Mrs. Mary Hale Chemist and Druggist, Brecon. Aged 64 years.

On the 14th of December, 1880, Mr. John Laycock, Chemist and Druggist, High Street, Skipton. Aged 30 years.

On the 14th of December, 1880, Mr. Henry Metzler, Pharmaceutical Chemist, Minories, London. Aged 63 years. Mr. Metzler had been a Member of the Pharmaceutical Society since 1853.

On the 15th of December, 1880, Mr. John Marshall, Chemist and Druggist, John Street, Bradford. Aged 39 years.

On the 16th of December, 1880, Mr. John Ord, Chemist and Druggist, Frederick Street, Westminster. Aged 40 years. Mr. Ord had been a Member of the Pharmaceutical Society since 1876.

On the 18th of December, 1880, Mr. John Manshaw Teear, Pharmaceutical Chemist, Humberstone Gate, Leicester. Aged 61 years. Mr. Teear had been a Member of the Pharmaceutical Society since 1842.

On the 21st of December, 1880, Mr. Thomas Crowther, Pharmaceutical Chemist, Tickill, Yorkshire. Aged 67 years. Mr. Crowther had been a Member of the Pharmaceutical Society since 1846.

On the 23rd of December, 1880, Mr. August Anholm, Chemist and Druggist, Smeaton Street, Hull. Aged 54 years.

On the 24th of December, 1880, Mr. Gilbert Pickering Watson, Chemist and Druggist, Lower King Street, Norwich. Aged 64 years.

On the 25th of December, 1880, Mr. Owen Richards, Chemist and Druggist, Bridge Street, Aberystwith. Aged 42 years.

On the 29th of December, 1880, Mr. William Bryan

Salisbury, Pharmaceutical Chemist, Market Street, Leicester. Aged 49 years. Mr. Salisbury had been a Member of the Pharmaceutical Society since 1858. For many years he was an assistant in the establishment of Messrs. J. Bell and Co., Oxford Street.

On the 29th of December, 1880, Mr. Ellis Powell Jones, Chemist and Druggist, Rhyl. Aged 54 years.

Review.

Inorganic Chemistry. By Dr. W. B. Kemshead, F.R.A.S., F.G.S. William Collins, Sons and Co. London and Glasgow. 1880.

Dr. Kemshead here provides a revised and corrected edition of his text-book, specially adapted for the use of elementary students in the classes connected with the South Kensington Science and Art Department. The fact that this issue numbers the twentieth thousand alone speaks much in its favour.

A definite syllabus, and examination questions published yearly, encourage the production of class books containing just the requisite amount of information, with but little beyond. Such books are unfortunately too numerous and too largely used, but the one before us is of a superior type; it not only thoroughly covers the necessary field, but much information is added which renders its perusal profitable, even to those who may consider themselves to have stepped beyond the pale of elementary classes.

The clear and explicit style, without excess of detail, which pervades the book has its value enhanced by quotations on difficult points from Dr. Frankland's invaluable 'Lecture Notes for Chemical Students,' Miller's 'Chemical Physics,' etc. Rational formulæ are used throughout, but, for the advantage of students unaccustomed to them, the principal equations are given in empirical notation also. The graphic formulæ, often so difficult to instil into the beginner's mind, are here rendered very easy of acquisition.

Dr. Kemshead has provided rather more than can be made thoroughly clear to an elementary student within his prescribed limits; for instance, the definitions of isomerism and base, and the rules for correcting the volume of a gas for temperature, etc., are not quite so lucid as might have been desired. Some subjects, such as catalytic action, are touched upon without a definition of the same being given; but as the work is essentially a class book, the teacher supplies the deficiency, and the omission can scarcely be considered a fault. A few typographical errors may be found, and on page 96, under HgO is written "mercurous" instead of "mercuric" oxide.

Throughout the text there is a copious supply of experiments very practically described and illustrated by well executed diagrams, eminently calculated, not only to fix the facts on the student's mind, but to cultivate the faculty of observation and to furnish the beginner with knowledge that will form a sound basis for the subsequent attainment of the profounder principles of chemistry.

As far as possible the book is brought up to the present state of knowledge on points of importance to elementary students, and a concluding chapter is given on the liquefaction of the so-called permanent gases.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Chemistry: General, Medical and Pharmaceutical; including the Chemistry of the British Pharmacopœia. A Manual on the General Principles of the Science, and their Applications in Medicine and Pharmacy. By John Attfield, F.R.S., etc. Ninth Edition. London: J. Van Voorst. 1881. From the Author.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[473]. Please allow me to put myself right with your readers in general and "Endymion" in particular. If that gentleman will look again at what I said in the Journal of December 11, he will find that I did not advise the use of ferri sulph. exsiccat., as he implies in his remarks of the 25th ult. What I advocated was that a medical man should order the preparation he intends to be used, and having ordered it that it was the duty of the dispenser (speaking generally) to use what is written, and not what he thinks is the best. I say again that if ferri sulph. is written it should be used.

Edward B. Kendall.

[484]. Two reasons may be given for the explosion of the mixture:—1. Succ. tarax., for evidently this is intended by "ext. tarax.," when slightly diluted, is very liable to fermentation, even at ordinary temperature. 2. Many samples are more or less acid, and would probably decompose the mag. carb. with the evolution of sufficient carbonic acid to cause explosion if the bottle was tightly corked.

J. M. J.

[487]. Will you please correct the statement of the writer of "The Month?" It was not I who recommended the use of magnesia in preparing aq. caryophylli.

H. W. Langbeck.

[*** Mr. Langbeck, in fact, recommended the alternative use of an aq. caryophylli prepared by mixing oil of cloves with French chalk (silicate of magnesia), and exhausting with distilled water. See p. 487.—Ed. P. J.].

[490] This is a lotion and ointment for the eyes. Ung. P. is a contraction of Ung. Pagenstecheri, which is, I believe, composed of the yellow oxide of mercury and cold cream, but I do not know the proportions. It is frequently ordered by a leading Manchester oculist. Probably the formula emanates from a continental source, and has been published, as the ointment is denoted in the list of a local wholesale house.

Charles Swinn.

[*** The formula for Ung. Pagenstecheri is—

Ung. Hydrarg. Oxyd. Flav.

℞ Hydrarg. Oxyd. Flav. . . . . . 0·15
Ung. Lenientis* . . . . 5·0
M.

Hager's Praxis.

This would of course be yellow, unless a liberty be taken, and hyd. oxyd. rub. be used.—Ed. Ph J.]

[490]. I should dispense ung. hyd. ox. rub. for the ung. P. The prescriber's memory or Latin seems to have failed him, so he writes "ung. precipitate," or rather, intended to do so. The prescription being for the eyes, the red precipitate ointment is what is meant.

Hastings. J. M. G.

[490]. With reference to ung. P. I may possibly be able to throw a little light on the subject.

Some time since a prescription was was brought to be dispensed; it was for a mixture and ung. P. Being able to communicate with the prescriber, an eminent oculist, I found the ointment to be as follows:—

---

* *Ung. Leniens.*
Ung. Cetacei Rosaceum, *seu* Cold Cream.

℞ Hydrarg. Oxydi Flav.	gr. 32½
Crem. Frigid.	ʒj.

M.

This, I believe, is a formula in use at the Manchester Eye Hospital, and is called "Unguent. Pagenstecheri." As "Ointment" says it had been dispensed by a Manchester firm, I am inclined to think that the above was what was intended, but how it could be of a pink colour I cannot understand, unless the cold cream had been coloured.

R. S. TICKLER.

[493]. In answer to "Calumbo," I should fancy that berberina is the ingredient meant, it is prepared in the following way:—

Treat a watery extract of barberry root with sp. rect. as long as the water acquires a bitter taste. Distil off the spirit and let the residue cool. Let the crystals which form be recrystallized, first from s.v.r., then from water.

PERCONTATOR.

[493]. Berberia or berberina is one of the active principles obtained from the common barberry (*Berberis vulgaris*), and from several varieties of calumbo root. It is quite probable that this was what the doctor intended to order. Had it been "berberiæ sulph.," there need have been no hesitation in dispensing beberia: but, as it is, I think that the barberry alkaloid ought to be used.

M.

[493]. In my opinion the sulphate of the beberia alkaloid was intended to be used, this being the only form met with in the B.P.

It appears to have been prescribed to take the place of quinine, as it rarely or never produces nausea or headache, though its febrifuge properties are far inferior to those of quinine. Beberiæ sulphas, as a febrifuge, is given in doses from 5 to 20 grains. There is a berberia, an alkaloid found abundantly in the common barberry (*Berberis vulgaris*), which is sparingly soluble in water. I do not think this was intended.

Bedford. HENRY W. NICHOL.

[495]. In making up this mixture I find it thickens a little, but it is dark coloured and quite transparent. "Transfugio" does not say whether his was opaque or not. Probably the London mixture was thick also.

M.

[496]. Will anyone inform me what I should have dispensed for ext. ergotæ in the following?—

℞ Pil. Assafœtid. Co.	gr. 60.
Ext. Belladon.	gr. ij.
Ext. Nucis Vom.	gr. iij.
Sulph. Ferri Exsic.	gr. 25.
Ext. Ergotæ	gr. 18.
Podophyllin	gr. ij.
Ext. Aloes Aquos.	gr. 60.

Misce. Ft. pil. xxxvi. S. ij nocte.

NEMO.

I.

[497].

℞ Extract. Aloes	gr. ij.
Hyd. Subchlor.	gr. ij.
Ext. Hyoscyam.	q. s. ut fiat pil.

II.

℞ Ext. Aloes Aquos.	gr. ij.
Ext. Coloc. Co.	gr. iss.

Ft. pil.

In the above prescriptions which extract of aloes should be used, Socotrine or Barbadoes?

ONLY A JUNIOR.

[498].

℞ Acid. Prussic. Dil.	gr. 20.
Sol. Morph. Mur.	ʒiss.
Tr. Aurantii	ʒiij.
Aquæ	ad ʒiss.

What should be given for 20 grains?

ONLY A JUNIOR.

[499]. Can any reader inform me which of the two should be dispensed when ext. glycyrrhizæ mollis is ordered in a mixture, ext. glycyrrhizæ liq., B.P., or ext. glycyrrhizæ, B.P.?

NIL DESPERANDUM.

Notes and Queries.

[693]. In answer to No. 693, I have found the following recipe answer very well, and the resulting jelly is quite transparent:—

Glycerine Jelly.

Glycerine,		
Aq. Ros.	āā	f ℥iij.
Aq. Fl. Aur.		f ℥j.

Aq. Cinnam, a few drops.
Gelatine Lozenges (Nelson's Patent) No. 10, or q.s.

SARNIENSIS.

[697]. In your Notes and Queries, December 1880, Mr. C. Jones asks for a formula for concentrated infusion of gentian. Without going into the question as to whether such a preparation ought to find a place in any modern pharmacy, I must say that if such a preparation is kept, it should be a concentrated infusion, and not a mere tincture, as is generally the case. In making say a gallon of inf. gent. co. conc., the best way to proceed is to macerate 2 lbs. avoir. of fresh lemon peel (flavedo only), and 16 troy ounces dry bitter orange peel, in one quart of spirit for fourteen days, press out the spirit, and infuse the marc with 16 troy ounces of gentian root (thin slices) in eight gallons of boiling water for one hour, strain, and evaporate in a steam or water-bath (preferably in vacuo) to seven pints; when cold mix with the tincture, allow it to stand as long as possible and filter, make up if necessary to one gallon by pouring water over the precipitated pectin. I do not, however, think that even this preparation, mixed with seven parts of water, will fairly represent the Pharmacopœia fresh infusion, and I think it behoves every chemist who can get a fair price for dispensing to use nothing but fresh infusion; when two or three infusions are ordered in one mixture, if water of the same temperature is used, and the time of infusion is the same, they can be made at one operation.

P. B.

[698]. Can any reader oblige with a good recipe for a pomatum with vaseline as a base?

GREASE.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

DRAFT PHARMACY ACTS AMENDMENT BILL.

Sir,—The publication of the "Proposed Amendment of the Pharmacy Acts," in your last issue, and the hope uttered by certain members of the Council that the trade generally would express an opinion thereon, induce me to draw attention to one special alteration set forth. I am the more inclined to do this because the last paragraph in the leading article of the same Journal somewhat incorrectly describes the effect of this particular alteration in the following words:—

"*Widows are left as they have been under the present Act, but there is a provision that the executors, administrators, or trustees of a deceased pharmaceutical chemist or chemist and druggist shall not continue to carry on the business for a longer period than three years, unless by permission of the Council of the Pharmaceutical Society.*"

Under the present law the representatives of a deceased chemist may continue his business for an indefinite time, and by so doing may enable his widow to maintain herself, and rear her family in respectability and comfort, whereas her power to do so under the proposed alteration would be in many cases taken entirely from her. I set aside the "permission of the Council," which might be applied for, and might be granted or refused, as a condition bad in itself, and improper for the Council to possess.

It is very well known that chemists generally are not wealthy men, and it not unfrequently happens that a man dies in comparatively early life leaving nothing behind him but the small capital which he has worked up in his business. This may be yielding £300 or £400 a year, but if converted into money would not produce enough, *as an investment*, to keep his widow and family clear of absolute want. It may be, too, that in the family there is a son fourteen or fifteen years of age, who in due time would succeed to that business. By fixing a time by which a business *must* be sold, his chance is destroyed, and the value of a business is also depreciated in the market.

Can any reasonable man say that under this new proposal widows would remain as they have been under the present law?

I, on the contrary, say that passing such an unnecessary and oppressive amendment would indeed be to "*spoil widows' houses*," and I earnestly trust that those who agree with me in this will take care to let their views be known to the Council before its next meeting (February 2), after which the Bill will probably be at once submitted to Parliament. I may add that my feeling on this point is strengthened by the fact that when I moved the erasure of clause 5 in the Council, the motion was only defeated by the casting vote of the President.

For myself, I hope to see this widows' question put into a better condition even than it stands in the Act of 1868. Those who were so intimately engaged as I was in framing that Act, know well enough that the exemption set down in clause 16 to enable the business of a deceased chemist to be continued was intended mainly for the benefit of widows. The clause has always been called the "widows' clause," and I would now definitely exempt them, as *widows*, and not merely as "executors, administrators or trustees."

Piccadilly. GEORGE W. SANDFORD.

Sir,—Considering the experience we have recently had of the value of even a single word in an Act of Parliament, I should have expected a more careful draft Bill to have been presented to the members of the Council. There seems to me to be little difficulty in driving the historic "coach and four" through the Bill as it now stands, for if I rightly understand the meaning of the words, neither co-operative stores, nor grocers, nor others need trouble themselves much about it.

In the first place, the Act, if carried as at present, will apply only to "open shops." Co-operative stores will very rightly argue that they do not keep "open shop" in the ordinary sense of these words; they are simply private associations for mutual benefit, and do not supply "the public:" hence they do not come within the scope of the Act. Again, if a man keeps an "open shop" the Act merely prevents his selling, retailing, etc. Now selling and retailing involve the transference of goods for a consideration, and nothing else; hence a grocer may distribute these poisons—so far as this Act is concerned—provided he makes no charge. It is not an uncommon practice amongst many tradesmen to "give" some present or premium to a customer, and I can well imagine a grocer informing his customer that although he does not sell—say chlorodyne—he can present him with a bottle provided he makes a purchase of a pound or two of tea. In fact, any itinerant cheap Jack may pitch his tent on any open space and work on the same lines.

I would suggest, therefore, that wherever the words "open shop" occur in the draft Bill, the words "house or other place" should be conjoined, and that wherever the words selling or retailing occur, the word "distributing" should be added; because in this way, not only do the difficulties referred to disappear, but the "safety of the public," which of course is our peculiar and chief aim, will be best assured.

The few final words of clause 1, form a very inelegant redundancy. I suppose most persons, "fit and proper" or otherwise, are generally in Scotland or elsewhere. I would suggest that the clause end with the word "person;" if some limit must be put upon the area whence examiners may be obtained, say "persons resident in any part of Great Britain," or, if that is not wide enough, say "British Empire." "Qualified" persons too would be a better expression than "proper" person.

Clause 7 is just one of those involved clauses that are the delight of the lawyers, and will form an excellent handle with which a smart lawyer will turn the Act on its back. I suppose the intention is to obtain information as to the actual members of any firm or association selling or distributing poisons, etc. If so, it would be better to put it as plainly as possible; more especially so as many members of the Legislature are in favour of applying the principle to every form of partnership.

Clause 10 is not sufficiently specific. The term "patent medicine" is more conventional than legal. An astute lawyer would, I think, manage to wriggle, say, chlorodyne through this clause. There are very very few "patent" medicines nowadays; they are chiefly "nostrums" covered by a Government stamp of definite value. I would suggest that after the word "article," line 2, should be inserted the words "subject to the provisions of the Act of 52 Geo. III."

Clause 16.—I would suggest omitting the word "law," and cite the Act as the "Pharmacy Amendment Act, 1881."

I had hoped to have found a clause in the new Act repealing that part of clause 2 of the 1868 Act which imposes upon the Council the duty of making additions to the poison schedule. I am strongly of opinion that this places the Council in an invidious and false position. It would be better to rest this power in the hands of the General Medical Council, and thus do away entirely with the idea that an addition can by any possibility be made on trade grounds. I do not mean to suggest that the Council ever has or even ever could allow their trade instincts to bias them, but when we are dealing with what some may consider the interests of other trades, it is best the Council should be in a position like Cæsar's wife—beyond suspicion.

Torquay. EDWARD SMITH.

Sir,—I notice in the report of the Council Meeting as published in the last issue of the Journal, that a member of the Council stated "he believed that the copy which was sent to Birmingham was not even a copy of the Bill under discussion at the present moment."

As many of your readers might be led to infer from this report that the President of the Society had forwarded to me, as President of the Trade Association, a draft which materially differed from the Bill which had been discussed by his Council, I think it desirable on this point to quote the last paragraph of a letter, dated December 29, 1880, from the Secretary of the Society to the Secretary of the Trade Association.

"The draft Bill which you have sent me is not that which will be under the consideration of the Council on Wednesday next, nor indeed, does it happen to be the print which was before it at its meeting on the 14th inst., although the differences between the two may be described as merely verbal."

THOMAS BARCLAY.

Sir,—The projected Pharmacy Bill is evidently drafted for the special benefit of a certain section of the chemists, and not for the trade generally.

The disadvantage to the general body of chemists so far exceeds the advantages as to be something like giving a sixpence with one hand and abstracting a shilling with the other. True there are clauses directed against the stores and the sale of patent medicines containing poisons by unregistered persons, but what are these weighed in the scale against the 5th clause, which, except as a special privilege from the Pharmaceutical Society, condemns to poverty the children of all chemists who die before they have been able to make adequate provision for their families.

Trusting the chemists of the country will unite in their efforts to defeat or modify this objectionable clause.

JOHN TERRILL.

Sir,—Now that we are to have an amendment of the Pharmacy Acts, may I suggest that we have an amended Poison schedule,—that plumbi acetas and calx chlorata be added to part II. At present it is an anomaly that Mr. Perruquier, the barber, should sell his 2 ounces of plumbi acet. in his hair restorer (?) without so much as a caution of the danger he so readily supplies.

SPECULA.

Sir,—Having read over the proposed amendment of the Pharmacy Act, I have noticed what I consider one or two serious omissions:—

1st. That proprietors of branch shops are not to be compelled to employ at least one registered assistant in each shop. Take Liverpool, for instance, in which, and its suburbs, I suppose there are at least a score of branch shops, and not a single registered assistant in any one of them. Therefore I cannot really see what ground we have to take action against co-operative stores, who, at least, employ one or more registered assistants, whilst we allow members of our own trade to open as many shops as they please and employ anyone they can get. I think the best plan would be to forbid anyone to carry on more than one business at the same time.

2nd. The Preliminary examination ought to be made compulsory before commencing apprenticeship, which would prevent a lot of men from obtaining apprentices, who are really not capable of teaching them their business, and who employ them in work for which they ought to keep a porter; and would bring in a better class, and tend to lessen the numbers entering an already overcrowded trade. Fancy, a young man having paid a fee and served a five years' apprenticeship, during which his time has been occupied with the sale of oils, paints, colours, etc., and then finding himself face to face with the Preliminary!

I think if these suggestions could be carried out they would greatly benefit the whole trade.

SEMPERVIRENS.

WHOLESALE CHEMISTS AND THE NEW BILL.

Sir,—In clause 8 of the proposed amendment of the Pharmacy Act, the sale of poisonous patents is restricted to qualified chemists. Why should not the preparation of the same likewise be restricted to qualified men? There seems only one way of bringing this about, and that is, by compelling wholesale chemists to qualify themselves, by passing the necessary examinations; and there seems to be no reason why they should be exempted. In this way all outside the circle of registration would be prohibited from concocting and vending poisonous patents.

It is a well known fact that many a retail chemist is brought to grief through the negligence of a wholesale dealer, merely because the one is within the grasp of the law and the other is not.

I have known of grocers in the country being supplied with large quantities of arsenic for the purpose of preparing sheep dip; the wholesale trader in such a case is left to be guided by his own conscience, for he knows he may sell with impunity to anyone.

Surely this requires consideration so far as the safety of the public is concerned. A sufficient capital seems to be the only qualification necessary at the present time for wholesale chemists, and until wholesale and retail chemists are alike qualified by examination a looseness is certain to exist in the Pharmacy Act.

W. S. T.

HOMŒOPATHIC PREPARATIONS.

Sir,—Will you allow me to direct attention to a possible source of danger? I have often been asked for powerful drugs, and on inquiry have found that the homœopathic preparations were wanted. If I had unwisely supplied what my customer asked for, something like the case of poisoning reported last week might have occurred.

E. WARRELL.

SPIRITUS AMMONIÆ AROMATICUS.

Sir,—My letter was not intended for students, but was addressed to fully fledged pharmacists; consequently, I did not enter into detail unnecessarily, though I still think I was sufficiently explicit.

Mr. Tanner a little misrepresents me, and has evidently read my letter carelessly. When he makes me say, "Nor has there been any loss of CO_2 or ammonia during the distillation," he neglects to quote the words "practically speaking," which begin the sentence and which I used purposely to guard against conveying the impression that the conservation was absolute. Of course there is evolution of CO_2 during the process. This fact is too well known to make it necessary even to allude to it. But it by no means follows that this CO_2 must be lost, and if Mr. Tanner will be good enough to read the description again of the precautions I recommend he will see that there is provided an almost air-tight communication between the condenser and receiver. I need only add now that the glass bent adapter I use fits, by means of an indiarubber band, closely to the condenser and reaches a long way down into the Winchester quart, and also that the distillate is frequently agitated. The reasons for these precautions are self-evident.

In all sincerity I say it, if Mr. Tanner can produce a sample of spt. amm. arom. made with distillation equal to that made by the B.P. process, no one will be more obliged to him than I; but I note with regret that he defers suggesting a definite formula until his experiments are completed, as he is still working at the subject.

It is evident, therefore, that up to the present he has not succeeded, and having witnessed so many failures, I feel it would be wise to curb one's expectations until he is in a position to submit a sample to inspection and comparison.

C. E.

THE ALKALOID OF JABORANDI.

Sir,—In this communication I desire to direct attention to certain particulars of the recent investigation conducted by Harnack and Meyer,[*] as compared with my own earlier study of the same subject; and the remarks will be found to apply to two principal points, viz., as to whether jaborandi contains more than one alkaloid, and as to the correct formula for pilocarpine.

In my investigation the leaves, twigs, and stems of the genuine plant only were employed, these having been kindly furnished me by Mr. Thomas Farries. The aqueous extracts were altogether devoid of the odour of oil of tobacco which characterized some of the preparations of Harnack and Meyer, and I failed to obtain either the free alkaloid or its simple salts in a crystalline state, in spite of all my efforts, in which all known precautions against failure were duly observed.

That the jaborandi upon which I worked contained but one alkaloid is proved by two considerations. The method employed for the isolation of the alkaloid was such that the resulting product would contain the entire amount of base present in the plant, and its examination furnished no reason for believing it to contain more than one substance. Further, its ultimate analysis gave results concordant with those obtained by similarly analysing the well-crystallised chloroplatinate. It will be at once apparent from this statement that Harnack and Meyer are incorrect in affirming that after the crystallization of the alkaloid, I obtained a small quantity of a sticky substance, which refused to crystallise. As a fact, the whole of the free base "was soft and plastic," and refused to crystallize. Harnack and Meyer adduce no evidence touching true jaborandi, of the presence of two distinct alkaloids, and I am well convinced from my own investigation that there is only one alkaloid. This, of course, is quite apart from the possibility of its being found to exist in two states, such as many other bases are known to affect.

Then, as regards the formula of pilocarpine, I see no reason for abandoning that which I originally assigned to it, and can adduce some reason for adhering to it. The analysis of the free base was conducted with all the refinement of the best methods, and a combustion *in vacuo*, with cupric oxide and metallic copper, furnished carbonic anhydride and nitrogen in such quantities as showed the relation of carbon to nitrogen, to be as 1: 6, a requirement which the formula of Harnack and Meyer does not satisfy or explain.

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[*] *Annalen*, 204, 67–84; *Pharm. Journ.*, January 8, 1881; and *Journ. Chem. Soc.*, December, 1880.

The analysis of the chloroplatinate revealed the same relationship of the elements carbon and nitrogen and the general concatenation of the analytical results is of such a character that it is not excelled, so far as I can judge, by the later results of Harnack and Meyer.

The percentage of platinum found in my preparation leads to a calculated molecular weight of 842. Now $C_{23}H_{34}N_4O_4 2HCl PtCl_4$ gives exactly 842.

The analysis of the free alkaloid led to $C_{23}H_{34}N_4O_4$ as the simplest expression of the obtained results, and the analysis of the chloroplatinate led to $C_{23}H_{34}N_4O_4$ also as the simplest formula for the alkaloid, pilocarpine. Harnack and Meyer arrive at $C_{11}H_{16}N_2O_2$ or $C_{22}H_{32}N_4O_4$, showing an apparent difference of CH_2 in the two larger formula. In my opinion future investigation in new directions is required, in order to decide which formula is nearest the truth, and also to enable chemists to speculate as to the constitution and chemical relationships of pilocarpine. At present we only know that trimethylamine can be obtained from it.

Until such new information is obtained I shall use my own formula.

C. T. Kingzett.

Pharmacists and the Pharmacopœia.

Sir,—If the Pharmaceutical Society is to be represented on the Council sitting for the consideration of a new Pharmacopœia, may I suggest that the delegates of the Society should point out the advisability of using vaseline as a basis for all ointments, it having now become so cheap a commodity, and as it is so unchangeable in its composition?

George T. Starkey.

Syrupus Ferri Iodidi.

Sir,—The syrup made as recommended by the British Pharmacopœia gives no doubt a good result; but be it prepared in whatever way it may it is liable to decomposition more quickly if exposed to daylight than if kept in the dark. To prevent this Mr. Groves and other chemists proposed the addition of phosphoric acid, but I consider it objectionable, for a medicament would be introduced into the syrup not intended by the prescriber. The syrup can be kept for a long time if filled in bottles of about 1 ounce capacity, in the cork of which the end of an iron spiral (music wire) is fastened, its other end reaching the bottom. These bottles should then be kept in a dark and cool place.

It has been supposed that the smaller or larger amount of glucose often present in the sugar might be the cause of the decomposition of the syrup, but its presence, far from deteriorating the preparation, on the contrary, conserves it; therefore honey has been proposed as a medium instead of sugar.

W. H. Langbeck.

Chloral for the Toothache.

Sir,—In "The Month" of No. 548, I find a note of Dr. Sporer, of St. Petersburg, recommending chloral in the solid state to relieve toothache. This idea is not a new one, for as far back as 1869, I employed it frequently, but only with the effect produced by chloroform, viz., anæsthesia of the exposed nerve. Destruction of *Leptothrix Buccalis* and therefore arrest of the decay, is out of question; the latter is attained by continual use of glycerinum acidi carbolici.

W. H. Langbeck.

The Buott Fund.

Sir,—Please allow me to acknowledge the following contributions to the fund in aid of old Mr. Buott. I regret to say that his circumstances are still unhappy and dependent upon the kindness of others. The entire sum received in response to my appeal is £34 8*s*. 10*d*. This will enable him and his daughter, who takes care of him in his extreme old age and adversity, to keep the assaults of poverty at bay a little time longer. When the remainder of the sum obtained is exhausted, and this eventuality is close at hand, I know not what will become of them!

I cannot allow Mr. Buott to sink down into the depths of poverty without pleading again in his behalf. Will nineteen gentlemen (or ladies) guarantee the payment of one shilling a week, that I may be able to pay him twenty shillings per week? He is now very old and feeble, and may not require our help and sympathy very long.

Robt. Hampson.

	£	*s*.	*d*.
George Harvie, Helensburg	0	5	0
Jonathan Jessop, Halifax	0	5	0
E. N. Butt, London	1	1	0
Warrick Brothers, London	2	2	0
Thomas Hyde Hills, London	2	0	0

Errata.—In the abstract of Mr. Walker's paper on "British Ferns," before, p. 525, col. ii., in line 33, from bottom, *for* "*Lycopodium Helago*" *read* "*L. Selago*;" line 22 from bottom, *for* "*B. hunasia*" *read* "*B. lunaria*;" line 20 from bottom *for* "*P. oquelina*" read "*P. aquilina*."

On p. 509, col. ii., line 5, *for* "dilute solution of calcium carbonate" *read* "dilute solution of potassium carbonate."

J. P. Richards and *A. A. Goodall*.—Your letters have been handed to the Secretary, to whom all instructions as to the transmission of Journals should be addressed.

A Local Secretary.—You are recommended to communicate your views to the Honorary Secretary to the Chemists' Ball Committee, who would no doubt bring the subject under the notice of the gentlemen entrusted with the arrangement of the details.

W. A. Cartwright.—We do not remember seeing such an advertisement, but perhaps the advertisement agents, Messrs. J. and A. Churchill, could give you the information.

J. J. E.—A method of preparing "salicylic cotton wadding" was described in vol. vii., p. 270, and another in vol. x., p. 130. They consist essentially in a preliminary treatment of the "wool" with soda to remove fat, and then steeping it in a solution of salicylic acid in alcohol or glycerine and water and drying.

Sarniensis.—According to Cooley, "pearl powder" consists of "pearl white" (subnitrate of bismuth) mixed with an equal quantity or more of finely scraped French chalk.

T. Foden.—If you will read the draft Bill published in the Journal for last week you will see that the subject you refer to is dealt with.

A. B., U.S.—It has been stated that petroleum can be deodorized by treatment with a mixture of concentrated sulphuric and nitric acids and alcohol. See vol. viii., p. 582.

N. M. Falkner.—The formula you require will be found on p. 330 of vol. x. of this Journal.

Major.—Recipes for Lemon Syrup will be found in vol. ix. of the present series, pp. 689, 706, 806. For Ginger Ale the following recipe is given in *New Remedies*:—

"Into 1 gallon of boiling water put 1 lb. of sugar, 1 oz. of best Jamaica ginger, bruised, ¾ oz. bitartrate of potassium, and 2 lemons, sliced. Stir the ingredients frequently until the water is lukewarm, covering the vessel carefully in the intervals of stirring. Then add ½ to 2 ozs. of yeast (liquid), and keep it in a moderately warm place until a brisk fermentation sets in. The next day pour off the liquid and strain it through flannel. Let it work another day or two, strain again, and bottle, wiring down the corks."

Eureka.—We cannot undertake to recommend particular houses.

A. H. H.—(1) Apply to the Secretary for a copy of the pamphlet called 'Hints for Students.' (2) The Pharmaceutical Latin Grammar is published by Groombridge and Co., and Lindley's 'School Botany' by Bradbury, Evans and Co. (3) The "Bell Scholar" does not "enter into residence," but he has to attend the course of instruction at the School commencing in the month of October next after the examination.

Communications, Letters, etc. have been received from Messrs. Ellwood, Postans, Will, Parker, Tirrell, Mackay, L., F. S. M., Specula, Discipulus, Hiawatha.

THE ALKALOIDS OF ASPIDOSPERMA QUEBRACHO BARK.*

BY O. HESSE.

It has recently been alleged by Wulfsberg† that aspidospermine, prepared by Fraude from the bark of *Aspidosperma Quebracho*, is without doubt identical with my paytine. As I, nevertheless, doubted the correctness of this statement, upon the ground of what had been said about it by Fraude,‡ I thought it advisable, in order to clear up the point, to undertake a fresh investigation of the subject. Naturally I used for this purpose only authentic material.

This investigation showed that the bark in question, for which I have to thank Professor Baeyer, contains not the least trace of paytine, and that aspidospermine is totally different from that alkaloid. Consequently Wulfsberg's allegation is thus disposed of.

But the examination of this bark was also of interest in another direction. It is known that the *Aspidosperma* bark (or true quebracho bark) in many cases favourably influences dyspnœa, and as Herr Penzoldt§ could not bring the action of aspidospermine quite into harmony with the action of that bark, he came to the conclusion that the bark must still contain something that had a specially powerful action.

My investigation carried out on this direction has shown, among other things, that the *Aspidosperma* bark contains an alkaloid endowed with valuable properties in relatively larger quantity (0·28 per cent. against 0·17 per cent. of aspidospermine).

I have named this new alkaloid "quebrachine." It crystallizes from alcohol in small white anhydrous prisms. In hot alcohol it is readily soluble, less freely in cold, and it is difficultly soluble in ether. It melts at 214° to 216° C. (uncorr.) under partial decomposition. Its composition corresponds to the formula $C_{21}H_{26}N_2O_3$.

	Calculated.		Found.	
C. . . .	71·18	71·22	71·14	71·21
H. . . .	7·34	7·51	7·52	7·53
N. . . .	7·90	7·72	—	—

Quebrachine dissolves in pure concentrated sulphuric acid with a bluish colour, but in the course of some hours this solution becomes gradually darker in colour. If lead peroxide be suspended in the solution it assumes pretty quickly a magnificent blue colour. This reaction takes place with especial beauty when sulphuric acid containing molybdic acid is used, or when a small crystal of potassium bichromate is added to a solution of the alkaloid in concentrated sulphuric acid.

As quebrachine when boiled with solution of perchloric acid gives a yellow solution, this reaction immediately calls to mind strychnine and curarine. But Herr Penzoldt has found that the physiological action (upon frogs) of quebrachine does not correspond with that of strychnine, although it has a moderately poisonous action. For instance, according to Penzoldt, 0·04 gram of quebrachine rapidly killed a small rabbit.

Quebrachine is a strong vegetable base. In alcoholic solution it blues litmus paper, and is capable of completely neutralizing strong acids.

The neutral sulphate of quebrachine crystallizes in four-sided prisms, which are easily soluble in alcohol and hot water and moderately soluble in cold water. In an imperfect crystallization it is only obtained as a crystalline powder. In both cases its composition agrees with the formula—

$$(C_{21}H_{26}N_2O_3)_2,\ SO_4H_2 + 8\,H_2O.$$

The neutral hydrochlorate also crystallizes in short white prisms, which, although very difficultly soluble in cold, are freely soluble in hot water. Its aqueous solution gives with platinum solution a dark yellow flocculent precipitate, with the composition $(C_{21}H_{26}N_2O_3)_2,\ PtCl_6H_2 + 5\,H_2O$.

Quebrachine also forms with other acids handsome crystalline salts, which partly can be advantageously distinguished from the corresponding salts of aspidospermine by their slight solubility in water. I shall refer to these in a subsequent communication, and shall then describe the separation of these alkaloids from one another as well as from three other alkaloids that accompany quebrachine and aspidospermine in the bark in question.

STUDIES OF THE GENUS STRYCHNOS.

BY G. PLANCHON,

Professor in the Ecole Supérieure de Pharmacie, Paris, and Honorary Member of the Pharmaceutical Society of Great Britain.

(*Continued from page* 531.)

IV. THE CURARE OF THE UPPER AMAZON.*

The region of the Upper Orinoco, which was dealt with in the previous section, is connected by the Cassiquiari and Rio Negro with that of the Upper Amazon. Like several of its affluents, the immense river, which after having traversed a great part of Peru washes with its waters the southern districts of Brazil, takes different names in various parts of its course. In its passage through the Peruvian mountains, from its source to the confluence of the Iça, it bears the name of Marañon; then it is called Rio Solimoens down to the confluence of the Rio Negro and the Rio Madeira. This name is characteristic; according to La Condamine,† it signifies "the river of the poisons," and the name has probably been given because of the poisoned arrows which are the ordinary arms of the inhabitants of its banks. Lower down, the river bears the name of the Amazon.

Numerous rivers of considerable importance swell the waters of the first two portions of its course. These are, from west to east on the right bank, the Ucayalé, Javari, Juvua, Teffé, Purus and Madeira; upon the left bank, the Pastazza, Morona, Tigre, Napo, Iça (called in its upper part Putu-Mayo), Yapura (of which the name in Columbia is Caqueta), and finally, the Rio Negro or Guaiana, the confluence of which is a little above that of the Madeira. It is throughout this region that the curare of the Upper Amazon is prepared, and that the plant is found which is used for its basis. The tribes which are mentioned by authors as devoting themselves to this preparation live especially upon the southern bank of the river. They are: first, below the confluence of the Tigre, the Yameos, who, according to La Condamine, are very adroit in making long blow-pipes for darting their poisoned arrows; then, not far from the banks of the Napo, the Orejones or Oregones; lower down, the Yaguas and the Ticunas; and lastly, upon the banks of the Maranon, and to twelve leagues below the confluence of the Napo, the Pebas or Pevas.

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* *Berichte d. deutschen chemischen Gesellschaft*, xiii., p. 2393.

† See before, p. 269.

‡ *Berichte*, xi., 2189; xii., 1500.

§ *Berl. klin. Wochenschrift*, 1880, No. 40.

* *Journal de Pharmacie*, [4], vol. i., pp. 380 and 438.

† La Condamine, *Histoire de l'Académie des Sciences*, 1745.

The curare brought over by La Condamine was first experimented with under the name of the "poison of the Ticunas." He says, "It is an extract made by means of fire from the juice of certain plants, and particularly of certain lianas. It is asserted that more than thirty kinds of herbs or roots enter into it. The Indians always compound it in the same manner, and follow to the letter the process which they have received from their ancestors as scrupulously as the pharmaciens among ourselves proceed in the solemn compounding of theriacum, although probably this great multiplicity of ingredients is no more necessary in the Indian poison than in the European antidote."[*]

The very judicious reflection of La Condamine we know to be perfectly correct. In reality, there is but one species which is necessary, and that is the *Strychnos Castelnæana* which Weddell has described, and of which the principal characters are the following:—

The "ramou," this being the popular name, is a liana, or "bush rope," which, according to M. Crévaux, attains a height of 20 metres. Its young branches are remarkable for the ochre-yellow pubescence which, especially upon the floriferous branches and peduncles, forms a thick close down; large tendrils, rolled up in the form of a crosier, are also covered with this yellowish crust. The leaves are opposite and of considerable dimensions (I have measured some which have been 26 centimetres long and 16 centimetres broad); they are elliptical, oblong, or nearly ovate, acuminate, entire, shining green above, paler underneath, having five longitudinal veins, covered with ferruginous hairs, giving off transverse veins that form by their divisions a very distinct network. The flowers form a close dense inflorescence, composed of cymes with short ramifications grouped at the extremity of a thick peduncle. Each of them has a calyx with five obtuse lobes, a short corolla, naked at the throat, with valvate and concave lobes, which frequently fall off before arriving at maturity. The five stamens have short filaments and anthers furnished towards their base with bunches of descending hairs. The fruit is still unknown. The leaves vary according to the age of the plant. They vary in breadth, and are more or less rounded, but the species is very distinctly characterized and easily recognizable.

M. Weddell's specimens were collected among the Pebas Indians; those of M. Jaubert, at Calderao, not far from the Peruvian frontier. As to M. Crévaux, he has informed me that he met with the plant: (1) At Calderao, or Calderon, in the same locality as M. Jaubert, fifteen hours from the Peruvian frontier; (2) Upon the Rio Javari, an affluent on the right of the Amazon, where the Ticunas Indians are met with; (3) Upon the Rio Yaguas, an affluent upon the right of the Iça, and over the lower three-fourths of the course of the Iça; (4) Upon the lower three-fourths of the course of the Yapura. Higher up than these regions the plant would appear not to exist, which is indicated by the Indians descending the river from thence to make their provision of curare. Moreover, M. Crévaux assures me that there is no better money, or barterable commodity, in these countries than the arrow poison. A small pot, valued at five francs upon the banks of the Yaguas, is worth more than twenty on the Upper Iça.

Together with his herbarium specimens, M. Crévaux kindly gave me a piece of stem 60 centimetres long, 3 centimetres in diameter, bent and twisted in one part. The bark is grey-brown, strewn all over with verrucous elevations of the same colour. Transverse furrows are to be seen here and there; they are especially noticeable in the convex portion of the curve.

This bark is not more than 1 to 2 millimetres thick; it covers a large ligneous portion, difficult to attack with cutting instruments, greenish grey and surrounding a very narrow medullary canal. At a first glance no well-marked opening in the wood is perceptible to the naked eye; but a closer examination reveals a considerable number, especially in a section cut obliquely to the stem.

The anatomical structure of the various parts is that of the genus *Strychnos* in general; but with the following peculiarities:—

In the bark the suberous zone is formed of a variable number of rows of tabular cells, very numerous where the verrucous excrescences occur, to the number of seven or eight in places where the bark is smooth. Underneath the zone of stony cells has an average diameter and breadth. The internal zone is remarkable for the considerable quantity of these same stone cells which form numerous and well-developed islets in the midst of the parenchymatous tissue of the liber and of the medullary rays. These cells become larger in proportion as they belong to more central layers, so that they are sometimes of considerable diameter and present under the microscope a curious appearance through the thin superposed layers that constitute their walls and the ramified canalicula which traverse them from the centre to the circumference. In this respect the bark of the "ramou" is very characteristic.

The woody layers show numerous ligneous fibres pressed one against the other, containing dotted vessels of average diameter and separated among themselves by numerous medullary rays with several rows of cells and by ligneous parenchyma extending transversally and recalling the appearance of the rays. Lacunæ appear very few and slightly developed in the internal part, and larger and more extended transversally in the more exterior layers. They are not filled with any secretion, but in some may be observed traces of an indistinct tissue, the nature of which remains to be determined.

Besides the "ramou," travellers have noticed and brought back to Europe other species, which without having the same interest yet merit attention. It remains to examine and determine them as far as may be possible.

Among the plants which the Pebas and the Ticunas add to the *Strychnos Castelnæana*, Wedd., the best known and most important is that which is called "pani" by the Yaguas and "nobougo" by the Oregones. M. Crévaux has brought back this species from the same regions and also from the banks of the Yapura, where among the Kuretou

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[*] La Condamine, *op. cit.*, p. 490.

Indians it bears the name of "yané" and among the Miranhas that of "nedjememmo."

The plant has been described by Weddell and referred by him to the genus *Cocculus*; it is his *C. toxicoferus*. Its flowers are not known, which renders it difficult to indictate the genus exactly. By its leaves it recalls more the genera *Abuta* and *Chondodendron* than the genus *Cocculus*; but in the absence of precise means for its determination, I will designate it under the same name as the able botanist who first made it known.*

It is a liana, the flattened trunk of which resembles a fasciated stem. The bark is thin and smooth, dark brown, covered here and there with greyish lichens. The small branches are cylindrical, striated and glabrous. At the ends of long petioles (22 centim.) they bear handsome leaves, 10 to 12 centim. long and 8 to 10 centim. broad, ovate, slightly attenuated at the base, abruptly and narrowly acuminate at the summit, entire at the margin, glabrous on both surfaces, shining green above, pale and whitish below. The venation is rather characteristic. From the base of one strong midrib are given off two lateral veins, which towards the middle of the leaf bend round in an arch to anastomose with the secondary veins. These to the number of three or five spring from the midrib at a very open angle and bend back in a sharp curve to reunite among themselves. Tertiary veins run transversely and form a loose network which is prominent chiefly on the inferior surface.

An anatomical study of the young branches shows that around a central mass of cellular tissue constituting the medulla are a number of radiating bundles, within very clear limits, with pitted woody fibres, pressed one against another and surrounding a certain number of large vessels, also pitted. These bundles are separated from each other by broad medullary rays, formed of from seven to ten rows of cells, and terminating towards the exterior by a cellular tissue, partly destroyed, which belongs probably to the cambium zone.

Opposite the woody bundles is found a well-defined mass of liber fibres pressed one against the other. Opposite the medullary rays the interval between the woody bundles is occupied by a rather compact mass of stone cells with very thick walls. These stone cells occur scattered through the cellular tissue which surrounds this internal zone, and the whole is terminated at the exterior by a suberous tissue, formed by several rows of tabular cells, becoming brownish in the superficial layers.

By the side of the preceding specimens, which correspond very exactly to those that Weddell supplied to the Museum of Natural History, ought to be noticed a specimen brought by M. Crévaux, which represents a young shoot, with a root and a slender stem, crowned by a bouquet of five or six leaves. These leaves differ in some characters from the preceding. They have the inferior surface pale green, but not whitish. In this they correspond to the description by Weddell, but not to his herbarium specimens. Neither is the venation exactly similar. The lateral veins are five in number, the two inmost nearly reaching the apex of the leaf before recurving to form an arch, and the secondary veins are reduced to one or do not exist at all. Notwithstanding these differences I consider this specimen should be referred to Weddell's species. A section of the stem shows very clearly to the naked eye the radiating arrangement of the woody bundles, which appear pale in colour upon the more sombre background of the tissue.

The taste of this bark is bitter and aromatic. A fragrant odour is developed when this part of the plant is cut or grated.

I have laid some little stress upon the characters of the *Cocculus toxicoferus* because it is the plant always mentioned as accompanying the "ramou" in the preparation of the curare of the Amazon. I shall indicate much more briefly the other accessory plants of this preparation.

The following are those communicated to me by M. Crévaux as being employed by the Ticunas and the Pébas. First, there are three species of *Piper*:—

(1) A species, represented by a leaf, which resembles tolerably well *Piper caudatum*, H. B. K. (*Artanthe caudata*, Miq.).

(2) A young shoot, with roots, stems and leaves. The leaves are narrow-lanceolate, 20 to 24 centimetres long, 5 to 6 broad, and unequal at the base, one of the sides of the limb descending the petiole a centimetre lower than the other. They are finely punctate and approach, without being quite identical with, *Piper geniculatum*. In their native country they bear the name of "ox tongue."

(3) Another species represented by a young shoot and remarkable for its large inequilateral leaves, which are ovate, oblong, obtuse at the summit, cordiform at the base, with two very unequal rounded lobes, the largest of which covers one side of the petiole and in its development passes over to the other side of the limb. It is a *Piper* that must be associated with the section *Macrostachys* of the *Artanthe* of Miquel, near to *Piper pothifolium* of Kunth (*Artanthe pothifolia*, Miq.), but which is not exactly referable to any of the species of this section that I have seen figured or in herbaria.

(4) A species of *Aristolochia*, represented by its rhizome, as large and long as a thumb, and by numerous slender stems bearing leaves, which recall, without resembling exactly, *Aristolochia deltoidea*, or *A. Raja*, Kunth.

(5) An aroid, *Diffenbachia Seguinum* (*Caladium Seguinum*, Vent.).

(6) One of the Phytolaccaceæ, *Petiveria alliacea*, distributed abundantly in these American regions.

The Curare of Yapura.

The preceding species belong to the curare prepared by the Pebas and the Ticunas. Other species are indicated by M. Crévaux as being used specially for the curare made in the basin of the Yapusa.

The poison has always for its basis the *Strychnos Castelnæana*, Wedd. There is also the *Cocculus toxicoferus*, as has been previously indicated in giving the native names for the plant among the Kueretou and Miranhas Indians. Among the other plants may be noticed:—

(1) A species of *Strychnos*, which I have grounds to believe new, and which I will designate provisionally *Strychnos Yapurensis*. It is represented by branches furnished with leaves, which are opposite, shortly petiolate, ovate, rounded at the base, acuminate at the summit, entire, 15 centimetres long, 7 centimetres broad, glabrous, dark green on the upper surface, bright green on the lower. The veins are very prominent beneath and of a reddish

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* Castelnau, 'Expédition dans la partie centrale de l'Amérique du Sud. Histoire du Voyage,' vol. v., p. 22.

tint. The midrib is very strongly marked; from its base spring two large veins which run at a certain distance from the margin to the apex of the leaf, anastomosing in their course with well-marked veins which are detached transversally from the midrib. Quite against the margin on each side runs a fine undulating vein anastomosing with the ramifications of the lateral veins. The plant bears among the Miranhas Indians the name "guagueyemeu," and among the Kueretou Indians that of "moneratu." M. Crévaux refers to it as a plant used in the preparation of the curare of the Yapura.

(2) A species of *Spigelia* that does not correspond exactly to any of those I have been able to examine in the herbarium of the Museum of Natural History, nor to any description that I have been able to find. It is a plant 30 centimetres high, the stem of which is furnished with shortly petiolate, elliptical or lanceolate, acuminate membraneous leaves, much larger as they are higher up the stem, finished by four at the summit, which surround the base of the slender inflorescence bearing tuberculous fruit. It is the "gueyenetta" of the natives.

(3) A species of Aroideæ, perhaps a *Philodendron*. It is the "niagua beremba" of the natives. The root enters into the preparation of the poison.

(4) A series of species too imperfectly represented to enable me to determine them, and in respect to which I must content myself for the time with giving the native names. These are—

A species with compound pinnate leaves, having a large number of leaflets; perhaps one of the Meliaceæ. It bears the name of "ehekatsa."

Another plant with compound pinnate leaves, of very considerable bitterness; probably one of the Simarubeæ. It is the "nichtcaheso" of the Miranhas.

A woody species, the root of which has a slightly nauseous taste, and of which the leaves are simple, narrow, linear and acuminate. The "doketso" of the natives; perhaps one of the Anonaceæ.

Two species which bear the name of "guanaso" among the Miranhas, and one of which the Kueretous call "kaa."

A plant with handsome simple, obovate, acuminate leaves. This is the "ébémala" of the Miranhas.

Another species, with large broadly-elliptical penninerved leaves, having a rather dense pubescence upon the nerves. This is the "debao" of the Miranhas, the bark of which is added to the curare of the Yapura. The last two are probably species of Anonaceæ.

Finally, a curious species with large alternate membraneous leaves, which are light green, broadly obovate, acuminate, and covered upon the nerves by a soft pubescence. This is the "gueyenetso" of the Miranhas.

(*To be continued.*)

OLEATE OF MERCURY.*

BY NATHAN ROSENWASSER.

The present method in use for making this preparation consists in dissolving yellow mercuric oxide in excess of oleic acid, sufficient of the latter being used to make a resultant of 20, 10, or 5 per cent. mercuric oxide strength. That containing 20 per cent. is of the consistence of butter at ordinary temperatures, the other two being liquid. On exposure to the air for some time, the liquid preparations become partly decomposed, mercurous oxide being deposited. This decomposition takes place in the solid 20 per cent. preparation also, but as air has access only to the surface, *it* alone is found altered, the bluish grey surface indicating a separation of mercurous oxide, which is unable to settle to the bottom as it would were the preparation liquid. The unexposed parts beneath the surface will be found free from sediment and unaltered.

It would seem from this, as also from other experiments made, that all oleates of mercury exposed to the air become decomposed, losing the mercury from combination, whether an excess of oleic acid be used or not. I would recommend the following changes in the method of preparing and dispensing these oleates.

1st. The preparation of the true oleate of mercuric oxide.

This is done by combining mercuric oxide with its equivalent of oleic acid. The proportions are $HgO = 216$, $2C_{18}H_{34}O_2 = 562$, or one part of mercuric oxide to $2\frac{3}{5}$ oleic acid by weight. Oleate of mercury thus prepared boils between 280° and 290° F., depositing mercurous oxide. It is solid, transparent while melted, opaque on cooling, and of the consistence of resin cerate in winter.

2nd. As the addition of cosmoline, vaseline, and allied petroleum bodies, prevents the oxidation of the oleate, I propose to bring the mercuric oleate to its requisite strength of 20 per cent., by addition of these, thus keeping a constant unaltered oleate of 20 per cent., which admits of still further dilution as may be desired with cosmoline, vaseline, etc., to any percentage desired. As a matter of cost these diluents are again as cheap as the excess of oleic acid, which presents no advantage as a preservative or as a solvent.

3rd. The 'National Dispensatory' (Stillé and Maisch) and other authorities, direct the use of yellow oxide of mercury, the price of which is from thirty to thirty-five cents per oz. The price of the red oxide of mercury, chemically identical, is but six cents per oz. Upon experiment I have succeeded more easily in preparing the oleate from this red oxide than from the more expensive yellow oxide.

The oleic acid is heated in a porcelain dish to about 220° F., the red precipitate then being added in small quantities, with constant stirring. The heat should be carefully regulated and not permitted to rise above 240° F. If the oxide of mercury is pure, it will entirely dissolve in pure oleic acid *without sediment*, otherwise it will be best to pour the solution while hot, from the slight impurities usually contained in red precipitate. As the acid is usually not entirely free from impurities, a slight allowance will be found necessary in practice to make up this deficiency. Oleate of mercury, as prepared above, of 20 per cent. mercuric oxide strength, costs but 90 cents for material, whereas, if made entirely from yellow oxide and oleic acid, the cost will be 1·80 dollars per lb. The weaker oleates show still greater reduction, cosmoline being fully twice as cheap as oleic acid. Possibly to obtain liquid oleates, paraffin oil will do instead of cosmoline.

The price, probably, more than anything else, prevents the more extensive use of this oleate, and ought to be reduced to reasonable figures.

NOTES ON THE SNAKE-STONES IN CEYLON.

The following notices of these curious articles in one or two books might possibly be of interest to the readers of the Journal, although it is not strictly a pharmaceutical subject. These notes are taken principally from Sir Emerson Tennent's work on Ceylon, partly also from Wood's 'Natural History.' They have been placed at our disposal by Mr. R. Modlen:—

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* Read before the Ohio Pharmaceutical Association. From the *Druggists' Circular*, January, 1881.

The use of the Pamboo-kaloo, or snake-stone, as a remedy in cases of wounds by venomous serpents, has probably been communicated to the Cinghalese by the itinerant snake-charmers who resort to the island from the coast of Coromandel; and more than one well-authenticated instance of its successful application has been told to Sir E. Tennent by eye-witnesses. On one occasion, in March, 1854, some civil officers of the Government were riding along a jungle path in the vicinity of Bientenne, when they saw one of two Tamils, who were approaching them, suddenly dart into the forest and return, holding in both hands a cobra di capello, which he had seized by the head and tail. He called to his companion for assistance to place it in their covered basket, but, in doing this, he handled it so inexpertly, that it seized him by the finger, and retained its hold for a few seconds, as if unable to retract its fangs. The blood flowed, and intense pain appeared to follow almost immediately; but, with all expedition, the friend of the sufferer undid his waistcloth and took from it two snake-stones, each of the size of a small almond, intensely black, and highly polished, though of an extremely light substance. These he applied, one to each wound inflicted by the teeth of the serpent. The stones attached themselves closely, the blood oozing from the bites being rapidly imbibed by the porous texture of the article applied. They adhered tenaciously for three or four minutes, the wounded man's companion in the meanwhile rubbing his arm downwards from the shoulder towards the fingers. At length the snake-stones dropped off of their own accord, the suffering of the man appeared to have subsided, he twisted his finger until the joints cracked (whether as part of the cure or in bravado Tennent does not say), and went on his way without concern. Whilst this had been going on, another Indian of the party who had come up, took from his bag a small piece of white wood, resembling a root, and passed it gently near the head of the cobra, which the latter immediately inclined close to the ground; he then lifted the snake without hesitation, and coiled it into a circle at the bottom of the basket. The root by which he professed to be enabled to perform this operation with safety he called the Naza-thalee Kalinga, protected by which he professed his ability to approach any reptile with impunity.

In another instance, in 1853, Mr. Lavalliere, the district judge of Kandy, saw an equally convincing demonstration of the efficacy of this singular remedy. Sir E. Tennent secured the snake-stones and pieces of wood used on both these occasions. The root or stick of one appeared to be a bit of the stem of an Aristolochia, and the other was so dry that it was impossible to identify it with certainty, but it resembled the quadrangular stem of a jungle vine. It is, however, probable that the use of any particular plant is a pretence or delusion; the reptile being overpowered by the resolute action of the charmer, and not by any influence in the stick. The confidence inspired by the supposed charm enables its possessor to address himself fearlessly to his task, thus effecting by determination and will, what is popularly believed to be the result of charms and stupefaction. At the same time, it is curious that the natives of northern Africa, who handle the cerastes without fear, ascribe their impunity to the use of a plant with which they anoint themselves before touching the reptile; and Bruce says of the people of Sennaar that they acquire exemption from the fatal consequences of the bite by chewing a particular root and washing themselves with an infusion of certain plants. He adds that a portion of the root was given to him with a view of testing its efficacy in his own person, but that he had not sufficient resolution to undergo the experiment.

One of these stones was sent for analysis to Professor Faraday, who pronounced it to be made of charred bone, and in all probability to have been filled with blood, and again charred. "Evidence of this is afforded, as well by the apertures of cells or tubes on its surface, as by the fact that it yields and breaks under pressure, and exhibits an organic structure within. When heated slightly water rises from it, and also a little ammonia, and if heated still more highly in the air, carbon burns away, and a bulky white ash is left, retaining the shape and size of the stone." This ash is composed of phosphate of lime, and Sir E. Tennent observes, with much judgment, that the blood discovered by Professor Faraday was probably that of the native to whom the snake-stone was applied.

Another light has been thrown on the subject by Mr. R. W. H. Hardy, who states that the snake-stone is in use in Mexico, and that it is formed by cutting a piece of stag's horn into the proper shape, wrapping it lightly in grass or hay, folding it in sheet-copper so as to exclude the air, and calcining it in a charcoal fire.

Mr. Wood, wishing to test this, tried the experiment. On removing the piece of horn from the copper, the hay had been fused into a black mass (after exposure to the fire for an hour and a half), easily broken, and forming a complete cast of the horn, which fell out like an almond from its shell. On comparing the charred horn with the veritable snake-stone, it was found to be identical, except in the polish. The fracture of both was the same, and when exposed to a white heat in the air, Mr. Wood's specimen burned away, leaving a white ash precisely like that of the real specimen, although Mr. Wood's own manufacture had an ash of an purer white than that examined by Professor Faraday, possibly owing to the absence of any blood in the former. On throwing it into water, it gave out a vast amount of air from its pores, making the water for a few seconds like newly opened champagne, a peculiarity which agrees with Thunberg's description of the snake-stones used at the Cape, and imported at a high price from Malabar. "The rather high polish of the Cinghalese snake-stone I could not rightly impart to my own specimen, probably for want of patience. I found, however, that by rendering the surface very smooth with a file, and afterwards with emery paper, before exposing it to the fire, it could be burnished afterwards by rubbing it with polished steel. Even in the original objects the polish is not universal, the plane side being much rougher than the convex."

The manufacture of these stones is a lucrative trade, carried on by the monks of Manilla, who supply the merchants of India. Thunberg, in 1772, was shown the stones used at the Cape by the Boers, imported "from the Indies, especially from Malabar," at so high a price that few of the farmers could afford to possess one. He describes them as being convex, black, and very porous.

THE MICROSCOPIC CRYSTALS CONTAINED IN PLANTS.*

BY W. K. HIGLEY.

It has been the custom to call all crystals that occur in plants, whether in the cell contents, the cell-wall or even the non-microscopic crystals that are found in the outer portions of plants, by the common name "raphides," no matter what the form may be. And while giving this general name to their form, a much more general chemical composition was given, viz.: oxalate of lime; and for a long time they were all supposed to have had this composition, and even up to the present day many writers have considered them thus. The decision of some seems to have been based on the analysis of the inorganic matter of one crystal-bearing plant, which proved to have the above composition, and in drawing their conclusions they considered that all crystals of apparently the same crystalline form were of the same composition. But it is difficult to tell, at all times, the exact crystalline form, as different forms sometimes resemble each other very much. And as the form may vary, so may the chemical composition.

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* From the *American Naturalist*, October and November, 1880.

Crystals of some form seem to be nearly or quite universal; on close examination they may be found in some part or parts of the majority of plants. In some plants they are only found in a certain position and of one form, while in others they may occupy several localities of the plant, and have as many forms. But the position and form often vary so much that it has been recommended by some authorities that they be made a family, and in some cases a generic distinction in the study of systematic botany.

Professor George Gulliver, while making dissections under the microscope for the purpose of comparing the relations between the structure of plants and animals, made note of every case in the examination of plants where raphides or other crystals occurred, and he says: "It was not before a large accumulation of my notes had been examined that crystals were thought of in this point of view; for they had not even been particularly looked after, and were merely noted whenever seen, long before their significance as characters was suspected. But when every one of these notes on raphides had been picked out, it was very unexpectedly discovered that the plants in which they occurred would sometimes come under certain orderly arrangements. Thus not a single species belonging to the order Onagraceæ or Galiaceæ was without a note of raphides, while in no single instance were these acicular crystals noted in the next allied orders." A converse example is then given. He then proves by more extended experiments that raphis-bearing is essential throughout the lives of certain species. By this and other experiments that I might mention, it is shown that the form and position of microscopical crystals in plants may be used as a distinctive character between orders especially, and perhaps, to a certain extent, between genera and species (?). Plant crystals as a character would only be of benefit to the botanist who had at hand a microscope that magnified at least a hundred and twenty-five diameters. Hence the objection to making them a means of identifying plants in our works on systematic botany.

As to the history of crystals, Lindley states that they were first seen by Rafn, who found them in the milky juice of some species of the family Euphorbiaceæ, and that they were afterwards seen by Jurine in the leaves of *Leucojum vernum* and elsewhere.

Edwin Lankester, M.D., writing on raphides, credits Malpighi with the discovery of crystals in plants, who found them in a species of *Opuntia*, and he says, further, that they were afterwards described by Rafn as occurring in the milky juice (latex) of some plants belonging to the family Euphorbiaceæ, and that Jurine soon after found them in the leaves of *Leucojum vernum* as stated by Lindley.

Raspail seems to have been the first person who studied crystals with their chemistry in view, at least he was probably the first to demonstrate that some of the crystals were composed of calcic oxalate.

John Quekett, in a paper written in or about the year 1852, also gives the credit of the discovery to Malpighi, and says that they were subsequently described by Jurine and Raspail, as stated above.

Professor Gulliver says that the raphides so early mentioned by Rafn in the Euphorbiaceæ were only the starch-rods which he (Gulliver) described as having found in the latex of the British Spurges.

Crystals should be divided into (at least) three classes and these seem to cover all the ground that was formerly covered by the name "Raphides." They are as follows:

1. Raphides.
2. Sphæraphides.
3. Crystal prisms.

1. *Raphides.*—The term raphid is from the Greek *ῥαφίς*, a needle, and was formerly applied by De Candolle to crystals resembling a needle in form.

Professor Gulliver gives the following definition of the term: "These are slender needle-like crystals with rounded, smooth shafts, vanishing at each end to a point, from about ten to fifty or more lying parallel together so as to form a bundle, which partially fills a cell or intercellular space."

I have never been able to find over thirty in one cell, and generally from five to twenty-five. The cells which contain them are generally elongate, or quite oval. To obtain these crystals in a bundle and still have a thin section fit for microscopical work, a steady hand and great care are required, as they are easily disturbed, when they will be seen scattered in every direction. Often on slight pressure they are seen to escape, one by one, quickly from one or both ends of the cell. When this occurs they are then known as "Biforines." The bundle of crystals is very loose and might be compared to a bundle of needles.

The genus *Trillium* affords a good example for the investigation of these crystals, and still better the species of the family Araceæ, with one exception which will be mentioned soon. In this family the raphides are found in great abundance and are about the largest that I have seen. As the plants of this order are very common, any one may examine them at pleasure. They may be found in any part, but are best seen in the stem.

2. *Sphæraphides.*—This word is from the Greek *σφαιρα*, a sphere or globe, and *ῥαφίς*, a needle or pin. "They are more or less rounded forms made up of a congeries of crystals, many of which are prisms, often acicular." As they often have points extending in all directions from the main body of the crystal, they appear rough and frequently stellate; they are generally found regularly placed, one imbedded in the substance of each cell. A collection of cells containing these crystals is known as a "sphæraphid tissue."

The flower parts of the geranium serve as a good field for observing them. These crystals are very common and are found in connection with raphides in the family Vitaceæ. But the best place to examine them is in the family Cactaceæ. These crystals as well as the next class were formerly known, incorrectly, under the common name "Raphides."

3. *Crystal prisms.*—These are "acicular forms with well-marked faces and angles both on the shafts and tips." They are found imbedded in the tissue of the plant and are never seen in bundles or loosely packed together, or single in a cell or intercellular passage. I have found as many as five of these crystals imbedded closely together in certain tissues, but generally only one. They vary much in size but are generally much larger than raphides, from which they may be easily distinguished. The family Compositæ furnish about the best field for the examination of this class of crystals, but they are much less common than the other forms of crystals.

My own observations and experiments have been, at present, mostly confined to the natural orders Araceæ, Vitaceæ and Compositæ. I examined the first two orders especially, as they abounded in crystals, and this gave me a better opportunity to examine into their chemical composition with more sure and satisfactory results.

In examining each specimen for the composition of the crystals, I first made the test under the microscope as far as possible, and in the case of inorganic crystals incinerated the substance and analysed the residue. Of course from this analysis it is not possible to state the exact composition of the crystals, whether they are, for example, acid or neutral salts; but we are able to state with certainty what the elements are that enter into the crystal. And at times and under certain conditions, and also by analogy, the exact composition may be ascertained; for example, if on examining the tissues of a plant octahedrons are found, and if under the microscope they do not effervesce with acetic acid, but do with stronger acids, and if after incineration we find on analysis calcium and carbonic acid, we may conclude with certainty that these crystals are composed of calcic oxalate. However, other acids than the one just mentioned do occur, as phosphoric and carbonic acids; the former I tested for under the microscope in the following manner: obtaining as large a field as possible of the crystals, I added a drop of hydrochloric acid and heated the slide slightly and then added a small amount of molybdate of ammonia; heating the slide again and allowing it to stand for some time, I placed it under the microscope, when, if any phosphoric acid was present the characteristic crystals of phosphomolybdate of ammonia would appear. These crystals are stellate forms consisting of four or six points, and have a yellow colour. *This test requires care, as too much heat seems to dispel the crystals.*

The latter (carbonic) acid I detected in the usual manner with acetic acid.

The three acids mentioned above are the only ones that I have found. Dr. Gray, in his 'Structural and Physiological Botany,' page 60, reports sulphuric acid.

The tests applied for the base were the same as those given in Douglas and Prescott's 'Qualitative Analysis,' but the only base found was calcium. The methods of testing given above were followed in nearly all cases. Where there is any change it will be mentioned in its proper place.

I will now give the results of my own work, commencing with the order Araceæ; in this order the raphides are abundant and large, and the cells that contain them are much elongated. The bundles contained from ten to twenty-eight crystals. The number was noted in twenty specimens and the average, twenty-five, taken from the results. Raphides were found in all parts of the plant *Arisæma triphyllum*; they varied some in size, but were, on the average, about $\frac{1}{100}$th of an inch long and $\frac{1}{10000}$th in diameter. The raphis-cells were very large and elongated and easily distinguished from the surrounding cells.

Dracontium, another species of the same genus as the above, showed no material difference in the position, size and number of the crystals from the first species.

In *Symplocarpus fœtidus*, or skunk's cabbage, the crystals were as common as in *Arisæma*, but were, on the whole, somewhat larger, and were found, as in the above species, throughout the plant. The raphis-cells of this plant were about $\frac{1}{50}$th of an inch in length and $\frac{1}{1000}$th in diameter. Some of the crystals appeared to be biforines, which I did not observe to be the case in any other species of this order. Thus if the odour of this plant can be overcome, it furnishes a good field for work upon this subject.

In *Acorus calamus*, or sweet flag, I was not able to find a single raphid, and as far as I am able to find articles upon the crystals of this family, none have ever been reported, but time and again students have been disappointed in not finding them. This genus is thus marked off from the rest of the family, although agreeing with the family characters perfectly in other particulars. Dr. Gray, in his systematic arrangement of plants, places this genus in the family Araceæ, but Lindley, on account of there being no raphides, and as the general characters of the plant would not permit of its being placed in any other family, places it in a family by itself, calling it Acoraceæ. This genus contains but few crystals of any sort. On examining a number of specimens I found only a few crystal prisms, which effervesced and dissolved with hydrochloric acid and were probably oxalate of lime. With the exception of the genus *Acorus* the crystals mentioned in this family showed with certainty that they were composed of phosphate of lime when the chemical tests were applied both under the microscope and also to the incinerated residue.

I shall now take up the species of the family Vitaceæ, and in these a wider view of crystals will be presented.

This family gives us a good field for the examination of both raphides and sphæraphides in the same plants. In all the species that I have examined the raphides were the most abundant in the leaves with their appendages, the petiole, and the epidermis of the stem in young plants, while the sphæraphides were more common in the old stems and berry, but were also found, though rarely, in the other parts mentioned for raphides. Crystals in the grape have been known for a long time. In the common cultivated grape, raphides are abundant, but the largest are only found in the leaf and petiole, and at times much smaller ones may be looked after in the fruit. These crystals, whenever found, gave the test for phosphoric acid and lime. In the pulp of the berry sphæraphides are abundant; those of the fruit stalks were about $\frac{1}{1000}$th of an inch in diameter. When a collection of these is met with they form a beautiful field, which I think is only surpassed in beauty by the sphæraphid tissue in the testa of the elm. These crystals would not answer to any of the chemical tests except those for calcium, so that I have reason to believe that the base was combined with some organic acid, perhaps tartaric.

Vitis æstivalis and *V. cordifolia* abounded in both sorts of crystals, but neither is as large as in the common grape. In *Ampelopsis quinquefolia* I found raphides, but they were often free, that is they were not in a close bundle. The sphæraphid tissue is very fine in this species. Each crystal seems to form a nucleus to a single cell. The cells are placed very regularly and symmetrical in form. The blackberries contained raphides in more abundance and of a larger form than those of the grape fruits, but the largest were in the leaves and petioles of the younger shoots. The sphæraphides were not as large as those of the grape. As in the genus *Vitis* the crystals of this species, except those mentioned last, seemed to contain lime as a base and phosphoric acid.

In this family all the crystals contained in the fruit, except the raphides, gave the tests for lime, but failed to give the tests for the common acids, so that I think it probable that the base was in combination with some organic acid. I expected to find in this family more acicular crystals, but in this I was disappointed.

The next order that I shall report upon is, as is well known, the largest natural order, and is represented by a number of hundred species, it being universal. This family, the Compositæ, is well represented in the Northern States. Raphides are not as common in this family as in the other two, Araceæ and Vitaceæ, but forms of all three classes do occur. I have only found the needle-shaped crystals in the ovary or fruit, and sometimes in the receptacle and involucre. In some species minute cubical crystals occur which dissolve with effervescence in acetic acid. Globular masses of crystals known as inulin are quite common. I did not find the raphides in bundles except in one case, *Achillea Millifolium*, which contained in the receptacle, on the average, about twenty raphides in each bundle; in all other cases when raphides were found they were single, which was perhaps due to some disturbance.

In *Inula helenium* I could find no crystals except the globular aggregate known as inulin. This substance is an organic compound having the composition $C_6H_{10}O_5$. Miller says that this is a variety of starch, insoluble in alcohol but soluble in hot water, and by boiling with dilute acids it is converted first into dextrine and then into pure lævulose. It forms an insoluble precipitate when its solution is mixed with one of acetate of lead and ammonia is added. I did not attempt to extract it from the root as that is quite a difficult operation to perform. The crystals appear like a globular mass with fissures radiating from the centre outwards; iodine, when applied to the well-cleaned section, gives with inulin a distinct yellow colour. This statement is in direct opposition to that made by Flückiger and Hanbury (see 'Pharmacographia,' under Elecampane). The only part of the plant that I had was the root, it being too early for the stem, leaves, etc., so that I am not able to state what might be found in the other parts.

Taraxacum dens-leonis also contains inulin, but in much smaller amount than the last, and also a few sphæraphides, which seem to have no particular location, as they may be found, on close examination, in almost any part of the plant, although rare. They were too small and too few in number to obtain any definite chemical tests with them. Also raphides were present, but only in small numbers and not in bundles.

Cichorium Intybus contains inulin, but it is in still smaller amounts than in the last.

I also found inulin in the root of *Cirsium arvense*, or Canada thistle; in which plant raphides are formed in the flower receptacle and also in the parts of the flower, also some other crystals which seemed to have four faces tapering to a point at each end (crystal prisms). The number of faces was probably double this. These crystals were soluble, with effervescence in hydrochloric and not in acetic acid. The raphides gave the chemical test for phosphate.

In *Cirsium muticum*, or swamp thistle, the crystals of inulin were very small and indistinct. The raphides were found the same as in the last species, though more numerous. The crystal prisms I was not able to find at all, the reason perhaps is, that I had only a young plant, while of the Canada thistle I had a fall or late specimen. *Cirsium lanceolatum* gave the same results as *C. arvense*.

In *Cynthia virginica* raphides of small size but no inulin were found. There were also a few cubical crystals in the lower part of the stem and in the flower receptacle, which gave answer to the test for carbonic acid with acetic acid, but the raphides proved to be phosphate. The cubical crystals were about the $\frac{1}{2000}$th of an inch in diameter.

Senecio aureus and *S. balsamitæ*[*] contained acicular crystals which, upon chemical examination, gave evidence of oxalate of lime. In this genus I was not able to find any raphides at all, nor any inulin. A few crystals were present, but on account of their small size and number, I was neither able to determine their form nor chemical nature.

Lappa major, or common burdock, contained in the flower receptacle and dried fruit minute cubical crystals, which gave the tests for carbonate of lime. No raphides or acicular crystals of any sort were present.

Tanacetum vulgare contained both cubical and acicular crystals, the latter in the leaves and petiole, and the former in the flower parts and upper part of the stem; both oxalate and carbonate of lime seemed to be present.

The raphides of this order seem to be rarer in the division or sub-order Liguliforæ, while the acicular crystals or crystal prisms were only found in the sub-order Tubuliforæ. Inulin is common to both sub-orders.

It will be seen on reference to my work that the raphides seemed to be composed of phosphate of lime, the acicular or crystal prisms of oxalate, and the cubical crystals of carbonate of the same, while the sphæraphides seemed to be the same base combined with different acids according to their locality.

It will be remembered that in the first part of this paper I mentioned the fact that crystals of some form were nearly if not quite universal, and as some slight evidence of this I have compiled with care a list of all the families in which crystals have been reported. This is the beginning of a more complete list of the genera and species which I hope soon to have ready for publication, which will be classified according to the kind of crystals that the species may contain.

The following is the list of families:—

CRYPTOGAMIA.

[†]Filices
Equisetaceæ
Hepaticæ
Characeæ
Musci
Algæ
Fungi.

PHÆNOGAMIA.

Exogenæ.

Araliaceæ
Aurantiaceæ
Balsaminaceæ
Berberidaceæ
Cactaceæ
Camelliaceæ
Caprifoliaceæ
Caryophyllaceæ
Chenopodiaceæ
Cinchonaceæ
Compositæ
Coniferæ
Crassulaceæ
Cruciferæ
Cycadaceæ
Droseraceæ
Elæagnaceæ
Euphorbiaceæ
Ficoideæ
Fumariaceæ
Galacineæ
Geraniaceæ
Galiaceæ
Halorageæ
Juglandaceæ
Leguminoseæ
Linaceæ
Melastomaceæ
Nyctaginaceæ
Oleaceæ
Onagraceæ
Orobanchaceæ
Oxalidaceæ
Passifloraceæ
Phytolaccaceæ
Polygonaceæ
Pittosporaceæ
Rubiaceæ
Saxifragaceæ
Scrophulariaceæ (Gelsemineæ)
Tetragonieæ
Tiliaceæ
Urticaceæ
Valerianaceæ
Vitaceæ
Zygophyllaceæ.

Endogenæ.

Amaryllidaceæ
Araceæ
Bromeliaceæ
Burmanniaceæ
Butomaceæ
Cyperaceæ
Dioscoreaceæ
[*]*Gramineæ*
Hæmodoraceæ
Hypoxidaceæ
Iridaceæ
Juncaceæ
Liliaceæ
Linaceæ
Marantaceæ
Melanthaceæ
Musaceæ
Orchidaceæ
Orontiaceæ
Pandanaceæ
Pontederiaceæ
Smilacaceæ
Typhaceæ
Xyridaceæ
Zingiberaceæ.

The names that are in italics indicate the families in which I have seen and studied the crystals, but only in a few cases their chemical composition.

Some of these, as the Onagraceæ and Orchidaceæ, contain large and beautiful crystals. In the vanilla bean, which is a fruit belonging to a species of the latter family, T. F. Meyer, of the university class of 1878, has reported and made drawings of the crystals. He states that they are composed of the active principle of the bean and belong to the second class or crystal prisms.

It is often supposed that minute substances have no particular use, and so it may be thought of these minute crystalline bodies; but generally anything that occurs in such abundance and so regularly has some use in the economy of either the animal or vegetable kingdom. On the use of the crystals Professor Gulliver says: "Although the precise use of crystals in the vegetable economy may be obscure, it is plain that whatever is constant in the plant must be important, and by no means necessarily of little importance because of such obscurity." Taking, for example, the Cactus family, which abounds in large crystals, some specimens of which have been reported to contain so many of these minute inorganic bodies that it was almost impossible to move the plant without breaking it, and when moved it was necessary to pack it in cotton with great care, as if it were the finest jewellery. A case like this is seldom met with, but as the occurrence of crystals is so constant a feature of this family, they must be of some use, which is, as yet, beyond the reach of man's power to perceive, and it would seem ridiculous to say that they have no use, as some prominent scientific gentlemen claim.

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[*] A variety of *S. aureus*.

[†] In this family I have seen crystals but once, and these were contained in *Phegopteris hexagonoptera*.

[*] The crystals of this family were shown to me by a fellow student in the University, Ann Arbor, Mich.

But such crystals may be of use to man, perhaps in two ways; first, when contained in some medicine.

It is well known that the disease called "rickets" is treated, or at least has been, with sarsaparilla; now the plant itself contains a large number of crystals which are composed of phosphate of lime. Query—why may not this plant, in connection with its tonic effects, also furnish some of the needed phosphate to strengthen the bones?

Second, they may be of use to man when contained in decaying leaves or plants, thus acting as a fertilizer.

Again, crystals are sometimes used by the merchant as a test for the genuineness of a drug. The quality of rhubarb is often tested by its grittiness, which is due to inorganic crystals, and rhubarb should contain a high per cent. of inorganic matter.

Other uses might be enumerated and given in this list, and perhaps some of them are of more importance than those mentioned, but sufficient has been said to show that they are probably of some practical value to man. It is hoped that this article will induce other investigators to take up this subject and find, if possible, their exact use in the economy of the plant.

The time is probably not far distant when we shall know more about microscopical crystals in plants, and for that time we must all wait, each investigator endeavouring to do his best.

THE MIGRATION OF EUROPEAN ANIMALS TO AMERICA AND OF AMERICAN ANIMALS TO EUROPE.*

BY PROFESSOR E. W. CLAYPOLE, B.A., B.SC. (LONDON), OF ANTIOCH COLLEGE, OHIO.

(Continued from page 578.)

Every lover of apples is too familiar with the larva of the apple worm or codling moth (*Carpocapsa pomonella*) and with the mischief it does to the apple crop of Canada and the States. Burrowing into the apple at the eye it nestles around the core and pips until its growth is complete, when it eats a way through the side of the fruit and makes its escape. The housekeeper here hardly dares to put a whole apple into her dumpling, as is the practice in England, lest inside it should be the white fat larva of the codling moth, with its accumulated grass. Its winding tube bored hither and thither causes further waste in cutting it out, and the value of the apple crop is often diminished by a half by the wreck it works inside the fruit. Yet the codling moth is no native of America, but was introduced from Europe with the apple on which it feeds, and rapidly spread over the Eastern and Midland Provinces and States. It seems quite impossible to import the fruits and flowers of Europe without sooner or later importing the insects that prey upon them and destroy them. And once here, many of them, as the codling moth, become nuisances and pests, and inflict damage immeasurably beyond anything known in the Old World.

The honey bee (*Apis mellifica*) was introduced into North America at Boston by the English, in the seventeenth century, and is said to have been driven over the Alleghany Mountains by a hurricane in 1670. There is no honey-making bee indigenous to North America, though some of the species found here collect a small quantity. They were long known to the Indian as "English flies," and Irving says they considered them the harbingers of the white man. To this Longfellow alludes, when in 'Hiawatha' his Indian warrior sings:—

> "Wheresoe'er they tread, before them
> Swarms the stinging fly, the ahmo,
> Swarms the bee, the honey-maker."

Soon escaping from its human masters, it took to the woods, where it multiplied rapidly, until now the honey-bee of Europe is familiar from the Atlantic to the Pacific, and is often thought of as a native insect. It is, however, probably of Asiatic rather than of European origin.

For many years the honey bee flourished in America undisturbed by one at least of its worst European foes. Not until the beginning of the present century was the wax moth (*Galleria cereana*) introduced, but the American and Canadian bee-keepers now suffer as much from its ravages as their brethren in Europe. It consumes their wax, wastes their honey, and clogs the combs with its web.

The European red currant is persecuted on this continent by its imported European enemies to a degree quite unknown in its old home. The currant borer (*Egeria tipuliformis*) has followed it, injuring and at length destroying the bushes by boring in the stem. In or about the year 1856, the European currant sawfly (*Nematus ventricosus*) made its appearance, introduced, no doubt, in earth about the roots of currant or gooseberry bushes. Messrs. Riley and Walsh, in the 'American Entomologist,' traced it to the celebrated nurseries of Messrs. Ellwanger and Barry, at Rochester, and suspect that it had been previously imported into Maine and Vermont. "In nine years it reached the Hudson River. In 1860 or 1861 it was found at Erie, Pa., in 1864, at Ann Arbor, Mich., having spread at the rate of about 25 miles a year. It has been known in this part of Ohio for four or five years, and bids fair to run through the whole country and make the raising of this favourite fruit both difficult and uncertain.

Among the insect-plagues of the farmer there are two so eminently destructive that they are objects of national importance and deserve more than a passing mention. In the first year of the infant Republic, and almost before the ink on the Declaration of Independence was dry, an enemy set foot on this continent destined to commit greater ravages than any yet named. In August, 1776, Earl Howe, with a force of Hessian troops, landed on Long Island, and while these soldiers were the foe to which attention was directed, the real danger lay in the straw they brought with them as litter for their horses. There were in all probability concealed a few chrysalids of the Hessian fly (*Cecydomyia destructor*), future destroyer of the American wheat crop. Within two or three years of that time, so rapid was its increase that we read in the 'Colonial History of New York,' as quoted by Dr. Fitch:—

"1779. No wheat can be bought for continental money, nor for hard money under twelve shillings (two dollars) a bushel. The last harvest was short on account of a blast and a *fly* which before the snow fell devoured the green blades."

Since that time the Hessian fly has spread through almost the whole country where the winter wheat is grown, and its ravages have been at times so great as to prevent the cultivation of the plant. "It reached Saratoga, at a distance of 200 miles, in 1789." "It was reported west of the Alleghany mountains in 1797." Says Dr. Harris: "Wheat, rye, barley and even timothy grass were attacked, and so great were its ravages that the cultivation of wheat was abandoned in many places." It is not too much to say that in this locality (S.W. Ohio) I have during the past two years seen many fields in which one-fourth, at least, and in some a much larger part of the crop, was destroyed by this insect.

Transcending, however, even the Hessian fly in its destructive work in our wheat fields, is another European immigrant, the wheat midge (*Cecidomyia tritici*), or, as it is commonly called by farmers in this part of the country, the weevil, a name which should not be employed, as it belongs to a family of beetles. To Canada is the rest of the continent indebted for the importation and distribution of this destroyer. According to Dr. Fitch, it was recognized as early as 1828, on the St. Lawrence, above Quebec, and it is said to have been found in N.W. Vermont even earlier. Quebec appears to have been its port of landing, and its progress over the country appears to have followed the St. Lawrence and Sorel rivers. Thence it steadily advanced upon the wheat crop in all directions. About 1849 it began to destroy the crops on the north shore of Lake Ontario. The Secretary of the State Agricultural Society of New York estimated the value of the wheat destroyed in that state in 1854 at fifteen million dollars. Much was never reaped at all. Canada, Upper and Lower, and Nova Scotia, sent in similar reports, the loss in the former province being estimated at two and a half million dollars in 1856. But space forbids detail. Writing in 1865, Dr. Fitch says:—

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* Reprinted from the 'Fourth Report of the Montreal Horticultural Society,' 1878.

"In consequence of the presence of this insect over all the New England States and all New York and Canada, except their western parts, wheat has wholly ceased to be a staple product. Wool-growing and dairying have become the leading pursuits. These require fewer labourers. Then this insect has done much toward reducing our population by producing extensive emigration to the west." "Upon one of the Vermont hills, within sight of my residence, from which in former years seven stalwart men regularly made their appearance at militia musters, the hearth fires are now extinguished and the dwellings demolished."

This is surely one of the most striking illustrations of the truth that small causes can produce great effects if sufficiently multiplied. The midge has driven the cultivation of wheat out of many districts altogether, and in many others it can only be continued because the heat of the climate brings the plant to maturity before the insect can seriously injure it.

The list is yet far from being exhausted. We have a cockroach in America, a harmless insect enough. But he has a relative, the Asiatic and European cockroach (*Blatta orientalis*), of habits so different that there are many houses in England of which we may, without exaggeration, say that the cockroaches tolerate the presence of the human owners. This pest landed from some infected ship, and at once preëmpted a claim in the western world that extends from the Atlantic to the Pacific. This claim his descendants are rapidly occupying without the slightest danger of dispossession.

There are cheese-lovers in the old country who eat and say they prefer "skippery cheese" to any other. I have seen at least one such, who was accustomed to munch, with apparent relish, a piece of such cheese alive with what the uninitiated declared were "maggots," but which he asserted were only cheese in a concentrated form—cheese alive. To the cheese-maker in England this "hopper" (*Piophila casei*) is a nuisance, against which he is compelled to wage unceasing war. But this "nuisance" has long been at home in America, and the epicure may gratify his taste for "skippery cheese" on this continent without importing it from Europe.

About half a century ago—quoting again from Dr. Fitch—the European onion fly (*Anthomyia ceparum*) made its appearance on this continent, and since then has spread over all the Eastern States, though I have not yet heard of it in the West. There is a native American onion fly, but the mischief it does is so insignificant beside that caused by its European relation that few gardeners even notice its presence.

All our European immigrants, however, are not injurious. Let us relieve the monotony of this list by noticing one or two. The garden tiger moth (*Arctia caja*) is known, but has never become abundant here. Several specimens were taken at Trenton Falls in 1837 by the English entomologist, Mr. Doubleday. This "woolly bear" of English children appears to be the insect mentioned in 'Hiawatha':—

"The mighty caterpillar
Way-muck-kwana, with the bear-skin,
King of all the caterpillars."

An English entomologist would be almost wild were he to catch sight of a specimen of the Camberwell beauty (*Vanessa antiopa*), and should he succeed in capturing it his joy would be unbounded. It would be one of the events of the season. Since its old haunts at Camberwell were built over by the growth of the "Great Metropolis," it has become so exceedingly rare that Stainton, writing in 1857, could say: "It has hardly been seen for ten years." Yet here, where it was introduced at an early date, it has become so thoroughly naturalized that now it is one of our common species, and in some seasons has so abounded as to become destructive and awaken the foolish fear of the country folks, leading them in not a few instances in New England to fell the tall Lombardy poplars on which the harmless larvæ were feeding, under the impression that they were poisonous and must be destroyed at any cost.

But I must bring this list to an end. Let me notice a family, small in size but great in number and in destructiveness, and all foreigners,—a family whose members vex lady readers more than most of the above,—the great *moth* family, using the word in its proper sense. Foremost comes the clothes moth (*Tinea flavifrontella*), feeding on woollen fabrics; the carpet moth (*Tinea tapetzella*), whose home is between the carpet and the floor; the fur moth (*Tinea pellionella*), so destructive to winter clothing, and the grain moth (*Tinea granella*). This last is too common in granaries, where the caterpillar forms its nest on the outside of the heap, binding several grains together, or spinning its threads over the whole and covering it with cobwebs.

Space forbids more than a mention of many of the parasites which have crossed in the train of man to prey upon him and the domestic animals. The great army of fleas, bed-bugs, lice, sheep, cattle and hog ticks, sheep, horse or ox bot-flies, with the infamous muscle worm of the pig (*Trichina spiralis*), are all foreigners naturalized here, and combine with the native blood-suckers, pre-eminently the mosquito and black fly, to render some places almost uninhabitable to those whose hide is thinner than that of the rhinoceros.

(*To be continued.*)

MIALHE'S TOOTH-POWDER AND DENTIFRICE.*

The formulæ for these are the following:—

Sugar of milk, 1000 part; lake, 10 parts; pure tannin, 15 parts; oil of mint, oil of anise-seed, and oil of orange-flowers, so much as to impart an agreeable flavour to the composition.†

Mialhe's directions for the preparation of this tooth-powder are: to rub well the lake with the tannin, and gradually to add the sugar of milk, previously powdered and sifted, and lastly, the essential oils are to be carefully mixed with the powdered substances. Experience has convinced him of the efficacy of this tooth-powder, the habitual employment of which will suffice to preserve the gums and teeth in a healthy state. This formula of Mialhe has been recommended, especially when the teeth have been blackened by the chalybeates. It would, however, be useful in other cases.

For those who are troubled with excessive relaxation and sponginess of the gums, he recommends the following astringent preparation:—

Mialhe's Dentifrice.—Alcohol, 1000 parts; kino, 100 parts; rhatany root, 100 parts; tincture of tolu, 2 parts; tincture of benzoin, 2 parts; oil of canella, 2 parts; oil of peppermint, 2 parts; oil of anise seed, 1 part.‡

The kino and the rhatany are to be macerated in the alcohol for seven or eight days, and, after filtration, the other articles are to be added.

A teaspoonful of this preparation, mixed in half a goblet of water, should be used to rinse the mouth after the use of the tooth-powder.

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* From *New Remedies*, January, 1881.

† Mialhe, 'Chimie Appliquée à la Physiologie et à la Thérapeutique,' 1856, 8vo., p. 638.

‡ *Ibidem*, p. 638.

The Pharmaceutical Journal.

SATURDAY, JANUARY 22, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE RELATIONS OF MEDICINE AND PHARMACY.

WHILE efforts are being made to effect an amendment of the Pharmacy Act, which may be hoped to promote the interests of pharmacists and secure to them a fair chance of remunerative compensation for the qualification they are required to possess for the efficient and safe service of the public, it is evidently of especial importance that the attitude of the medical profession in regard to this endeavour and the opinions of the medical press concerning it should be observed with attention. The practical relations of medicine and pharmacy in this country are in many respects far from being so satisfactory as could be desired, and though we are not disposed to concur with those who, on either side, make such defects as exist the ground for mutual recrimination, we are strongly of opinion that the prospective amelioration of the business of pharmacy can only be hoped for as the result of improvement in the relations between its followers and medical practitioners.

In regard to dispensing, which is the especial business of the pharmacist, and should be, as in other countries, carried out almost entirely by him, it would not perhaps be exaggeration to say that not a tenth part falls to his share. This is a misfortune, we think, for medical men, no less than for pharmacists, and the alteration of such a state of things ought to be one of the objects most strenuously sought for by the latter. That there is a very general disposition on the part of medical men to view with favour the transfer of dispensing to the hands of pharmacists, we have frequently had opportunity of observing. Not very long since when the chemists and druggists of Rochdale took this matter in hand there was a very general expression of opinion on the part of medical men that the sought for change was desirable; but still there are so many incidental circumstances involved and so many side influences to be dealt with that the progress made is but slight.

It is therefore with especial satisfaction that we gather from the letter of Dr. JAMES WILLIAMSON, published at page 607, that a movement is being made by several members of the British Medical Association, having for its object the discontinuance of dispensing by medical men. From Dr. WILLIAMSON'S letter it appears that in the first instance it is only in regard to cities that this is contemplated, and there is good reason for such a limitation of the attempt at the outset, but we cordially agree with our correspondent in the opinion that this is a step in the right direction, and one which ought to command the sympathy and cordial support of the Pharmaceutical Society as well as every member of the trade.

That in order to carry out this important amendment in the practice of pharmacy in Great Britain it is essential that the chemist and druggist should supply exactly and skilfully what is ordered by medical men and charge as reasonably as possible for all medicines dispensed is a proposition that cannot be controverted, and when we reflect on the improvement which has been wrought during the last twenty years or so in the educational training of pharmacists in this country there is little reason for fearing that there would be any shortcoming on their part in fulfilling all the requirements of prescribers and their patients.

We gladly accede to the request of our correspondent, therefore, and with the object of encouraging discussion of the matter refer our readers to his letter, sharing with him the hope that it may lead to good results. Probably the meetings of the Medical and Pharmaceutical Congresses that are to be held in the course of the present year may afford favourable opportunity for the discussion and for the adoption of measures that would further the desired object. In any case, the subject is worthy of serious consideration, and we shall be happy to receive expressions of opinion, both from medical and pharmaceutical correspondents, as to the means most likely to be effectual in seconding and carrying into practice the desire of medical practitioners to give up dispensing their medicines.

As yet we have not met with any expression of opinion in the medical journals upon the proposed amendment of the Pharmacy Act. In the *Lancet* of last week there is a *résumé* of the Bill, and the main object of it is represented to be that of rendering illegal the action of co-operative societies in dealing in drugs. This is perhaps too literal an interpretation of the provisions of the Bill, and it would be more correct to say that its main object is the maintenance of the principle that personal qualification of the owner of a chemist and druggist's business is essential in the interest of the public. The *Lancet* appears to think that in our statement of the case the week before last we had overlooked the fact that neither the Pharmacy Act nor the Medical Act was intended for the protection of the class which it regulates, but that each was intended for the protection of the public. We disclaim any such omission and, on the contrary, contend that it is the protection of the public which demands personal qualification of the proprietors of pharmacies. If the legal necessity for such personal qualification also operates incidentally in favour of the pharmacist and protects him in the exercise of the business, in so far as to leave him undisturbed by the competition of persons who have not that personal qualification, surely that is an influence that should not be grudged, nor should it be regarded any more as the means of maintaining a monoply than the provision of the 32nd section of the Medical Act that no unregistered person shall be entitled to recover charges for medical or surgical advice, attendance, etc., or for medicine prescribed and supplied. The qualified practitioner is in so far protected against the competition of quacks and it is in the interest of the public that he is accorded such protection. There are also other provisions of the Medical Act which operate in the same direction and are in like manner justified by regard for the public interest. We venture to assert that the personal qualification of pharmacists, which is the leading idea of both the Pharmacy Acts, is equally an essential thing from the same point of view, and that being the case we do not admit the argument of our contemporary that it is necessary to show that danger to the public is incurred by the practice of pharmacy by associations of unqualified persons employing a qualified pharmaceutical chemist to conduct their business.

We regret that we cannot congratulate our readers upon the evidence of any sympathy afforded by such remarks as our contemporary has made upon the proposed Pharmacy Bill. With the exception of approval of the provision that patent medicines containing poisons should be subject to the regulations now in force as to the ordinary sale of poisons, the tendency of its remarks seems to be rather in the opposite direction, although from the point of view we have referred to above it ought, we think, to be obvious that medical and pharmaceutical interests are so closely connected as to necessitate the cordial co-operation of both classes in any projected measure of reform.

THE CHEMISTS' BALL.

THE weather has been sufficiently wild this week to have excused the gloomiest prognostications of failure concerning the Chemists' Ball. But these were not justified by the event, and the position which this annual gathering has now attained could hardly have been more markedly shown than by the fact that on Wednesday about three hundred ladies and gentlemen braved the snow and cold and consequent difficulties attending locomotion to put in an appearance at WILLIS'S Rooms. Once arrived there, their comfort and enjoyment were secured by the excellent arrangements of the Committee, carried out under the superintendence of the Honorary Secretary, Mr. J. F. SAVORY. At the supper-table the chair was taken by Mr. M. CARTEIGHE, who proposed the single toast, "Success to the Chemists' Ball."

THE CHEMISTS' ASSISTANTS' ASSOCIATION.

THE annual dinner of the above Association will take place at the Holborn Restaurant (Little Queen Street entrance), on Wednesday next, January 26, 1881, Professor BENTLEY in the chair. Application for tickets should be made early (*vide* advertisement in last issue).

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of this Association will be held on Thursday, January 27, at 8.30 p.m., when a Report will be made by Mr. C. H. HUTCHINSON, F.C.S., on "SOXHLET'S Researches on the Quantitative Determination of the Sugars." A Report on Pharmacy will be made by Mr. W. H. SYMONS, F.C.S., "Notes on Vaseline."

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

At a meeting of the Board of Examiners for England and Wales, held in London, on Wednesday, January 19, 1881, the report of the College of Preceptors on the examination held on January 4 was received.

Two hundred and seventy-five candidates had presented themselves for examination, of whom *one hundred and forty-six* had failed. The following *one hundred and twenty-nine* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

(Arranged alphabetically).

Agar, John George	Mansfield.
Alderton, William Baker	Enstone.
Andrews, John Henry	Winchester.
Askren, Michael William	Thorne.
Auchinachie, Peter	Keith.
Baxter, Thomas Richd. Cooper	Birmingham.
Bearpark, Charles Frederick	Scarborough.
Benest, Herbert William	Jersey.
Bentley, John Richard	Thirsk.
Black, Charles Jeffrey	Anstruther.
Blackham, William George	Liverpool.
Booth, Charles Henry	Walsall.
Booth, John	Keith.
Boucher, Hubert	Birmingham.
Bowen, George	Stafford.
Brackenbury, Richard Hayes	Bardney.
Brampton, Isaac Arthur	Birmingham.
Brand, Roger	Wallsend.
Buck, Walter	Boston.
Buck, William Henry	Otley.
Burbank, Thomas J. A. R.	Caistor.
Bygott, Walter Frank	Barton-upon-Humber.
Campbell, William John	Dundee.
Carpenter, Ernest Frederick	Cirencester.
Castles, Thomas Wallace	Bolton.
Castle, John William	Durham.
Clark, James	Buxburn.
Cook, George Russell	Grimsby.
Cox, Charles James	Guernsey.
Culverwell, Ebenezer	Torquay.
Curnow, Edmund	Penzance.
Davies, David	New Quay.
Davis, Albert Edward	London.
Eden, Richard A. S.	Aberdeen.
Elliott, Henry Alfred	Derby.
Ellwood, William Mark	Leominster.
Fawssett, Theodore	London.
Fisher, George	Wigton.
Foulds, Robert, jun.	Liverpool.
Gardiner, David	Dundee.
Gardner, Charles Edward	Grahams Town.
Gardner, Joseph Samuel	Daventry.
George, Wm. Albert Watkin	Hirwain.
German, George William	Lichfield.
Glass, David	Edinburgh.
Godwin, Frederick James	London.
Goold, Bruce	Cardiff.
Grayson, William Henry	Kidderminster.
Hall, Arthur William	Sunderland.
Harrison, Thomas	Bowness-on-Windermere.
Haslop, William Henry	Oldham.
Hay, Alexander	Montrose.
Hearnshaw, Arthur Donington	Spalding.
Hern, George	St. Austell.
Holyoak, William Wringrose	Leicester.
Hope, John	Wigton.
Horsley, Edward	Manordeilo.

Jackson, Herbert	Horncastle.
Johnston, James	Edinburgh.
Johnston, Thomas	Edinburgh.
Jones, Richard William	Llanberis.
Kelly, Philip Alfred	London.
Kershaw, William Henry	Dewsbury.
Lane, Henry Charles George	Salisbury.
Law, James	Insch.
Lee, Benjamin	Leicester.
Lewty, Alfred E. R.	Preston.
Leyland, Thomas William	Prescot.
Livingstone, James Taylor	Morecambe.
Lloyd, Henry	Pencader.
Loesby, John Newton	Ely.
Lyon, Walter Henry	Chatteris.
McNaughton, Henry Brougham	Ballinluig.
Mallinson, James Edward	Oxford.
Mander, Alfred	Coventry.
Marshall, Alexander James	Linlithgow.
Miller, Thomas, jun.	Leith.
Mole, Alfred Ernest	Sheerness.
Moyse, Arthur	Fareham.
Nelmes, George	Liverpool.
Newton, John	Heckington.
Nicol, Joseph Clarke	Stirling.
Oldham, Arthur	Stamford.
Page, Thomas	Stourbridge.
Paton, Robert Alexander	Irvine.
Peden, William	Kilmarnock.
Poll, William George	Gt. Yarmouth.
Price, Joseph	Bilston.
Reyner, George	Thurlstone.
Richmond, Alfred Edward	Gt. Yarmouth.
Roberts, Herbert	Halifax.
Rogers, Frederick Samuel	Margate.
Rutherford, William	Retford.
Scharpe, Samuel Chaplin	London.
Shairp, William	Glasgow.
Shaw, William Alfred	Sheffield.
Shepherd, Robert, jun.	Ellon.
Skewes, Josiah	Penryn.
Skyrme, Charles George	Cardiff.
Smithson, Frederick William	Thirsk.
Southall, Wilfred Francis	Birmingham.
Spencer, Harvey	Cheddar.
Spencer, John	Keighley.
Strouts, Sidney Robert	St. Mary Cray.
Sturges, Arthur Blackwell	Leicester.
Sutherland, Adam G.	Edinburgh.
Symonds, James Alfred	Leamington.
Taylor, George	Edinburgh.
Taylor, Joseph John	Sittingbourne.
Thomson, George, jun.	New Deer.
Tonking, Wm. Oliver Hosking	Camborne.
Townsend, William Thomas	Bradford.
Turner, Ernest	Cheltenham.
Walker, George Bilderbeck	Wellingborough.
Warner, William	Bath.
Watson, Albert James	London.
Watson, Edward	London.
White, Edmund	Rochester.
Whiteley, John William	Gainsborough.
Whyte, Alexander	Huntly.
Williams, Henry Collins	Tredegar.
Wilson, John	Aberdeen.
Wood, Arthur Graham	Bingham.
Wood, Charles Granville	Oldham.
Wood, Walter	Blyth.
Wood, William	Scotswood-on-Tyne.
Woodhouse, Leonard Arthur	York.
Woodruff, Albert Edward	Sandwich.
Wooler, Frederic William	Leeds.

The following is a list of the centres at which the examination was held, showing the number of candidates examined at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	14	10	4	Jersey	1	1	0
Birmingham	15	10	5	Lancaster	5	3	2
Brighton	1	0	1	Leeds	14	5	9
Bristol	8	2	6	Lincoln	10	6	4
Cambridge	3	2	1	Liverpool	11	4	7
Canterbury	4	4	0	London	32	10	22
Cardiff	7	4	3	Manchester	12	4	8
Carlisle	4	2	2	Newcastle-on-T.	9	5	4
Carmarthen	7	3	4	Northampton	4	2	2
Carnarvon	4	1	3	Norwich	3	2	1
Cheltenham	2	2	0	Nottingham	6	3	3
Darlington	2	0	2	Oxford	2	2	0
Dundee	6	3	3	Peterborough	4	3	1
Edinburgh	26	8	18	Sheffield	7	4	3
Exeter	3	2	1	Shrewsbury	7	1	6
Glasgow	6	4	2	Southampton	6	2	4
Guernsey	1	1	0	Truro	7	4	3
Hull	10	4	6	Worcester	4	3	1
Inverness	2	0	2	York	6	3	3

The questions for examination were as follows:—

Time allowed: Three Hours for the three subjects.

I. LATIN.

1. Translate into English the following passages:—

A. Capto monte et succedentibus nostris, Boii et Tulingi, qui hominum millibus circiter quindecim agmen hostium claudebant, et novissimis præsidio erant, ex itinere nostros latere aperto aggressi, circumvenere; et id conspicati Helvetii, qui in montem sese receperant, rursus instare et prælium redintegrare cœperunt.

B. Quæ quidem res Cæsari non minorem, quam ipsa victoria, voluptatem attulit; quod hominem honestissimum provinciæ Galliæ, suum familiarem et hospitem, ereptum e manibus hostium, sibi restitutum videbat, neque ejus calamitate de tanta voluptate et gratulatione quicquam fortuna deminuerat. Is, se præsente, de se ter sortibus consultum dicebat, utrum igni statim necaretur, an in aliud tempus reservaretur.

2. Parse—"qui hominum millibus circiter quindecim agmen hostium claudebant."

3. Decline the words in (2) which undergo inflexion; giving the present, perfect, supine, and infinitive of *claudebant*.

4. Translate into Latin:—(i.) It was told to Cæsar that the cavalry of Ariovistus were approaching the mound. (ii). After an interval of three days, Cæsar began to pursue the Helvetii with all his forces. (iii.) One of the soldiers said that Cæsar was doing for the tenth legion more than he had promised.

II. ARITHMETIC.

[The working of these examples, as well as the answers, must be written out in full.]

5. Goods were bought at 6½*d*. per lb., and the cost of carriage is 1½*d*. per lb. They are sold at £4 10*s*. per cwt. What is the gain or loss per cwt.?

6. Simplify—

$$\frac{2\frac{1}{4} - \frac{2}{3} \text{ of } 1\frac{5}{8}.}{\frac{1}{8} \text{ of } 3\frac{1}{3} + \frac{13}{36}}$$

7. Find the sum, difference, and product of 573·005 and ·000754.

8. How do you convert degrees on the Fahrenheit scale into their Centigrade equivalent? Express 45° C. as degrees F.

9. If 1 cubic centimetre of a given liquid weigh 2·45 grammes, what will be the weight in grammes of 1·5 litre of the liquid?

III. ENGLISH.

10. Distinguish *adjectives* from *adverbs*, *preposition* from *conjunctions*. Give examples.

11. Name various ways of forming the plural in English nouns.

12. From what roots are the following nouns formed:—*stitch, smith, shaft, shred, health, drift.*

13. Parse the words in italics in the following passage:—

> "*Be thou therefore in* the van
> Of circumstance; yea, seize the *arrow's* barb
> *Before* the *tense* string *murmur*."

14. Write a short composition upon *one* of the following subjects;—

- (i.) The habits and qualities which are most favourable to a student's progress.
- (ii.) The habits and qualities which are most favourable to success in business.
- (iii.) The true place of advertising in business.
- (iv.) The value of Latin, Arithmetic, and English to an intending Pharmaceutical Chemist.

The undermentioned certificates were received in lieu of the Society's Preliminary Examination:—

Certificate of the University of Cambridge.

Scott, George	Mildenhall.

Certificates of the College of Preceptors.

Hamilton, Bruce	London.
Rookledge, Frederick	York.
Young, James	London.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

A meeting of the above Society was held on Wednesday evening, January 12, Mr. Ellinor, President, in the chair.

After the minutes of the previous meeting had been read, and the ordinary business of the Society completed, the remainder of the evening was occupied by a discussion on the proposed Pharmacy Law Amendment Bill, at the conclusion of which the following resolution, proposed by Mr. E. R. Learoyd, seconded by Mr. W. Ward, F.C.S., was unanimously adopted:—

> "That this meeting, after due consideration of the proposed Pharmacy Law Amendment Bill, cordially approves of the provisions of the same, and pledges itself to actively support it."

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fourth meeting of the session was held on Wednesday, January 12, in the rooms of the North British Branch, Mr. J. D. Robertson, President, in the chair. Owing to inclement weather the attendance was small.

The minutes of the last meeting having been read and confirmed,

The Chairman expressed regret that, owing to illness, Mr. Reynolds was unable to read his essay on "Rhubarb," as expected, and called upon the Secretary to read it in his absence.

In the essay, which gained the apprentices' prize last session, Mr. Reynolds treated the subject in a systematic and exhaustive manner, bringing the information regarding the source of the drug up to the most recent date. It was well received by the Association, and was generally spoken of as very creditable.

The following resolution was then submitted, and unanimously agreed to, viz:—"A member of any kindred Association, coming to reside in Edinburgh, and having paid his subscription for the current year as a member of that Association, may be elected as a member of this Association without further payment for that year, on producing a certificate of membership from the Secretary of that Association."

Several queries were afterwards submitted and replied to. In answer to the query, "What is the composition of the precipitate produced on adding an acid to infusion of chiretta?" it was stated that by the action of acids the chiratin present in the infusion is split up into ophelic acid and chiratogenin, a substance almost insoluble in water, which constituted the precipitate in question. The subject, however, seemed to require further investigation.

The Chairman having intimated that the next meeting would take place in February, when a paper on "Cochineal and Cochineal Colouring," will be read by Mr. Robert Aitken, the meeting was brought to a close.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, January 13, Mr. D. Hooper, Vice-President, in the chair. A paper was read on—

STARCH AND STARCHES.

BY W. H. SYMONS, F.R.M.S.

After a *résumé* of the history, morphology, and chemistry of starch, the author proceeded to consider it dietetically, and stated, "That the power of digesting starch is not by any means such as to secure the digestion of all that enters the alimentary canal as food. Starch granules, especially when the starch has been ingested in the raw state, have been frequently shown to pass off from the alimentary canal in considerable numbers with the evacuations, both in man and in the lower animals."—(Pavy.)

To prove this half a pound of Bermuda arrowroot of the brand known as T had been mixed with milk and drunk at intervals during the day, two ounces being taken with each meal; all other farinaceous food and fermented liquors were abstained from, milk, eggs, and meat being the staple diet. It is to be noted that the starch was not retained in the mouth as long as it would have been had it been eaten in the solid state, and would not be well mixed with the saliva; but it had been proved by experiment that saliva had very little if any action upon unbroken starch granules, and a good portion of saliva would be carried into the stomach with the meat eaten, and this would be at liberty to act on the starch if it had any power to do so.

As raw starch is frequently given to infants suffering from diarrhœa, constipation was anticipated; but contrary to expectation diarrhœa set in after the third meal. The first stool, consisting of a light yellow frothy substance, only was collected, well mixed with chlorine water and strained through muslin; nothing was left on the muslin but a few lumps of undigested fat. The strained liquor was allowed to settle, which it readily did, the liquid decanted, the sediment several times washed, passed through fine muslin, and ultimately thrown on a filter paper, well washed with distilled water and carefully dried; yielding about an ounce and a half of starch, perfectly free from odour and presenting the usual physical characters of arrowroot.

Under the microscope the granules showed no alteration of size or shape; the hilum was distinctly visible, the rings less so; but about one half the granules appeared as if eroded on their surface.

With polarized light they exhibited the cross as distinctly as before passing through the alimentary canal. With boiling water, with iodine, with solution of caustic potash, and with sulphuric acid it yielded the same results as did a fresh sample of the same arrowroot.

The author believes that with care he could have collected most of the starch taken as food in the raw state, and that it would be the same chemically and physically as it was prior to ingestion, with the exception of the erosion, which he has endeavoured to produce artificially by the action of saliva, the pancreatic secretion and chlorine water, but without success.

The paper concluded with a description of the general microscopy of the starches.

After a lengthy discussion the thanks of the meeting were awarded to Mr. Symons for his paper.

Review.

THE ELECTRIC LIGHT FOR INDUSTRIAL USES. By R. E. CROMPTON, Mansion House Buildings, and Anchor Iron Works, Chelmsford. London, 1880.

Mr. Crompton has been known to the public for some time past as an electric light engineer and as the inventor of a successful electric lamp. We are thus led to expect that he will be able to give sound, practical advice on the increasingly important subject of electric lighting, and we are bound to say that this expectation is quite realized in the pamphlet before us.

This pamphlet has been written for the information of owners of large floor spaces, yards for loading and unloading vans, etc., and others desirous of employing the electric light as an improvement on the existing methods of illumination.

The author thinks it will be convenient for an intending user of the electric light to have the following questions answered:—

1. How is the motive power for driving the machines best obtained?
2. What are the merits and demerits of the generating or dynamo machines now in the market?
3. What are the corresponding merits and demerits of the regulator lamps?
4. The most convenient and useful accessories, lanterns, cables, switches, carbons?
5. What will be the working cost?

This classification will doubtless be found very convenient to many of the class of readers for whom this pamphlet has been written.

Mr. Crompton states in his preface that he has endeavoured to be strictly impartial in his judgment of the merits and demerits of the dynamo machines, motors, cables and carbons; but he very frankly tells us that about the lamps he cannot speak so impartially, as, naturally, he cannot but think his own to be the best.

In most cases Mr. Crompton advises, and we think justly so, the use of a separate engine to drive the current generator or generators, as the case may be, as if from any cause the speed is liable to vary, such as by putting loads on or off the engine, corresponding variations in the lights are produced. This is the reason why sensitive governing gear is of such great importance in all engines used for the production of the electric light.

Mr. Crompton, however, assures us that there is no difficulty in procuring perfectly trustworthy engines from at least fifty makers. He appears to think highly of Messrs. Marshall, of Gainsborough, and Ransomes, Sims and Head, of Norwich, as makers of engines with very perfect automatic gear. We believe Mr. Crompton used one of Marshall's engines for the lights at the Alexandra Palace, and that its working was quite satisfactory to the electrical superintendent.

As regards the dynamo machines, the author thinks "it is very doubtful if the Gramme and Siemens machines have ever been fairly beaten in economic efficiency by any of their later rivals, as it must be allowed that all the later inventors have only rung the changes on the Gramme ring or the Siemens bobbin."

The points he draws the intending user's attention to in choosing a machine are—

1. The internal resistance of the machine itself, on which depends its power of giving a stable current against a given external resistance.
2. The firmness and durability of the construction, mechanically considered.
3. The wear and tear and risk of damage in working.

Mr. Crompton states that the Gramme machine has commonly an internal resistance of 1 ohm, or thereabouts, as against ·7 to ·75 of the Siemens machine, and as a consequence, Schwendler, Hopkinson and Tyndall have come to the conclusion that Siemens's machines give better results than do Gramme's; but the author pertinently remarks that had they compared the two machines on even terms of internal resistance, they would probably have found the difference to be inappreciable.

Mr. Crompton also seems to think highly of the Bürgin machine, a low tension machine, from Switzerland. In his opinion, the character of the light from low tension machines is very satisfactory as regards whiteness in colour and the power of penetrating a foggy atmosphere. Of the high tension currents of the Brush machine, capable of turning 16 arcs in series, he does not so much approve, as the colour is not so good, being sometimes purplish, blue and greenish, and the arc being more flickering and unsteady. We cannot but agree with him on this point; the arcs of the Brush lights at the Liverpool Street Station of the Great Eastern Railway Company appear to have a distinct rotatory movement at intervals, which is entirely absent in the really splendid low tension Siemens lights at the British Museum.

In the latter installation, the steadiness of the lights is almost all that can be desired, the lamp feeds are nearly absolutely unobservable, and the light appears exceedingly uniform and constant.

It is said that the electromotive force of the large Brush machine is equal to 800 Volts. Mr. Crompton believes, and we think rightly, that Brush has considerably overdone the tension of his current, and that if he had been content with four or six arcs in series instead of sixteen, he would have obtained better results as regards steadiness and purity of colour.

Some very good instructions are given for managing the machines which cannot but be of service to an intending user. The plan of taking off the brushes to stop the current is rightly condemned as destructive to the contacts; that this must undoubtedly be so is perfectly apparent to anyone accustomed to seeing the burning of the contact breakers of induction coils by the extra current of the primary circuit, and of course the two cases are analogous when the wire of the electro-magnets of a dynamo machine are in circuit with the armature. In all cases a separate switch should be provided.

As regards the use of oil on the commutator, we are in favour of its use if the oil can be depended on for not leaving an insulating film by wear. We believe the late Dr. Golding Bird used oil on the commutators of his electrical apparatus and found no appreciable ill effects from its use, and it is almost invariably used on the circuit breakers of electro-motors.

On the question of regulator lamps the author is quite at home and his remarks are of considerable value, himself being the inventor of a regulator lamp nothwithstanding. We think we may say, as regards his own lamps, of which we have had some little experience, that in practice they have been found highly satisfactory and to yield a very steady light and to be durable and fairly simple in construction, whilst their price is moderate.

As regards conducting cables, the author finds from his own experience that the nineteen wire strand cable of the Silvertown Company is as desirable as any in the market. We know personally that this is so; its flexibility is very good and the dielectric (indiarubber taped and tarred) is all that can be desired.

As to carbons Mr. Crompton appears to think Sautter Lemonnier's or Carre's are as good as any to be had; not that he is quite satisfied with any of them. He tells us that the late M. Gaudoin latterly succeeded in making carbons freest from electrical defects; the noiseless white light and the regular concave crater and freedom from ash being nearly perfection: they were, however, not straight, nor of regular thickness, otherwise they were exceedingly commendable. Then we are told that his secret died with him.

But we must close our summary of this interesting pamphlet, as we have already exceeded the limits of our space. Several points of interest, such as the cost of production and the cost of maintenance of the electric light, and the comparative tables given by Mr. Crompton, must unwillingly be left unnoticed. We recommend our readers to get the pamphlet and read it themselves if they are sufficiently interested in the subject.

Dispensing Memoranda.

[496]. "Nemo" should have dispensed ergotine (Bonjean), which is an aqueous extract of ergot.

JENKINS.

[496]. The German Pharmacopœia supplies a process for the preparation of the solid extract of ergot. It is reddish-brown, has a pungent, bitter taste, and an odour resembling that of roast meat. Dose 1 to 5 grs. This I think should be used in dispensing the prescription given by "Nemo."

[496]. "374" would have evaporated down some ext. ergot. liq., and would have used it in about the same consistency as other extracts.

[497]. I believe that aloes barb. is always used unless aloes soc. is particularly specified.

374.

[497]. The extract of Socotrine aloes is generally used when ext. aloes or ext. aloes aquos. is ordered.

NEMO.

[497]. In both prescriptions extractum aloes socot., B.P., should be used, and always, when ext. aloes is so ordered; for whenever ext. aloes barb. is required, it is always specified.

JENKINS.

[498]. Most likely the prescriber intended acid. prussic. dil. gut. 20.

374.

[498]. Twenty minims of acid. hydrocyan. dil., B.P., should be given for the 20 grains ordered in prescription.

JENKINS.

[498]. Acid. prussic. dil. 20 grains would, I believe, as nearly as possible be represented by 21 minims.

NEMO.

[499]. When ext. glycyrrhizæ mollis is ordered in a mixture the B.P. ext. glycyrrhizæ should be used, and not ext. glycyrrhizæ liq. B.P.

NEMO.

[499]. Ext. glycyrrhizæ is generally called ext. glycyrrhizæ mollis. Here I should use ext. glyc. liq.

374.

[499]. I should certainly have used ext. glycyrrhizæ B.P., which, like most other extracts, when received from wholesale houses, is more of a "mollis" consistency than a pilular, as directed by the B.P.

JENKINS.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE DRAFT PHARMACY ACTS AMENDMENT BILL.

Sir,—It may be an open question whether a member of Council is justified in publishing how he recorded his *own* vote on a subject discussed and voted upon whilst that Council was in committee; but it is beyond question that no member has a right to publish the vote of another given under those circumstances, and more especially when that vote happened to be, as in the present instance, the casting vote of the Chairman, on whom occasionally devolves that important duty.

The publication of the Pharmacy Act Amendment Bill was intended by the Council to give the whole trade an opportunity of expressing their views on its several clauses; the letter of a member of Council, therefore, at this early stage may be considered at least premature. Its appearance, however, seems to require from me a defence of the vote in question.

Mr. Sandford's views on what he terms the "widows' clause" (the 16th section of the Pharmacy Act, 1868) do credit to his feelings; he depicts the misery that would result from carrying the amended clause in its present form and dwells feelingly on the "spoiling of widows' houses" and so forth, as though the subject could be regarded from one point of view only. Is there not another and more practical point from which business men contemplate the widows' question?

The experience of those who, from their position, have large opportunities of considering this subject in all its bearings is, that in by far the majority of instances it would be mercy to the widow if she were obliged to dispose of the business within a given time after the death of her husband. In special cases, such as that alluded to, the Council would have the power to extend the time and I feel sure would not fail to regard such cases with consideration.

The widows' clause admits the qualified assistant to conduct a business, and in an amended Pharmacy Act that permission must be removed or limited. With this provision, at variance with the spirit of the whole Act, which implies *personal qualification*, our course is crooked, illogical, and suicidal. This clause has been our stumbling-block in the past, and, if retained, would continue the same in the future. Occasional hardships may arise, but these exceptional cases cannot be legislated for. To borrow a hackneyed but very expressive phrase, "hard cases make bad laws."

In the present crisis it behoves every chemist and druggist in Great Britain to acquire clear views, free from sentiment, on this important subject. The widows' clause opens the door for qualified assistants to conduct a business the owner of which is not qualified; and if that be permitted in the case of widows, why not also in the case of stores, limited liability companies, grocers, *et hoc genus omne*?

The safety of the public, the advance of medical science, and the progress of pharmacy, with the well-being of the pharmacist, can be secured only through the *personal qualification* of the *owner* of the business being insisted upon, and this personal qualification can only be obtained by evidence of fitness shown in the examination room; a qualified assistant is only a *subordinate* and cannot as such be considered a *free agent*.

Sound legislation requires the maximum effort of the intellect with a minimum interference of sentiment.

THOMAS GREENISH,
President of the Pharmaceutical Society.

20, New Street, Dorset Square.

Sir,—In to-day's Journal Mr. Sandford sets forth his views of clause 5 of the proposed Act, and after taking exception to a statement in your last week's issue concerning widows (which statement is true notwithstanding), he argues that certain cases of hardship will occur if this clause becomes law, and strengthens his position by publishing certain voting in committee.

Although I was very desirous that the whole discussion on the Bill should have taken place in open Council, I should hesitate to write on this point, but that in making this part of the proceedings public property Mr. Sandford has inadvertently so stated it that your readers would be led to a very different conclusion from that which they would have arrived at had they been present or had the whole proceedings been published.

The facts as they occurred are simply these. The clause, as originally drawn, and the erasure of which Mr. Sandford moved, proposed that one year should be the limit to which executors or trustees should be allowed to carry on a business without special permission, the voting being as he states in his letter. But when three years was proposed as the period, the amendment was carried by a very decided majority; therefore the division recorded by Mr. Sandford and used by him to support his views has really nothing to do with the clause as published, and on which the opinion of the whole trade is invited.

I am not the author of this particular portion of the Bill, and when it first came before us it certainly did occur to me that we could do very well without it, and that under it some cases of hardship might possibly arise, although not many. But a few minutes' consideration served to show that we had two evils before us, and it was but common sense to choose that which was by far the least. The main feature of the present Act is, that for the safety of the public it is desirable that the individual proprietors of chemists' shops should be qualified, and that the employment of a qualified servant cannot confer qualification on the employer. Immediately we lose sight of this the Act is not worth a straw, and our chance of benefiting the trade ceases. The Legislature is surely not so blind as to believe that the public are protected by (an unqualified) widow or executor carrying on a chemist's business by means of a qualified assistant for an indefinite period, and are not protected if a corporate body does the same thing. The question then arises, Are we to abandon the main feature of our Act and with it the hope of protecting the interests of the whole trade, because of certain sentiment which suggests some cases of hardship which will probably never arise? Are we to give up all hope of ameliorating the evils of the present on account of some imaginary evil in the future?

The Council as a whole are as desirous as Mr. Sandford that the trade should look at this and, indeed, at all other points of the Bill, and express their views thereon, but by all means to look at both sides of the question.

Liverpool. CHARLES SYMES.

Sir,—I am glad to see that Mr. Sandford has taken up his pen in opposition to the 5th clause in the proposed amendment (so-called) of the Pharmacy Act, and is pleading the cause of the fatherless and widow against those who seek to perpetuate the injustice they have been made to suffer through the interpretation which has been most unfairly given to clause XVI. of the Act of 1868. There is no doubt, as Mr. Sandford says, that that clause was intended specially for the benefit of widows, and its meaning seems clear enough to anyone who understands plain English; but, as is too much the case in pharmaceutical matters, plain English and common sense have been pushed aside, and whilst any other person may continue a business indefinitely after the death of the proprietor, his widow, for whose especial benefit the clause was intended, is by a legal quibble deprived of its advantages.

Surely before the Bill goes to Parliament, if it ever does get there, this 5th clause will either be withdrawn, or so modified as to enable a widow to continue the business of her deceased husband, and bring up her children in comfort and respectability without having to ask permission of the Pharmaceutical Council or anyone else.

Taking the proposed Bill altogether, I do not think it would be any great loss if it never got nearer Parliament than it is at present, for there is hardly a line from one end of the Act to the other, except clause 14, that is likely to be any advantage to the chemists and druggists, whilst there are several additions to the vexations and annoyances to which they are already subject.

Clauses 8 and 13 are apparently intended to prevent the sale of drugs, etc., by co-operative stores and similar associations. But does anybody really imagine that those clauses will have that effect? They may possibly prevent the sale of a few articles in the poison schedule, and the dispensing of a few prescriptions containing them, at those establishments; but the great evil from which we suffer, viz., the selling of drugs and medicines of every description by co-operative stores, drapers, grocers, tailors and shopkeepers of all sorts, will not be touched in the slightest degree.

A great deal is said about the public safety, and the benefit to the public in connection with the proposed Bill; but I do not quite see why we should go so much out of our way in the supposed interests of the public to get so little benefit to ourselves; the public are not so ready to trouble themselves about our interests. After all the expense and trouble a man may have taken in passing the examinations, fitting his shop with every appliance of the most approved kind, selecting his stock with the greatest care, taking every precaution to guard against accidents, and doing everything possible to obtain the confidence of his customers, let a grocer or any other tradesman close by begin to sell drugs, etc., on the usual terms these gentry do that business, he will soon see where his customers go, and how the generous public appreciate his efforts. No, let the public look after their own interests, which they are quite capable of doing. We have done quite enough in that line without laying any more burdens on ourselves than we have to bear already. Although the Bill is professedly aimed at persons outside the trade, it will also, and quite as vexatiously, affect many who are properly and legally in the trade; for every druggist who puts up a cough mixture, or cough pills or lozenges, in which opium in any shape is contained, will be obliged to put on a poison label, and be subject to the same penalties and annoyances as outsiders, without benefit either to himself or the public whose welfare is so tenderly looked after.

We hear a great deal about the laws relating to pharmacy in France and elsewhere, and how desirable it is that the same laws should apply to us. But one important point seems always to be either forgotten or ignored, namely, that whilst pharmacists there are subject to stringent laws and regulations, the public have no choice but to get their medicines from the pharmacist, and have their prescriptions dispensed by him; they cannot go to the grocer or the tailor or the cobbler, and buy what they like, where they like, and when they like, as they do in this country.

If we must have a new Pharmacy Act at all, let us at all events try for one that shall confer some benefit upon us in return for the restrictions it imposes, and if we are to be so very anxious about the public interest, do not let it be without some advantage to ourselves.

Manchester. W. WILKINSON.

Sir,—I beg to offer for consideration and opinion of your readers, whether a clause somewhat like the following would not be more comprehensive than the open shop clause now in use, and would allow corporations and partnerships to be registered:—It shall be unlawful for any unregistered person, or partnership, or body corporate, to supply by retail; or to employ any servant, agent, or deputy to act as a dealer in any of the poisons enumerated; or to compound any medical or veterinary prescriptions, or private recipes, containing any of the aforesaid poisons, under a penalty of five pounds for each offense. The exceptions in favour of medical men and veterinary surgeons to remain as at present.

GEORGE BROWN.

Sir,—Is Mr. Sandford's tear for the widow sincere? Does he insist on personal qualification and registration on the one hand and the utmost laxity on the other?

Mr. Weller's advice just now should not be lost. Fancy a deceased physician's widow, or a surgeon's, say. "Sir Benjamin Brodie and Co., Surgeons," on a brass plate, and in the consulting-room one of the late surgeon's clinical clerks. "What a take in!" a patient would say. "Where's Sir Benjamin?" "Alas! no more! His widow has an interest in the concern."

It is this laxity and self-interest that has made our Acts of Parliament abortive. In this London of ours how many deceased chemists are driving a huge business? Right and honest enough, doubtless, in any other trade, but in the face of qualification and legislation, a terrible farce, and as such for the Pharmaceutical Society it has proved.

I am very grateful to the Council for the painstaking labour the draft Amendment Act shows, but, as I told the Secretary years ago, to attempt to get a really stringent Act of Parliament would raise a perfect hornets' nest of opposition. We cannot do it. Let us spend the money we have in education or amending our examination laws; but do not let us waste it in trying to do an impossibility. Any person with the calibre of a cabinet minister would see through the thing in five minutes.

We shall never have a Pharmacy Act in this country at all until a bishop is "translated" and the Government takes the matter in hand.

79, Grosvenor Road, Highbury. GEORGE MEE.

Sir,—So grave a matter as the above should not be too hastily proceeded with, and certainly not without ample time being allowed for a full and thorough discussion of its proposed provisions. I believe that the best method of obtaining such would be by summoning, at once, a special general meeting of the members of the Society, to which all members of the trade should be asked and allowed to take part. We may expect, without doubt, that some of its provisions will meet with determined opposition from those interested in the co-operative movement, who will certainly be on the alert after the recent legal proceedings of the Society against them.

I am, however, heartily glad that so able a member of our Society has so courageously attacked what struck me immediately, on reading the proposed Bill through, as being quite an uncalled for and unnecessary amendment of the law with reference to the carrying on of a business by a widow; surely a widow, if she complies with the requirements of the Act, ought to be allowed as a matter of right, rather than one of favour, to continue it for the support of herself and the education of her children. To give by enactment any such arbitrary powers as proposed into the hands of a Council would be a most undesirable and dangerous innovation, and I sincerely hope that such an obnoxious proposition may soon be consigned to the *limbo* of obscurity which it deserves.

I do not quite agree with "Sempervirens" in some of his suggestions; but with reference to the conduct of branch shops, although there are to my knowledge many fully competent yet unqualified assistants able to manage them, I would go so far with him as to re-echo his wish that only duly registered persons should be allowed to conduct them; and with a provision of this kind, I think we could go to Parliament with better grace and ask for the further protection sought for.

A clause in which a provision might run to this effect, that no branch shop shall be held to be properly carried on, unless under the management of a person registered under the Act of 1868, whose name shall be duly returned to the Registrar during the last week of each year; and also should any change in the management occur during any other portion of the year a notice to that effect should be sent to the Registrar within six weeks of such alteration.

The suggestion as to limiting the number of branches to be in the possession of any one registered person would be too retrogressive a movement in the present commercial age to meet with general approval.

Stowmarket. GEORGE JAMES GOSTLING.

Sir,—Without presuming to give any general criticism of the New Pharmacy Bill, I venture to urge upon the consideration of its promoters the necessity for a small change in clause 10 where it requires "the name of the patent medicine and the word poison" to be attached. It is important that the name of the poison should also be included in the requirement.

If a medical man, called in to a patient in a dangerous state, finds he has partaken freely of "Greenish's Balsam of Glycerine—Poison," the name of the medicine "balsam of glycerine," is little use to him, and the word "poison" only indicates one thing—that he should have no more. But if the label also indicates the presence of ant. tart., morphia, and hydrocyanic acid, it aids the judgment of the doctor, and the recovery of the patient.

It is of public importance that innocent sounding names be not allowed to hide poisons, against the danger of which the Poison Act is supposed to protect the public.

No doubt when Greenish prints the wrappers for his celebrated "Glycerine," he will take care to inform the public that it is only in conformity with the regulations of a foolish Act of Parliament that the word "poison" appears there at all.

I have not much faith in Acts of Parliament, but I think it would be a disgrace upon the Pharmaceutical Society to promote a Bill which, in this particular, so palpably sacrifices the public good to the interests of patent medicine proprietors.

BARNARD S, PROCTOR.

Sir,—I was pleased to see Mr. Sandford's comments upon the injustice that would be done widows (and those who in course of time might become widows), provided the Pharmacy Law Amendment Bill, 1881, came into operation in its present form.

I consider that the law in this respect should be amended, not by unnecessarily harsh measures towards the widow, but on the contrary, by permitting her to carry on the business of her deceased husband for any indefinite period by the aid of a qualified assistant. With this proviso the Pharmacy Act would accomplish its end with regard to the safety of the public, and many widows and fatherless children would be kept from want, as so clearly explained by Mr. Sandford.

With regard to co-operative dispensing and selling of poisons, this would be effectually stopped, provided the Pharmaceutical Society could pass a bye-law to the effect that any chemist who takes service under any co-operative society should be struck off the Register.

Stow-on-the-Wold. THOMAS BLACKMAN.

Sir,—The proposed amendments of the Pharmacy Act about which we have heard so long, are at length before us, and, as you justly observe in your recent leader (page 555), "it is especially desirable that the several clauses of the new Bill should be considered as much as possible in a catholic spirit as to the probability of their provisons being beneficial to the general interests of the trade."

Looking at them from the broadest point of view, I must confess I fail to see any real practical good likely to result from their adoption, or that they will in any way improve, as they at present stand, our old friend of 1868, imperfect as that friend undoubtedly is; while, on the other hand, I cannot but fully concur in the views so ably expressed by Mr. Sandford, that to pass such a clause as clause 5 would be a most objectionable and oppressive act.

Turning to clause XVI. of Pharmacy Act, 1868, what more can be desired than is to be found there for the safe conduct of a business unfortunately left in the hands of a widow? It runs thus: "Upon the decease of any pharmaceutical chemist or chemist and druggist in business at the time of his death, it shall be lawful for any executor administrator or trustee of the estate of such pharmaceutical chemist or chemist and druggist to continue such business if and so long only as such business shall be *bonâ fide* conducted by a duly qualified assistant," etc. Upon what possible ground can it be considered needful to nullify so ample and just a provision, by the proposed amendment, whereby, however satisfactorily such a business may be going on, the widow is compelled, *nolens volens*, either to change her name or her home at the expiration of three years, with the option, it is true, of presenting herself as a humble suppliant before the Council for permission to maintain herself and family out of the proceeds of her late husband's business, instead of becoming a recipient of the Benevolent Fund annuity? Can such an amendment be considered beneficial to the general interests of the trade?

With respect to clause 7, I am completely at a loss to comprehend its force against the citadel it is intended to demolish. It touches a subject upon which I have not unfrequently spoken and written, publicly and privately, and as invariably have been met with the rejoinder, by those at head quarters, that inasmuch as "open shop" was the only term used in the Act, the hands of the law were powerless where members of an association alone were served; and yet, strange to say, this very term, and this alone, we find used throughout the proposed amendment.

Such a clause, as it now stands, would be beneficial only to lawyers and their satellites.

Again, much as we deprecate the sale of poisons by unqualified persons, I cannot conceive that we are justified in subjecting ourselves to so objectionable a proceeding as that embraced in clause 10, whereby every proprietary medicine "containing a poison within the meaning of the Pharmacy Act, 1868," no matter how infinitesimally small the quantity, is forthwith to be branded, as a dangerous and noxious compound, with the word "Poison," failing which a penalty of five to ten pounds is to be forfeited. Surely some other means might be devised by which to overcome the difficulty without putting upon our own shoulders such a burden, and imposing upon the public the use of a word, which, by its frequent recurrence, would soon become valueless. Can such an amendment be "considered beneficial to the general interests of the trade?"

Mr. Sandford tells us that the Bill will probably be submitted to Parliament after the next meeting of the Council. Would it not be more in accordance with former practice that so important a step should be submitted to a special general meeting of the members before being carried to Parliament? Such has, I believe, been the rule hitherto, and would, I venture to think, be desirable on the present occasion.

I have had the chemists of Brighton canvassed upon the question and herewith forward copy of the memorial signed by thirty-seven out of forty-two called upon, two being absent from home. The original will be presented by Mr. Sandford to the Council at their next meeting. Hoping other towns will adopt a similar means of expressing their views.

Belgrave House, West Brighton. Edwin B. Vizer.

Sir,—I think, with Mr. Smith, that the words "open shop" are not sufficient, and that his addition of "house or any other place" should be added; also the word "distributing." I would also suggest (section 8) after sixteenth word (partnership), "corporation or association" should be added. I think also in case of the death of a chemist his business ought to be protected, if the business is under proper management; and I think assistants ought to be all qualified in every business.

Henry Long.

Sir,—Many and various are the suggestions of your correspondents respecting the proposed New Pharmacy Bill, some of which I have read with interest, but in all I fail to see a plan for effectually dealing with the vexed question of stores and patent medicine dealers, at the same time really proving a benefit to the trade.

I believe some clause might be added to the Bill, whereby we might feel thankful that we had elected such Councillors to administer to our wants. It would be useless on my part to recapitulate the grievances of many men who are struggling against the opposition of stores and small shopkeepers.

I will, therefore, with your permission, ask if it would not be possible to get a clause in the new Bill to the following effect:—"That from the date of the passing of this Act no person or persons shall sell or deal in drugs or chemical compounds unless such person shall be a duly registered pharmaceutical chemist or chemist and druggist within the meaning of the Act."

If something to this effect were added I am sure it would prove a boon to thousands who would then be able to make a living; at the same time raise the standing of the trade which now takes so much time, money and study before young men are allowed to commence business. It is all very well for some correspondents to talk about "taking the bull by the horns" and forming associations for mutual protection. I was in business years enough to find this game would not do; having had experience in this way (I mean as to arranging prices) I was not long in finding we had a Judas amongst us. Therefore, my humble opinion is that unless our rulers, who, as I said before, we have elected in the hope that they will look after our interests, fail to carry some such measure as I have named, the respectability of the trade will gradually die out, and the pharmacist of the rising generation will find after all his toils to enter what he believed to be not only a respectable but remunerative trade, he is only on a par with his neighbour the grocer, whose education is perhaps of the most limited kind, but who is privileged to sell everything excepting a few poisons. I would like to say more, but fear I have already trespassed too far. I trust the suggestion may in some way be duly considered for the benefit of the trade.

North Staffs. M. P. S.

Sir,—Although it would be erroneous to suppose that the draft of the proposed amendments can be deemed perfect, yet I feel that one would be quite justified in asserting that the omission from the amendments of any means for controlling the keeping of branch shops is a flagrant omission. I am glad, therefore, that one of your correspondents has drawn attention to the matter.

The principal motive which has impelled the trade to solicit amendments to the laws which govern it, is unquestionably the opposition which the trade has had in co-operative trading. Yet, while a clause is introduced which would tend to make co-operative pharmacy illegal, it is introduced with "regard to the public safety," although it is quite well known that the drug departments in stores are generally under the superintendence of legally qualified druggists. Now, it is unjust and unreasonable to seek repressive legislation on this point while we permit branch shops to be carried on as they at present are. Thus, in the town in which I am an assistant, there are thirty drug shops owned by druggists and doctors, and of these shops fifteen are under the charge of unqualified persons. Practically, they are under the entire charge of the unqualified persons, for the owners attend these shops not more than nine hours per week, and in some cases even, only once a week or fortnight, and that only to see how the businesses are going on financially. Consider from such circumstances upon what the "safety of the public" is dependent. The evil, however, does not end with the public safety, for branch shops directly tend to impede the progress of the younger members of the trade. Thus, in the town in question, I am aware of many a locality where I could make a more comfortable livelihood as a master than I at present do as an assistant, yet I am prevented so improving my circumstances by the fact that all the localities are occupied by branch shops.

Again, the public convenience is not served by branch shops, for I find that the suburban public will not patronise them unless in cases of emergency, or of a trifling nature, preferring rather to go to shops in which masters themselves are in charge, for any particular thing which may be required.

Now, sir, having carefully read your article this week on the proposed pharmaceutical legislation in France, I find that our French neighbours would allow only one place of business to each pharmacien. Such legislation on our part, would, I have no doubt, be considered contrary to the principles which govern our commerce, yet I have little hesitation in saying that our Government would see the reasonableness of having all drug shops under the direct charge of legally qualified persons.

I think that the attention of the Council should be forcibly drawn to this important subject, and for this purpose perhaps some of your readers will supply such statistics as I have given you. It is possible that branch shops are not so common in every town as in that which I cite: yet the case remains that one-half of the drug shops here are kept by unqualified persons, and as the whole intention of the pharmacy law is (in a legal point of view) the safety of the public, we must, I think, remove this anomaly before we endeavour to repress the wickedness of co-operative pharmacy.

P. M.

Medical Dispensing.

Sir,—A movement has been made by several members of the British Medical Association respecting the importance of medical men in cities giving up dispensing, and sending their prescriptions to chemists in their neighbourhood.

Every one must feel that this is a step in the right direction, but the members of the Pharmaceutical Society themselves must help in accomplishing this object, no less to the relief of medical men, than to their own advantage.

To ensure this, however, it is essential that the chemist should supply exactly and skilfully what is ordered, and charge as reasonably as possible for all medicines dispensed.

If a better understanding could be established it would result in an advantage to both medical practitioners and chemists.

If you will kindly give these few words a place in your Journal, and encourage discussion on the matter, it must lead to good results.

JAMES WILLIAMSON, M.D.

44, Mildmay Park, London, N.

SPIRITUS AMMONIÆ AROMATICUS.

Sir,—I hasten to apologise to your correspondent C. E. for my incomplete quotation from his letter; probably a greater injustice is done to an author by partial quotation than by misquotation, for the latter manifestly carries with it its own refutation, whilst the former by its apparent truth and semblance of veracity is calculated to mislead the majority of those who only superficially read it. I trust, therefore, that in begging to be allowed to repeat the quotation in its complete form C. E. will acquit me of any intention to misrepresent him. He says:—"Practically speaking the residue contains no ammonia, nor has there been any loss of ammonia or CO_2 in the distillation." As stated in my last letter, it is to the latter part of this sentence that I take exception; the truth being that "practically speaking" there has been a loss of CO_2 equal to about 60 per cent. of the quantity included in the carbonate of ammonia employed; in other words, the product contains about 60 per cent. less CO_2 than the materials used in the distillation, and neither India rubber bands, nor "an almost air-tight communication between the receiver and condenser," nor any other means consistent with the safety of the apparatus will prevent this loss of CO_2, even if it were desirable to do so.

Your correspondent admits the evolution of CO_2 during the process, but says, "it by no means follows that this CO_2 must be lost," a conclusion, to say the least of it, entirely opposed to fact; for if the CO_2 be not lost perhaps he will kindly inform us what has become of it, for every "fully fledged" pharmacist should know that this disengagement of CO_2 takes place long before distillation commences, and that, therefore, an empty Winchester quart with an almost air-tight communication between it and the condenser would be wholly inadequate under the circumstances to condense and retain it.

I must, in conclusion, beg to repudiate the charge which C. E. has preferred against me, of having read his letter carelessly; on the contrary, I can assure him and your readers that the startling nature of the assertion made respecting the CO_2 caused me to read it over carefully several times to be quite sure that I had not misunderstood its meaning. That I had not so misunderstood it is confirmed by C. E.'s last letter.

ALFRED E. TANNER.

P.S.—I should like here to utter a protest against the idea implied in the opening sentence of C. E.'s last letter. That our Journal should be used as a means of conveying information to "fully fledged" pharmacists only, to the exclusion of students, is, I think, an utter perversion of its legitimate function. The information which its pages convey ought, I think, to be equally available to the one as to the other.

HARNACK AND MEYER'S RESEARCH ON JABORANDI.

Sir,—I quite agree with Mr. Kingzett that Harnack and Meyer's research has not established the presence of a second alkaloid in jaborandi or pilocarpine; it is true they have made observations pointing in that direction, but their observations are not to my mind sufficiently conclusive to establish the identity of a new base.

Harnack and Meyer are stated to have prepared their new alkaloids from mixed residues obtained from jaborandi leaves and false jaborandi (*Piper reticulatum*). Now these are two distinct plants of different natural orders, the latter of which no investigation has yet shown to contain pilocarpine; it is, therefore, obvious that experiments upon such a mixture are of doubtful value; they might as reasonably mix belladonna and aconite extracts and call an alkaloid obtained therefrom a new base.

Again in one part of their paper they say that jaborine, their new base, is contained in jaborandi leaves; in another part of the paper that fluid extract of jaborandi is free from jaborine, but that jaborine is produced on evaporating its acidified alcoholic solution. These statements are inconsistencies which shake one's faith and detract very much from the value of their communication.

University College Hospital. A. W. GERRARD.

EQUALIZATION OF DOSES.

Sir,—It is fairly well known that an equalization of doses, as to measure certainly, and possibly equally as to weight of various medicines would prove itself a common convenience to those who prescribe and to those who dispense, and so in a scarcely indirect way would result as an advantage to those whose convenience it is the object and equally the interest of the prescriber and the dispenser to consult.

The subject has been mooted already, both here and abroad. The compilers of the Pharmacopœias of various dates of this country have never quite lost sight of this considerable convenience, and let me add of this sterling safety. I speak of safety because the practitioner has to recall at very short notice, as things at present are, very various doses and he has to rely on the dispenser as his only safeguard against accidental disaster, and perhaps also from my own standpoint, because the prescriber is in such case the responsible person and has to lean in this matter on the gratuitous benevolence of the dispenser, although as a matter of practical experience he, with fair confidence, very well may.

But then this difficulty seems to be quite an artificial one. There exists, for example, a definite dose for every remedy; I mean an understood standard dose, such for example, let me say, as 1 grain avoirdupois for a dose of quinine. Now if every drug were to be arranged, by the British Pharmacopœia authorities, of course (since no other authority exists), so as to be 1 grain, or 1 drachm, or 1 ounce (if only the liquid and solid measures should ever come to accord). This could only come by suitable dilution with some indifferent medium, say starch for solids, or water or glycerine or, if you will, spirit for liquids. Then we should be in this position that we should only have to regard the grain or the fluid drachm (or the 60 grains, but that is never a very serious difference), or the ounce, or the odd grains, that (as we are) makes up that ounce, which would demand our main care, and that, as I take it, is to avoid at least the risk of harm when we are aiming at the opposite of harm. Furthermore, if a definite authoritative dose could be set up, as indeed it already has been in some degree, then it would remain open to any prescriber and equally to any pharmaceutist (as his safeguard) to arrange the double or any fraction of the received dose, which would readily be remembered as a standard in prescribing or dispensing for individual cases. Let me suppose that Epsom salts shall stand for a standard solution, as 1 drachm to the ounce of water; now, in an 8 ounce mixture this could be considerably varied.

24, Weymouth Street, BALMANNO SQUIRE.
Portland Place, W.

"*Gratia.*"—There is an Ext. Stillingiæ Fluid. in the U.S.P., as well as a Tinct. Sanguinariæ. A formula for Ext. Eucalypti is given by Cooley.

"*Argos.*"—We should follow the B.P. formula for Inf. Cinch. Flav., with the necessary substitutition. Future questions relating to the contents of the Journal should be addressed to the Editor and not the Secretary.

A. J. Burden.—Henfrey's 'Elementary Course of Botany' or Balfour's 'Manual.'

H. L.—See the formula for Syrup of Croton Chloral given by Dr. Symes in September last, before, p. 241.

Solvent.—The quinine is first converted into oleate by precipitating the alkaloid from the sulphate with ammonia and dissolving it in oleic acid, and this is added to the cod liver oil. See a paper by Mr. Stiles in vol. v. of the present series, p. 641.

"*Junior.*"—Starch glaze is a mixture in varying proportions of finely powdered borax and starch.

A. E. Tanner.—The note on p. 578 contains the substance of the communication, which was not published in any other form.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Humphries, Claypole, Southall, Sowerby, Dewson, F.S.M., O.A.S.

"THE MONTH."

Although the weather around London is by no means such as to lead us to expect to find medicinal plants in bloom, yet such does not appear to be everywhere the case, for a correspondent, who sends to the *Gardeners' Chronicle* a list of about a hundred and twenty plants in blossom at Falmouth on the 6th of January, enumerates, among others, *Borago officinalis, Berberis aquifolium, Veronica salicifolia, Vinca major, Vinca minor, Pyrethrum Parthenium* and *Daphne Laureola*; while at Tresco, in the Scilly Isles, the *Aloe Socotrina* was in full blossom in the open air on the 6th inst., in company with many handsome exotics that require in London the protection of a conservatory.

In the neighbourhood of Penzance, according to a writer in the *Garden* (December 25, p. 276), there were to be seen in blossom *Anthemis nobilis* and *Papaver Rhœas, Veronica officinalis, Potentilla reptans, Silene maritima, Lychnis diurna*, the primrose, and many other wild and cultivated flowers.

Mr. Thomas Hanbury contributes to the *Gardeners' Chronicle* (January 8, p. 46), a list of nearly three hundred plants in blossom in his garden near Mentone on January 1. Among these several medicinal plants are noticeable, viz., *Eucalyptus globulus, Globularia Alypum, Datura alba, Calendula officinalis, Aloe Africana, Punica Granatum, Viola odorata*, and Rosemary, as well as others of economic interest, such as the Abyssinian tea tree (*Catha edulis*), and the carob tree (*Ceratonia siliqua*).

In the Economic House at Kew the cola nut tree, *Cola acuminata*, may now been seen in blossom. Its small polygamous flowers have no corolla; but the single yellow floral whorl consists of a coloured calyx, which at Kew does not manifest the purple spots which these flowers are said to possess in their native country.

The curious *Petiveria alliacea* is also now displaying its long whip-like spikes of inconspicuous flowers. It possesses acrid properties, and the leaves exhale a garlic odour when bruised. In Brazil it is put into baths to restore power to paralysed limbs. According to Lunan, it is used to stop toothache, and the juice as a remedy in hysteria. He states that if chewed the root will render the tongue as dry and black as would be caused by a malignant fever. In Jamaica it is known as "guinea-hen weed," those birds being said to be very fond of it. The plant received its name in honour of the celebrated apothecary and botanist, James Petiver.

Probably many of our readers have noticed, either at Kew or elsewhere, that various species of juniper not unfrequently present two forms of leaf on the same branch, so much so that if gathered separately it would be difficult for any one who had not seen them growing to guess that they were obtained from the same plant. In a letter to *Nature* (January 20, p. 267), Dr. Masters points out this fact and says with regard to it that it is now generally believed to be an instance of the reflex, as it were, of an ancestral state of things. Thus the *Retinosporas* common in our gardens and balconies are supposed to represent an immature or "larval" stage of some *Thuja*, the proof of which is occasionally furnished by portions of the plants suddenly assuming the foliage characteristic of that genus. But this peculiar development appears to be met with in fossil coniferæ also. Dr. Masters also directs attention to the resemblance in form and arrangement of the adult leaves in some Thujas and allied plants to the disposition of the leaves in *Selaginella*, and the close resemblance between the leaves of some species of *Lycopodium* and the "larval" leaves of many conifers.

But it seems doubtful if this similarity of form indicates a common ancestry in all cases, for the peculiar lanceolate form of many species of different natural orders which grow near rivers, etc., can scarcely be considered to owe the shape of their leaves to a single ancestor. Thus the willow, oleander and willow herb, have leaves very similar in shape.

In the recently issued *Botanische Jahrbücher*, a curious mode of growth is described by Engler, as occurring in the araceous plant *Zamioculcas Loddigesii*, a species with pinnate leaves. If one of the leaflets is detached and planted, a swelling takes place in a few days at its base, and the tuber thus formed produces two buds, below each of which roots are formed. The plant has been thus propagated at the Kew Botanical Gardens.

In a lecture lately delivered at the Royal Horticultural Society, the Rev. George Henslow directed attention to the peculiar method effected by the cyclamen of burying its fruits, as described by Darwin in his 'Movements of Plants,' and illustrated it by the *Trifolium subterraneum*, which by its recurved claw-like calyx assists the peduncle in burying the pods below the soil. As in the case of the ground nut (*Arachis hypogœa*), which indeed derives its name from this habit, the object appears to be to enable the fruits to absorb moisture and nutritious matters, and so cause them to ripen better, as those in which the burying process is prevented do not usually came to maturity. During the past month some fruits, imported from the Azores, and exhibited in Covent Garden Market under the name of "passion flower fruits," were stated by Dr. Masters not to be the fruit of *Passiflora edulis*, but of *Cryptomandra betacea*.

In a recent number of the *Linnean Transactions* the Rev. George Henslow published his opinion that some of the so-called scorpioid cymes, *e.g.*, Hyoscyamus, are not sympodia, but monopodia; in other words, are not cymes at all, but indefinite inflorescences. In the present number of the *Journal of Botany*, Dr. Sydney H. Vines gives a full account of the history of the term, "scorpioid cyme," and shows that much confusion exists in text-books with regard to its use, some authors making it synonymous with helicoid cyme and others drawing a distinction between the two. Unfortunately, in the paper above alluded to, Dr. Vines states that fig. 1 exactly resembles a diagram in Bentley's 'Manual of Botany,' 3rd ed., 1873, p. 200. As the diagrams do *not* correspond in the *Journal of Botany* (probably owing to a typographical transposition of the numbers 1 and 2) Dr. Vines's meaning may not be easily followed in this case by all who read it. Dr. Vines points out, however, that according to the most recent researches of Goebel,* the inflorescences of *Hyoscyamus niger, Symphytum officinale, Anchusa officinalis* and *Borago officinalis*, as well as that of several other Boraginaceous plants which he investigated, show by their development that they are monopodia with a flattened growing-point, which bears two rows of flower rudiments on its dorsal surface, a statement that Kraus had previously made with regard to bractless scorpioid cymes, so that if

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* 'Arb. d. Bot. Inst. in Wurzburg Bd.,' 11, 1880.

Goebel's statements are correct, the scorpioid cyme is a mere fiction, and what has hitherto been described under that name must hereafter be considered as a form of unilateral raceme. It seems, however, difficult on this theory to explain the forking of the branches of the inflorescence in *Symphytum*, etc., the form which at least renders plausible the suggestion of Kaufmann, that bracteate scorpioid cymes are produced by repeated dichotomy of an axillary bud.

During this time of frost and snow there is ample opportunity for lovers of nature to observe the singular effects of frost on the leaves of evergreens. When the leaves of such plants are frozen, some of the sap is forced into the interspaces between the cells, and as these are more abundant in the under-surface of the leaf, it may be observed that the colour there changes to a deeper green, and at the same time the leaf appears more transparent, owing to the replacement of the air by ice. In *Helleborus niger* and *Taxus baccata* and some other plants, the under-surface has been observed to become at first dotted with dark green, which, as the temperature falls below 24° to 26° F., spreads over the whole under-surface. In a warm room the fluid rapidly passes back again to the cells. Dr. J. N. Moll, of Utrecht, has observed that in taking leaves from an outdoor temperature of 30° F., to an indoor one of 48° F., the infiltration of water into the intercellular spaces disappeared in fifteen seconds in *Aucuba japonica*, and in one minute in the holly. He finds this phenomenon common to all plants, the infiltration disappearing in a few minutes more or less, according to the species. When the temperature rises above freezing point, even touching with the tip of the finger causes the instantaneous disappearance of infiltration from the spot touched. The drooping of leaves under the influence of frost, although imperceptible without measurement, in some plants, Dr. Moll finds to be common to all he examined. The latter phenomenon has been also noticed by Hofmeister in the leaves of *Pinus Strobus* and *Pinus excelsa*, in which the leaves become pendent and flaccid when the temperature descends to the freezing point, but rapidly regain their normal position when a thaw takes place. It is worthy of note that the leaves thus assume a position in which snow is more likely to fall off, and thus prevent to a certain extent the injury to the branches supporting them by the weight of snow that would collect upon the leaves.

In the *Annales des Sciences Naturelles* occurs a translation of a Russian paper on the "Influence of the Intensity of Light on the Decomposition of Carbonic Acid in Plants," of which the following is a summary:—(1) For a whole series of plants there is a maximum intensity of light favourable to the decomposition of carbonic acid, and if this maximum be exceeded no more carbonic acid is decomposed, but in some cases the energy of decomposition is diminished. (2) A jet of gas equal to 50 candles is able, if the dark rays be carefully absorbed, to cause an extraordinary decomposition of carbonic acid, the quantity of oxygen liberated being, in relation to that obtained under the influence of sunlight, as three to one, indicating the existence of a favourable maximum intensity of light. (3) The existence of a maximum is probably connected intimately with the changes of position and size of the grains of chlorophyll. (4) This maximum is of the greatest importance in studying the influence of the coloured rays on the decomposition of carbonic acid and also partly explains the contradictory opinions entertained by different writers.

Herr C. Bernbeck, an apothecary in Germersheim, describes in the *Archiv der Pharmacie*, p. 431, a new adulteration of valerian root. This consists of the root of *Sium longifolium*, a variety of *S. latifolium*, which is abundant on the margins of the ponds and ditches and in marshy meadows of the lowlands of the upper Rhine, where he has observed *S. latifolium*, in some years, owing to a prevalence of floods, undergoing a transformation into *S. longifolium*. This plant differs in not having its stem leaves like those of *S. latifolium*, all the leaves resembling the root leaves of that plant, but with the leaflets or segments rather longer and less sharply serrate. The root also differs, the root fibres becoming thicker and the stolons or slender creeping shoots being absent, owing to the plant growing in places left dry by the water, instead of at the margin of and partly in the water. He accounts for the root being mixed with valerian by the latter growing in the same places and being gathered by peasants at a time when the characteristic differences of leaf and flower are not observable. The *Sium* root may be distinguished by its simple rootlets being less fleshy and more wrinkled than those of valerian and not of a horny consistence.

At the drug sales this month, there were noticed, among other things, quebracho bark, evidently obtained from young smooth-barked trees, also the pods of the tree containing the characteristic membranous seeds, gum acaroides, false sarsaparilla and a quantity of the bright orange-red sarsaparilla grown in Jamaica, which is quite different in appearance to the so-called "Jamaica Sarsaparilla" of commerce.

At a recent sale, some apparently fine specimens of Flor. rosæ gall. were offered, which seemed, if anything, to be of a richer and more purplish tint than such as are generally met with; these, on examination, proved to be artificially coloured with an aniline colour or some similar dye. There is reason to believe that a small quantity of these leaves had entered into retail commerce before the adulteration was discovered. Those chemists and druggists, therefore, who may have purchased this drug within the last fortnight, should look to their samples. Safflower seeds, under the name of "curddi," and false Chian turpentine, have been noticed at the drug sale this week.

In the *British Medical Journal* (January 1, p. 25) an account, copied from the *Lyons Médical*, of the poisoning of some young children of the Orphan Asylum at Rocca is given. The children had been chewing fragments of roots of glycine (*sic*) instead of Spanish liquorice, the amount chewed by each child having varied from 15 to 90 grains. The symptoms produced were similar to those of poisoning by laburnum. The writer remarks that glycine seems to possess marked toxic properties, and that it acts like tobacco. It is unfortunate that the scientific name is treated as a vernacular one in this case, as it leaves the reader in some doubt as to the species of *Glycine* intended, that generic name having been at different times, and by different botanists, applied to the *Wistaria sinensis*, and also to *Abrus precatorius* and *Voandzeia Africana*, *Glycine soja*, *Apios tuberosa*, and other well-known plants. It is at least an argument for the retention of botany as a branch of medical education that such a want of accuracy not unfrequently occurs.

A correspondent of the same journal remarks, with regard to the growth of the *Eucalyptus globulus* in the Campagna, that the fever which in the neighbourhood of the Tre Fontana Monastery, which was formerly of such a pernicious character that it proved fatal to all the eighteen friars who first attempted to plant the eucalyptus, is now of so mild a character that all thoughts of abandoning the monastery and the work have been given up. This improvement is attributed to the growth of the eucalyptus tree, of which 25,000 have been planted within the grounds of Tre Fontana.

In the *Revue Medicale* for January, M. Timbal-Lagrave (fils) gives an interesting account of the forms of *Aconitum Napellus* found in the Pyrenees. He distinguishes three forms: *A. orientale*, having a large ellipsoid root; *A. centrale*, with elliptical transversely striated small roots, and *A. occidentale*, with elongated oval roots, of which two or three occur on the same plant. When cultivated in gardens these wild forms of aconite are apt to lose their activity to a certain extent. Thus the aconite of Luchond'Atos and of the lake of Oo, when cultivated, gave only 0·35 gr. of alkaloid per kilogramme, the wild plants yielding 1·25 gr. from the same amount of root. The experiments made tend to show that the roots yield from two to four times as much alkaloid as the leaves. The difference in the activity of various samples of aconitine, as experimented with by M. Duquesnel, in the presence of Claude Bernard, show that there is considerable risk in employing aconitine of unknown source. Thus, in the experiments now alluded to, the subcutaneous injection of ½ milligramme of aconitine killed a bird in very different periods, as follows:—in one minute, in fifteen minutes, in an hour and a quarter, and in two hours. These figures suffice to show that it is highly necessary there should be some guarantee as to strength given with the aconitine supplied by the makers, or that some test should be given in the Pharmacopœia by which its strength may be ascertained. The author, unfortunately, seems to be ignorant of the valuable investigations of the aconite alkaloids by Messrs. Wright and Luff, and others in this country. It may be useful to remember, in connection with the varying strength of commercial aconitine, that it has recently been shown by Dr. Ringer, "that atropine has an antagonistic effect" to that alkaloid (*Lancet*, January 8, p. 74). It seems a singular coincidence that the same week in which this fact was published, there should be recorded (in the *British Medical Journal*, p. 64) a case of fatal poisoning by aconite in which the action of atropine as an antidote does not appear to have been tried.

The antagonistic action of atropine to that of either pilocarpine or muscarine is attributed by Dr. Ringer to chemical displacement. He considers that atropine has a stronger affinity for the muscular and nervous structure of the heart than these substances, and displaces them, replacing their effect by its own. The experiments which have led him to this conclusion are detailed in the *Practitioner* for January, p. 5. If this theory be correct it would seem to follow that muscarine and pilocarpine have not a sufficiently powerful affinity for the same structure to act antagonistically to atropine. Pilocarpine was found by Lewin to be useful in syphilis, but owing to a tendency to produce collapse, he considered it to be less safe than mercury (*Practitioner*, January, p. 56).

Dr. Keyser, in the *Phil. Medical Times* (November 6), confirms the observations previously made by Drs. Volcher and Fuchs, to the effect that hydrobromide of homatropine causes so considerable an irritation of the conjunctiva that it is not likely to come into general use as a substitute for atropine or duboisine. Its action does not begin any sooner than that of duboisine, but passes off more readily, viz., in six or twelve hours instead of one to four days, as is the case with duboisine, and this seems to be its sole recommendation.

In the *Lancet* for January 15, Dr. J. H. Battye speaks highly of the use of "silicon lozenges" as an anodyne in the treatment of cancer, each lozenge containing 1 grain of silica. The formula is published in the Edinburgh *Medical Journal* for November, 1874.

Dr. Dabbs, of Shanklin, writes to the *British Medical Journal* (January 15, p. 86), in praise of ingluvin, as a remedy in certain cases of the sickness of pregnancy. He gives it in the dose of 10 to 15 grains twice a-day, one dose at as early a hour as possible, and the second at about 8 or 9 a.m.

In the *Practitioner*, Dr. J. Sawyer, of Birmingham, in some notes on recent remedies, states that he has used fuchsine (chlorhydrate of rosaniline) with success in cases of albuminaria. He gives it in the form of a pill, containing 1 grain of fuchsine, made up with extract of gentian and, if indicated, with also a little carbonate of, or reduced, iron. It colours the urine and fæces, and if given in the form of fluid, stains the lips and mouth also. It will be remembered that this remedy was recommended for use in chronic albuminuria complicated with anasarca in the *British Medical Journal* for October 11, 1879, since which time it has been used with considerable success in France by Dr. Bouchut and others.

In the *New York Medical Journal*, Dr. E. A. Anderson states that the leaves of *Vaccinium crassifolium*, which are said to resemble those of Uva-ursi, act powerfully as a diuretic when given in large doses. He consequently uses it in combination with bitartrate of potassium in the treatment of dropsy.

An interesting point in connection with *Alstonia constricta* has recently come to light. According to a quotation in the *Therapeutical Gazette*, Dr. A. W. Bixby has found that the action of the "Queensland fever bark" resembles in many respects the combined action of quinine and nux vomica. This accords well with the statement made by Dr. O. Hesse that the bark contains two alkaloids, one of which (alstonine), in his opinion, possesses properties akin to strychnine. Considering how nearly allied the Apocynaceæ are to the Loganiaceæ, in a botanical point of view, it is not astonishing that there should be this similarity in their physiological action. The bark is said to contain about 2½ per cent. of alstonine, while it only yields 0·05 per cent. of alstonidine.

In the *Lancet* (Jan. 22, p. 158), Dr. A. H. Allbutt, of Leeds, records a case in which Chian turpentine prolonged the life and alleviated the sufferings of a patient suffering from medullary cancer of a fungoid type behind the ear. Even if, as would seem to be the case, there are only a few instances in which Chian turpentine appears to be of service, there are at least sufficient to show that it should not be thrown altogether on one side as a useless drug, but should, at least, have a place among the other remedies for uterine cancer, such as ergot of rye, croton chloral, or (locally applied) glycerine of carbolic acid. When the large quantity of spurious Chian turpentine which has appeared in the market during the last twelve months is taken into consideration, together with the fact that a good deal of it must have been consumed in this country, the want of success attending its administration, in many cases, is at once accounted for.

A rutaceous plant, growing wild in the Argentine Republic, where it is called "naranjillo," and which has recently been described as a new species by Grisebach, under the name of *Xanthoxylum Naranjillo*, has been examined by D. Parodi, whose attention was directed to it through its resemblance to *Pilocarpus* jaborandi in its therapeutic properties, which are those of a sialogogue, sudorific, diuretic and stimulant. He reports (*Revista Farmaceutica*, vol. xviii., p. 409) that he has separated a substance forming salts with acids, having a decided alkaline reaction and giving all the reactions characteristic of an alkaloid, which he has named "xanthoxylina." The plant also yielded a hydrocarbon, "xanthoxylene" ($C_{10}H_{16}$), analogous to pilocarpene, a crystalline stearoptene, xanthoxylin, and finally an aromatic essential oil, having an odour between balm and lemon. From the great similarity of this plant to jaborandi it appears worthy of further experiment in a therapeutic direction.

Salicylic silk is recommended by Mr. McGill, of Leeds (*Lancet*, January 1), as a surgical dressing having advantages over salicylic cotton-wool and carbolic gauze, in being more absorbent and more elastic and requiring less frequent changing. It is made from silk "noils," a waste product sold for stuffing cushions and chair bottoms, which is soaked in a solution of salicylic acid made by dissolving the acid in methylated spirit and boiling water. After soaking and drying; ten parts of the silk should weigh eleven; consequently the silk when ready for use contains 10 per cent. of the acid. Mr. Reynolds, of Leeds, has more recently added to each pound of silk 1 ounce of glycerine, which fixes the acid and prevents it from shaking out and causing unpleasant sneezing.

An observation by Herr Fabini (*Pharm. Zeit.*, xxv., 766), that commercial carbolic acid, after it had been in contact with copper, reddened in a few days, and the fact that as a rule in aqueous solution it has an acid reaction on litmus paper, led him to suspect that the well known reddening of carbolic acid was due simply to the presence of a trace of copper. Experiments hardly confirmed this, but Herr Fabini found that when a drop of ammonia solution was added to carbolic acid containing copper the acid became dark red coloured in three hours. Upon adding also a drop of ammoniacal cuprous oxide solution or of ammoniacal cupric sulphate solution to perfectly colourless carbolic acid a strong red colour was produced in a few hours. He, therefore, concludes that the reddening of carbolic acid induced by ammonia is referable to the presence of a small quantity of copper, and he thinks this the more probable from the fact that carbolic acid usually comes into commerce in cylinders of zinc containing copper, from which a trace might be derived which is afterwards acted upon by the ammonia in the atmosphere. This conclusion has since been questioned by Herr Hoffmann (*Pharm. Zeit.*, xxvi., 3), partly upon the ground that ammoniacal copper solutions, however dilute, are always blue and never red. He found that upon adding a drop of ammoniacal solution of copper sulphate to liquid phenol, a greenish-brown, rather than a red-brown, was produced; but he admits that carbolic acid to which ammoniacal copper solution had been added was coloured deep red-brown in forty-eight hours. On the other hand ammonia solution, both with colourless and reddened carbolic acid, always produced a blue colour. The question cannot be said to be yet settled, and it is obvious that in future experiments, considering the minute quantities of copper and ammonia by which, if Herr Fabini's theory is correct, the red colour is produced, it will be desirable to avoid using an excess of the reagents lest a delicate reaction be obscured.

It is known that chloral, however preserved, at the end of a variable time becomes insoluble in water, in which state it is known as metachloral. M. Byasson in investigating the cause of this change has found (*Comptes Rendus*, xci., 1071) that anhydrous chloral, if only purified by rectification, however frequently repeated, always retains traces of sulphuric acid. But if these be removed, by agitating the chloral with 1 per cent. of its weight of caustic baryta, decanting and redistilling, the anhydrous chloral can then be kept an indefinite time without alteration. Some comparative experiments made with chloral placed in sealed tubes appeared to show that the change under the influence of sulphuric acid takes place more rapidly when the chloral is exposed to the light, and that hydrochloric acid induces a similar transformation, but more slowly and incompletely.

Some time ago considerable interest was aroused by a remark made by Sir Henry Thompson, when lecturing on calculus diseases, which implied that there was something in the condition in which the purgative salts occurred in natural mineral waters that invested them with special properties. Taking, as an instance, Friederichshall water, Sir Henry spoke of the average dose of 7 ounces as containing "about 25 grains of sulphate of soda and 20 grains of sulphate of magnesia, which taken in any combination you like out of a druggist's drawer would have no appreciable action." This statement was probably based upon a published analysis by Liebig; but in one of a valuable series of reports on the mineral waters of Europe by Dr. Tichborne and Dr. Prosser James, now in course of publication in the *Medical Press and Circular* (N. S., vol. xxx., p. 265, and xxxi., p. 12), the authors describe it as an unfounded notion and state that, although Liebig's analysis still fairly represents the quality of the ingredients and their relative proportions, the Friederichshall of commerce is now "much stronger and centesimally richer in ingredients." In fact, according to an analysis made by Dr. Tichborne, a dose of 7 ounces of Friederichshall would represent at the present time 57½ grains of sulphate of soda and 47 grains of sulphate of magnesia.

In a paper read before the Royal Society last month, Mr. Crookes deals with the subject of heat conduction in highly rarefied air (*Nature*, January 6, p. 234). Previous experiments as to the transfer of heat across air of different densities have appeared to show as a general result that heat conduction is almost independent of pressure. Mr. Crookes's experiments, however, point to a somewhat different conclusion. They were made with glass globes containing accurate thermometers and exhausted to various degrees, which were either allowed to cool from a raised temperature, or were heated by being plunged into hot water, and the time occupied in each change of 5 degrees of temperature, as indicated by the thermometer, being noted. The plan of raising the temperature gave the most constant results. Working within ordinary limits not much diminution in the rate of rise was observed with increased exhaustion; thus, with a pressure of 760 millimetres 121 minutes were occupied whilst the thermometer was rising from 25° to 50°, and with a pressure of 1 millimetre 150 minutes, whilst the time only increased to 252 minutes, even when the exhaustion was carried to 12 millionths of an atmosphere. But beyond this point the retardation was more marked, the time with 5 millionths of an atmosphere being 322 minutes and with 2 millionths 412 minutes. The explanation suggested by Mr. Crookes is that up to a certain point the diminution in the number of impinging molecules is compensated by the fewer collisions and consequent increase in the mean length of the path and augmented motion of the molecules, and that it may not be until high exhaustions are reached, in which the mean length of path between collisions becomes comparable with the diameter of the globe, that further exhaustion produces a notable fall in the rate at which heat is conveyed from the enclosing case to the thermometer. Thus a reduction of pressure from 5 millionths to 2 millionths of an atmosphere caused a fall in the rate equal to twice that which occurred by the reduction of pressure from 760 millimetres to 1 millimetre, and it is inferred that an additional diminution of a millionth would produce a still greater relative retardation.

According to the *American Journal of Pharmacy*, it has been determined by a Sub-Committee of the Committee on the Revision of the United States Pharmacopœia to recommend the official adoption of a substance to represent the soft paraffin substances now so largely used in pharmacy under such names as vaseline, cosmoline, etc. The suggested pharmacopœial designation of this substance is "saxoline."

In the very lengthened discussion in the "Dispensing Memoranda" which resulted from the question, "What is meant by hyd. chlor.?" one point of some interest was touched upon by A. P. B., page 546. He found that calomel from one source when blown into the eye could be borne with impunity, whilst that from another source caused considerable pain. That the latter must have been in a crystalline condition is suggested, and with some probability, but it was evidently one of those peculiar cases which should have been thoroughly investigated.

It is reasonable to suppose that the particles were in one instance crystalline, in another amorphous; but the difficulty should be solved, and a microscopic examination would be one means of setting the question at rest. A thorough investigation with satisfactory results would have raised the chemist in the estimation of the medical attendant, and this is just one of those instances where the pharmacist could give evidence of superior training.

Since the remarks last month on the powder of plumbi acet. and p. aluminis, when it was observed that the two powders mixed together keep very well in that condition, repeated references have been made by correspondents to the same subject, and in nearly every instance it is assumed that on mixing the two ingredients decomposition necessarily takes place, and that consequently the mixed powder becomes moist, inferring, therefore, that the prescription is not a suitable one for the prescriber to order for his patient. Such, however, is not the case, and those ingredients, each in a state of powder, may be mixed and kept, without any special precaution, for any reasonable length of time without change. If the alum. sulph. be powdered at the time it is required to be dispensed, it is just possible that a sufficient amount of water may exist in the interstices of the crystals to determine a decomposition which seems to have been occasionally met with and very generally assumed. There is no necessity for the suggestion that alum. exsic. should be used, and its employment in this instance cannot be sanctioned.

The first ingredient in prescription, No. 493, may safely be assumed to mean beberia, and most probably that which the prescriber intended to be used was the sulphate of the alkaloid, a preparation of the B.P., beberiæ sulphas. It is usual to combine it, as in that prescription, with an acid and carminatives. Beberiæ sulphas is much esteemed by some members of the medical profession, but is not in very general use.

There is no such article known as the ammon. quina carb. in No. 494, and it is scarcely probable that any solid preparation of quinine would be prescribed in that proportion. It is very likely a slip of the pen; the omission of "liquor" renders it probable that some confusion may have existed in the prescriber's mind when he wrote that prescription. Presuming that it has been correctly read, there is little doubt but that an error has been committed and that the preparation of quinine intended was the tinct. quinæ ammon.

In the prescription, No. 495, there must necessarily be a deposit, which deposit, by shaking the bottle, should be given in divided doses with the supernatant fluid. The compound which forms in a mixture of pot. iodid. and liq. hyd. perchlor. is Mayer's solution for determining the presence of some of the alkaloids, and has on more than one previous occasion been referred to in these columns. Its presence in a fluid preparation of cinchona would cause a deposit of the alkaloids with more or less extractive matter. Such a mixture cannot be clear excepting after subsidence of the separated matter, and in no case should that be left out of the mixture, or the greater part, if not the whole, of the alkaloids of the cinchona will be left out also.

The Pharmacopœial preparations of bark create more difficulties in dispensing than, perhaps, those of any other drug. Supposing the several prescriptions to have been faithfully prepared the difference can only be accounted for on the assumption of different kinds of bark having been used for the same preparation in different establishments. It can scarcely be conceived possible that any dispenser would separate the deposit that occurred in a mixture containing a preparation of cinchona bark with a view of sending out a clear mixture.

The ext. ergot. ordered in No. 496 not being official, the ext. ergot. liq., B.P., may be evaporated to the consistence of an extract and used in this instance, 16 ounces, according to Squire, yielding 2¼ of solid extract. In the prescription, however, the dose seems to indicate the use of a more active preparation, and on reference to the German Pharmacopœia there is an ext. secalis cornuti, made in accordance with the principle advocated by Bonjean, that of using spirit to throw down mucilageous matter with inorganic salts. The preparation is more elegant and possesses greater activity than an extract which is the result of simple evaporation. The use, therefore, of Bonjean's ergotine may safely be recommended as more calculated to fulfil the requirements of the prescriber. In considering which yields the most active preparation, care should be taken that it answers to the description of the article ordered in the prescription.

When either ext. aloes or ext. aloes aq. is ordered, as in Nos. 1 and 2 of 497, the extract of socotrine aloes should be used, and the other only when "barb." is ordered. This follows the nomenclature of the Ph. Lond., in which ext. aloes is described as an extract from socotrine aloes. Its synonym in the Pharmacopœia of 1836 being ext. aloes purif. Also in the same Pharmacopœia, the ext. of barbadoes aloes is ordered as such. The aloes of the prescription No. 1, therefore, accords with the nomenclature of the Ph. Lond., and in that of No. 2, the only addition is that of "aquos." The two really indicate the same preparation.

It is not unusual for grains to be inadvertently written when guttæ are evidently intended, as in prescription No. 498. It may safely be assumed that guttæ were meant by the writer, and should be dispensed by the chemist. It is sometimes difficult to say what latitude should be allowed to questions; but from "Juniors" it may perhaps be considerable and the inquiries be still perfectly legitimate.

The ext. glycyrrhizæ mollis of prescription, No. 499, does not admit the use of ext. glycyrrh. liq., but rather that of a soft extract of liquorice. The word "mollis," probably has some reference to the directions for the preparation of some of the extracts of the London Pharmacopœia in two forms, "extractum molle quod ad pilulas fingendas aptum sit et durum quod in pulverem teri possit." A soft extract, in fact the ext. glycyrrh., B.P., was doubtless intended, and more especially as the extract was to form part of a mixture.

THE MIGRATION OF EUROPEAN ANIMALS TO AMERICA AND OF AMERICAN ANIMALS TO EUROPE.*

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(*Continued from page* 598.)

And the end is not yet. Not yet has Europe ceased to send over to America her surplus population—human and insect, worthy and worthless. For more than two hundred years the cabbage enjoyed almost perfect exemption in this country from the attack of insects. The American cabbage butterfly (*Pieris oleracea*), it is true, fed upon it, but the damage done was trifling and usually confined to the outer leaves. Into this cabbage paradise, however, the Evil One at length gained entrance in the form of the English cabbage butterfly (*Pieris rapæ*). Crossing the Atlantic unperceived, he landed at Quebec about 1857. In a year or two entomologists began to collect these insects—pleasant links of association with the old country—and gardeners began to collect the larvæ—unpleasant memorials of the same—and both united in foreboding trouble to the growers of cabbage. Few, however, realized the extent to which their forebodings would be fulfilled. Professor Packard, writing in 1869, could say: "It is now found in the vicinity of Quebec and the northern parts of New England."* West and south spread the new immigrant, multiplying rapidly and travelling fast, until the growth of the cabbage became utterly impossible in many localities. It is said to have destroyed 500,000 dollars' worth in the state of New York in one year. It works incomparably more mischief here than in Europe, eating into the very heart of the cabbage, and so ruining far more than it destroys. It appeared in this part of Ohio about 1872 or 1873, and is reported in the 'Canadian Entomologist' for 1877 to have then reached Chicago.† It is now far west of Chicago and St. Louis,‡ so that probably in a few years the whole country east of the Rocky Mountains will be only too well acquainted with this insect and its depredations. Fortunately, one at least of its foes has followed it across the Atlantic, and is gaining to a great extent the upper hand. This fly (*Pteromalus puparum*), which lays its eggs in the caterpillar, annually destroys the greater part of the broods. Two years ago, out of twenty chrysalids I failed to obtain a single butterfly; swarms of these parasites issuing from the cases instead. An anonymous writer from Ontario has aptly described this mischievous little insect from the gardener's point of view in a recent number of *Vick's Magazine*:—

> "Frisking, flirting, airy sprite,
> Little Satan robed in white,
> Favourite of Beelzebub,
> Breeder of his choicest grub,
> With befitting courtesy,
> I take off my hat to thee.
>
> "Blighter of the gardener's hopes,
> Fell destroyer of his crops,
> Thy existence shall be brief,
> Though I smash a cabbage-leaf;
> Having put thee out of pain,
> I will don my hat again."

And this immigration is still going on. Asparagus has been a favourite vegetable for thousands of years. By Roman writers it is extolled as highly as by those of to-day. Its introduction into America is not on record, but no one can doubt that the English colonists lost no time in importing the culinary vegetables of their old home. Asparagus has become as great a favourite here as there. In its introduction its greatest foe and closest companion was, unwittingly, of course, left in Europe. No American insect attacked it, and for more than two centuries it was cultivated in peace and with profit. But about the year 1858, according to Dr. Fitch, the asparagus beetle (*Crioceris asparagi*) made its appearance in Long Island—imported, no doubt, with asparagus from England—and spread rapidly over the district, from Astoria as a centre, occasioning such ravages that many asparagus beds were ploughed up as useless.

As if the foregoing list were not long enough and gloomy enough, we have quite recently added another, an enemy to the housekeeper, who may expect additional labour and anxiety in consequence of its advent. About the year 1874, says Dr. Lintner—to whose kindness I am indebted for some of these details—the European carpet beetle (*Anthrenus scrophulariæ*) was first noticed in several parts of the state of New York. Dr. Hagen reports it as early as 1872 at Buffalo, and 1873 at Cambridge and Boston. Three-fourths of these latter cases were traced, he adds, to a large carpet store in Washington Street, Boston. "Should this insect," says Dr. Lintner,

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* Reprinted from the 'Fourth Report of the Montreal Horticultural Society,' 1878.

* This range was too narrow for that year.

† The account given in the place cited of its introduction differs from that usually accepted by placing it apparently at least three years too late. See Packard's 'Guide to Insects and Report of the Entomological Society of Ontario' for 1875, p. 31.

‡ I learn this year that it is still unknown at Kankakee, Ill.

“become as common as another of the same genus (*A. varius*), it is difficult to conceive how the luxury of carpets can still be indulged in within our homes.” The danger is great. “Its power of increase is almost incalculable. Camphor, pepper, tobacco, turpentine, carbolic acid,” says Dr. Lintner, “are powerless against it.” It eats large holes in the carpets, and living in the crevices of the floor, cuts them through as with a pair of scissors along the joints of the boards.

Thus has Europe contributed to people America. What will be her next gift? And it must be borne in mind that these European incomers multiply far faster and do, as a rule, infinitely more mischief here than there. So there is this, that some of them were not recognized in Europe until the reports of their wide-spreading havoc in America excited alarm. The British Privy Council met specially to take measures for preventing the introduction of the Hessian fly into England, not knowing that it had been there from time immemorial and had gone thence to the West.* In one or two instances, at least, it is still somewhat uncertain whether the insect migrated from Europe to America or from America to Europe. The woolly apple tree bark louse (*Eriosoma lanigera*) is an example of this. To the causes of this remarkable difference of behaviour I shall return presently. It is enough here to notice the fact.

Here this list must end, because time and space fail. Add to the depredation of these foreign pests the numerous native insects which plunder the farmer and the gardener to an extent unknown in England, and we shall not be surprised to learn that, according to an estimate made not many years ago by a competent entomologist, the annual loss to the country exceeds 300,000,000 dollars. The prospect is not comforting.

The other side of the question now calls for consideration. To what extent has America contributed of her insect population to increase the destroyers of European farmers' crops? Here, as was the case with American weeds, we are struck with the scantiness of the list.

Foremost among fruit destroyers of native origin is the detested plum weevil (*Conotrachelus nenuphar*). More fruit is destroyed by this insect than by all others together in many parts of the country. Few are the kinds that are spared by this little Turk. The eggs are laid in the plum and nectarine, and the fruit withers and falls; in the cherry, and the fruit swells and ripens, but the housewife must stone or examine almost every single one in order to determine whether she is canning fruit or a hotchpotch of weevil-grubs, grass, and fruit together; in the apple, and the fruit shrinks, becomes one-sided, and falls off hard, knotty, bitter and woody material, instead of flesh. In many parts of the country the culture of the plum has been abandoned, and the trees have been cut down. The downy skin of the peach saves it from becoming the nest of this weevil, but when the fruit is ripe the snout of the beetle bores through the rind and then lets in fungus spores, which soon cause fermentation and decay. No easy or thoroughly successful mode of checking it has been discovered, and it continues to work havoc among the orchards and gardens of the United States, and to some extent in those of Canada also.

Yet this insect has never crossed to Europe. There the plum and cherry, the peach and nectarine grow undisturbed, and grubby fruit is almost unknown.

The canker worm (*Anisopteryx vernata*), so widely distributed and so destructive to the apple tree, if it has ever crossed the Atlantic has not established itself on the other side. The squash bug (*Coreus tristis*), so mischievous in gardens, and the yet more noxious chinch bug (*Rhiparochromus leucopterus*), of which Dr. Shimer says that in 1864 it destroyed three-fourths of the wheat and half of the maize through almost the entire North-West, are equally unknown there. The apple tree flourishes there free from its deadly enemy, the apple tree borer (*Saperda candida*). The peach tree is not killed by the peach tree borer (*Aegeria exitiosa*). The apple tree web worm (*Clisiocampa Americana*) and the forest web worm (*C. sylvatica*) never spin on the orchard and forest trees their silky webs. The northern army worm (*Leucania unipunctata*), which sometimes covers wheat fields in the United States, is there unknown. The American cut worms (*Agrotis*) have never been seen there, though represented by European forms. The black locust tree of America grows and flourishes in Europe free from its native foe, the locust borer (*Clytus robiniæ*), which renders its growth impossible in some parts of the States.

The leaves of the rose, the pear, the vine and the raspberry, are not there destroyed by the attacks of the slugs, or larvæ of four sawflies (*Selandria rosæ*, *S. cerasi*, *S. vitis*, and *S. rubi*). The tussock moth (*Orgyia leucostigma*) does not destroy the foliage of the shade trees, as in Philadelphia and other cities. The ash-grey blister beetle (*Lytta cinerea*), which renders the cultivation of English Windsor beans impossible in many parts of the States, has found no lodgment there. The currant spanworm (*Abraxas ribearia*), sometimes so destructive in Canada and the States to the red currant, is not known in England. None of the American bees and wasps have emigrated thither. The same is true of the butterflies and moths of this continent, even the abundant black bordered sulphur (*Colias philodice*), which feeds chiefly upon the European clover in America, has never, so far as I am aware, been seen in England.

A few exceptions must, however, be noted to the general exemption. “The only specimen of white ant which exists within the limits of the United States (*Termes frontalis*) has been known for a long time as a guest in the plant-houses of Schönbrunn, in Germany, but is not reported to have spread into the surrounding country.” “A very minute yellow ant (*Myrmica molesta*), which often infests houses through the United States, has, according to Frederick Smith, become generally distributed and neutralized in houses in England.” The American cockroach (*Blatta americana*), says Dr. Hagen, is common in sugar refineries at Archangel. The pea weevil (*Bruchus pisi*), of which Mr. Bethune remarked in the ‘Canadian Entomologist’ for January, 1876, “we fear it may soon become a source of great loss to our agriculturists,” is another immigrant to Europe, where it is now common in the south, though the damage it causes is much less than that which it commits in some parts of America. Professor Kalm says the inhabitants of some parts of Pennsylvania, New Jersey and New York have been compelled to abandon the cultivation of this delicious vegetable, in consequence of the prevalence of this insect. And Professor Riley says: “The knowledge of the fact may not add to our enjoyment of a mess of green peas, yet the fact nevertheless remains, that those of us in the Mississippi Valley who indulge in this delicious esculent devour a young weevil with nearly every pea we eat.”

It has been doubted whether this pest of the garden is really a native of America. It was first noticed near Philadelphia, whence it has spread over the States, and threatens Canada. The garden pea being an imported vegetable, the insect must, if native, have originally fed on some other plant, not a solitary instance of change of food. Though it prefers a warm climate, yet Mr. Saunders, of London, Ont., says it prevails in all parts of Canada, from the Red River to Quebec, and in some places so abundantly as to discourage farmers from growing peas at all. Professor Riley adds: “We in the Western States are in the habit of sending to Canada for seed peas, because we then get them free from weevils, but the reason is their greater care in destroying the weevils and in sorting their seed.” Though thus mischievous here, yet Kirby and Spence say it does not occur to any injurious extent in England.

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* An interesting paper might be written on the migration of some of these insects to Europe from Asia, for not a few of them can be traced to the eastern continent, and it must not be inferred that the original home, whatever that expression may mean, of all these insects is Europe because they are here spoken of as European.

England has given to America her meal worm (*Tenebrio molitor*), but she has received another in return in American flour (*T. obscurus*), which is now found in some places in tolerable abundance. It feeds on dry and sound flour, whereas the European meal worm is only found in that which is damp or otherwise damaged.

Would that we could stop here, but there is one notorious, terrible exception, which claims notice. It first attracted attention about the year 1866, though it had been mentioned by Dr. Fitch ten years earlier. The leaves of certain varieties of vine, especially the Clinton, were covered with galls from the size of a pea downward. But the mischief was so slight that the late Mr. Walsh could write of it in 1860; "I do not think there is much likelihood of it ever becoming so numerous on any vine as unduly to check its growth." So far, however, is this expectation from agreeing with the fact that this little insignificant gall louse is threatening seriously to injure, if not to ruin, several varieties of vine in this country. This insect, like some others, the potato beetle, for example, has shown its good taste by transferring its attention from its native food to the now highly cultivated plants from Europe, and has taken hold of the European vine (*Vitis vinifera*). At some time, and by some means at present unknown, it was conveyed to France, where the havoc it has made among the vineyards is such that the French Government has offered a reward of 20,000 francs for an efficient and practical remedy. The names of Mr. C. V. Riley, late of St. Louis, Mo., and now one of the Entomological Commissioners at Washington, and of MM. Signoret, Lichtenstein and Planchon, are indissolubly connected with the investigation of this minute grape vine gall louse (*Phylloxera vastatrix*). The second of these gentlemen, while prosecuting his investigations, was shut up in Paris by the German besieging army, but nothing daunted, he carried on his studies of this little louse, and wrote by balloon that though he himself was reduced to cats, dogs and horseflesh, the phylloxera, which he had in boxes, kept well and in good health; a good illustration of the pursuit of knowledge under difficulties.

The gall louse is of two forms—one living in the summer on the leaves (*gallicola*), and the other in the winter on the roots (*radicicola*). In Europe the latter appears to be the more common, and is certainly by far the more mischievous. Our limit only allows a few facts. Since 1865 it has spread from Avignon, northward, eastward and westward, until it now prevails over the whole district between Montpelier, Lyons and Toulon. Out of 75,000 acres of vineyard in the department of Avignon, 60,000 have been destroyed. In the department of Gard, half an average crop was produced in 1871. In the commune of Graveson, the mean crop of 1865, 1866 and 1867, was 220,000 gallons; in 1868, 121,000 gallons, in 1869, 48,000 gallons; then diminishing year by year, until in 1873, the yield was only 1100 gallons. Instances like this might be given to almost any extent, both from Europe and this country. It is already wide-spread here. Mr. Riley says:—"I have traced it back in this country to 1834. I have with my own eyes witnessed it in Kansas, Iowa, Missouri, Illinois, Michigan, New York, New Jersey, Maryland, and in Ontario, and have evidences of its occurrence in North Carolina, Tennessee and Florida." To these I can add Ohio. At present its attacks are chiefly made upon the varieties of the frost-grape (*Vitis cordifolia* or *riparia*), and the European vine (*V. vinifera*), and their hybrids, such as the Clinton, Cornucopia, Taylor, Marion and Delaware. How long this will remain true it is impossible to say.

This pest is evidently at present little known in Canada, but vine-growers in the Dominion will do well to be on their guard, and make themselves acquainted with its appearance and habits. "Forewarned, forearmed," should be their motto, or it may be in their midst, and work them endless vexation and loss, before they know what is hurting them. In the 'Report of the Entomological Society of Ontario for 1877,' Mr. B. Gott, of Arkona, says:—"I have already seen specimens of it, and it is my decided opinion that unless some effective remedy is found, our vines will suffer much from the effects of this tiny insect upon their leaves, and especially their roots." The difficulty of finding any such remedy, may be seen from the fact that the 20,000 francs offered by the French Government remain unawarded, and that it is now proposed to cut a canal from the River Rhone, and flood the vineyards in winter, at a cost of 102,000,000 francs, in order to save "60,000 acres, yielding products amounting to 200,000,000 francs a year.

The difficulty felt by the Italian Government in dealing with this plague may be seen from the following extract:—

"The restriction on the importation of plants of any kind whatever, and from any quarter, is most rigid. A consignment of the newly discovered aroid, from Sumatra, was subjected in Genoa to formalities and delays that seriously compromised the safety of the tubers. In some places gentlemen must dispense with the ordinary floral decorations in their button-holes. On the French frontier no one is allowed to gather a bouquet of wild flowers in foreign soil, and take them across the border, for fear that the much-dreaded pest should exist in it. All scientific reasoning seems to be at an end in the minds of the Italian Government officials." Nat., Feb. 20, 1879.

These words called out the following reply:—

"It was soon found that to forbid the importation of foreign vines and fruit trees was quite ineffectual, as it only gave occasion for smuggling on a grand scale, encouraged by certain horticultural firms, who did not fear to compromise their respectability by so doing. They began by introducing the prohibited plants in their leafless state, labelled 'choicest exotics,' to the utter confusion of the custom house officials, who, not being naturalists, were at a loss how to act, until the government was obliged at last to send the order that no live plant should pass the frontier." This will give some idea of the difficulty of excluding such a pest. The same periodical reports that an Australian insect (*Dorthesia characias*), probably introduced with the blue gum tree, is killing many of the orchard and other trees in California. This same insect has proved a great pest in South Africa.

(*To be continued.*)

TINCTURA RUSCI.*

This tincture is recommended for ringworm, by Professor Kaposi, in Hebra's work on skin diseases.

Of the genus Ruscus, which is classed with the Smilaceæ or Liliaceæ, three species have been employed medicinally, all of which are indigenous to Southern Europe, one, *R. aculeatus*, Lin., or butcher's broom, being also found in England. The rhizome, known as *radix rusci* or *brusci*, possesses aperient and diuretic properties, and was formerly much used in visceral diseases. This is doubtless the species employed for the above tincture, but we have been unable to find a formula in old or recent works, though several give directions for decoctions. Since the dose was from 10 to 30 grains in powder, the tincture is, perhaps, best made of 20 parts of the powdered drug, exhausted with sufficient dilute alcohol to obtain 100 parts. The taste is disagreeable, sweetish and bitter.

The other two species referred to are *Ruscus hypophyllum* and *R. hypoglossum*, Lin., the former of which was known as *laurus alexandrina*, the latter as *bislingua*, *uvularia* and *laurus alexandrina angustifolia*. The root and evergreen leaves were employed in diseases of the uterus and bladder.

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The Pharmaceutical Journal.

SATURDAY, JANUARY 29, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE DIFFICULTIES OF PHARMACEUTICAL LEGISLATION.

MORE than a month has now passed since we ventured to suggest the probability that the attempt to bring about an amendment of the Pharmacy Act would have for one of its first results the demonstration that popular opinion among pharmacists is far from being unanimous in regard to any of those subjects which are considered to be of importance in connection with the future of the art they practise. We then pointed out that the existence of such differences of opinion as were to be anticipated would render the task of drafting a Bill one of much greater difficulty than would otherwise appertain to the work to be carried through, and subsequently, when publishing the preliminary draft of the Bill ordered to be published by the Council, we suggested the desirability of mutual concessions between those who hold adverse opinions, provided it could be admitted that the contemplated provisions of the Bill would in any degree conduce to the general interests of the trade.

In placing these remarks before our readers we had no desire to take the position of a croaker or a prognosticator of evil, but rather, if possible, to prevent the manifestations of unfavourable symptoms that might be regarded as possible. It seemed to us that if there were any room for introducing a measure to reform and ameliorate pharmaceutical affairs, the chief things needful for arriving at a successful issue were harmony of feeling and unanimity of action among the promoters of the Bill. So strongly were we impressed with the necessity of this condition that we urged the cultivation of mutual willingness to waive individual opinions so far that, if there could not be unanimity of sentiment, there should at least be concurrent and harmonious action.

The response to the invitation given at the last Council meeting that members of the trade generally should express their opinions upon the Bill has certainly not failed to furnish a justification of the fears which, in the articles above referred to, we rather hinted at than expressed. It would be mere affectation to question the existence of a discordance, not to say antagonism, of opinion in regard to the main features of the draft Bill, which does not promise much for the successful issue of the undertaking now in hand. The subjects which have evoked these expressions of dissent are precisely those to which we referred as being probably the most prominently noticeable. Widows and the bearing of the Pharmacy Bill upon their interests have come first to the front, and Mr. SANDFORD, acting upon the hope expressed by some members of the Council that the trade generally would state their opinions, has come forward as the uncompromising advocate of the maintenance of "widows' houses," regardless of its inconsistency with the main feature and leading idea of past pharmaceutical legislation, viz., the personal qualification of the individual to whom a business belongs. Mr. SANDFORD is not even content with the position of widows as they have been under the present Act, but reverting to the intention of those engaged in framing the Act of 1868, and to the object desired by them to follow from the exemption set down in the 16th section of that Act, he would now seek to carry out that intention still further than it has been carried, by definitely exempting widows from the provisions of the Pharmacy Act, 1868, as widows, and not merely as executors, administrators or trustees.

Viewing the position of a chemist and druggist's widow as a matter of sentiment the opinion expressed by Mr. SANDFORD will doubtless be extremely popular with a large portion of the trade, but it is precisely this view of the matter which appears to be the most inappropriate that can be conceived in regard to what is demanded for the general interest of the trade. Personal qualification of the owner of a business is, as the President affirms, the very soul of the Pharmacy Acts: that must be, as hitherto, the main object of all endeavours to improve the position of the pharmacist, and even by the decision that has been given against the Council in the late litigation, the wholesomeness of that principle has not been questioned, but merely the scope of the Act's phraseology. But if in the case of the widow of a chemist and druggist it be maintained that the safety of the public is sufficiently guarded by her carrying on business through the aid of a qualified assistant, the whole principle of the legislation is abandoned, and there cannot be any logical justification for objecting to other unqualified persons carrying on business in the same way.

Still, as we have remarked, the sentimental view of the matter will with many prevail over the logical one, even when the interests of the trade are at stake, and, as our correspondence columns last week and this week show, Mr. SANDFORD will unfortunately have supporters. Still more unfortunately he will have opponents, and when we take into account who they are that figure already in that attitude we cannot hope much for the prospects of success in the projected amendment of the Pharmacy Act.

It is, moreover, not only in regard to the question of widows that the prospect of success in amending the Pharmacy Act is doubtful, but in several other points of view there is evidence of tendencies too contrary to leave much hope of a satisfactory measure being carried. Mr. BARNARD PROCTOR well expresses the feeling of disheartenment which must be felt by many on hearing the demand for a monopoly in the sale of all kinds of drugs and pharmaceutical preparations, and we think it would be well if those who think with him would follow his example by putting on record their conviction that legislation in favour of the druggist is not to be looked for or wished for.

It is painful to have to note from time to time that in this respect so many members of the trade seem to have no proper conception of what appertains to the exercise of their business or of what they can claim in their own interest with any show of reason. It would seem as if those belonging to this category were involuntarily bent on demonstrating the inutility of pharmaceutical legislation and of giving support to the opinion that the trade would be better without any Pharmacy Act and left to be governed by the principle of the survival of the fittest. In any case it is evident that neither the drafting of a Bill, nor the passing of it through Parliament, will be a matter of such facile execution as has been supposed possible.

THE CASE UNDER THE WEIGHTS AND MEASURES ACT.

IT will be a matter of interest to many of our readers to know that the hearing of Mr. WHITTLE's appeal against the judgment of the Marylebone magistrates will come on at the Westminster Sessions House, Broad Sanctuary, as the first case on Saturday morning next at 10.30. The appeal is being conducted by Mr. GLAISYER, of Birmingham, for the Chemists and Druggists' Trade Association. The counsel for the appellant is Mr. BESLEY and Mr. POLAND is for the respondents.

THE CALENDAR OF THE PHARMACEUTICAL SOCIETY.

WE have received an early copy of the Calendar of the Pharmaceutical Society, issued under the authority of the Council, and are authorized to say that by the time these lines reach our readers this useful little volume will be ready for delivery. Of course, after the manner of Calendars, it contains all necessary information respecting the Society, such as Lists of its Members, Associates and Apprentices, Charter, Acts of Parliament, and Bye Laws, as well as a list of the Subscribers and Donors to the Benevolent Fund, giving the number of votes to which each is entitled. But in addition there is an Appendix containing a large amount of information interesting to chemists and druggists, as it includes most of the Acts of Parliament, or the essential portions of them, having a special bearing upon their business. We notice for instance that it contains as fresh matter the portion of the Spirits Act, passed last year, which relates to the sale of methylated spirit, and some extracts referring to the Weights and Measures Act.

We understand that the Register is also nearly ready, and these two volumes, taken together with the Registrar's Report, will enable us to give next week our usual statistical notice on the relations of the Society and the trade to each other.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The third meeting of the present session of the North British Branch was held on the evening of the 21st inst., in the rooms of the Society, 119A, George Street, Mr. J. B. Stephenson, President of the Branch, in the chair.

The minutes of the former meeting were read and confirmed.

The Chairman, at the opening of the meeting, said this was the first meeting since the death of Mr. Baildon. Mr. Baildon had been a very frequent attendant at their meetings and an occasional contributor to their proceedings, and their museum especially had been enriched through him. He (the Chairman) was sure it would be the wish of the meeting to honour the memory of Mr. Baildon by placing on record their sense of the great loss sustained through his death.

The Honorary Secretary announced the following donations:—

To the Museum.—A box containing a unique collection of Chinese Drugs, as put up for sale in the drug stores of China and the East Indies: presented by Mr. A. Mackay, The Dispensary, Singapore (late of Edinburgh).

To the Library.—(1) *Journal of the Chemical Society* for December, 1880, from Mr. Mackay; (2) *Canadian Pharmaceutical Journal* for December, 1880; from the Ontario College of Pharmacy; (3) *The Pharmacist and Chemist* for December, 1880, from the Chicago College of Pharmacy; (4) 'The Year-Book of Pharmacy' for 1880, from the British Pharmaceutical Conference; (5) 1 vol. and part of a vol. of Goebel's 'Pharmaceutische Waarenkunde,' with beautiful illustrations, from Mr. E. G. Schweitzer, London; (6) *The American Journal of Pharmacy* for 1879: a new addition to the Library (to be continued).

Mr. D. B. Dott, Edinburgh, then read the following "notes":—

SOLUBILITY OF SOME OF THE SALTS OF MORPHIA.

BY D. B. DOTT.

In the published statements concerning the solubility of the salts of morphia there are considerable discrepancies, while the proportions given by some authorities are obviously erroneous. These results have doubtless in many cases been obtained through the substances employed having varied in composition, or through the different experimenters having prepared their solutions n various ways.

I have determined the solubility in water of the principal morphia salts, and although the results are not supposed to be rigidly accurate, I believe they will be found sufficiently correct for practical purposes. The method employed in each case was the same. A saturated solution was prepared by digesting the salt in water in a closed test-tube for three days, the tube being frequently agitated. The solution was then quickly filtered into a tared beaker, the temperature at the same time being observed, after which the vessel and its contents were immediately weighed, and the solution evaporated to dryness on the water-bath. Before weighing the residue it was thoroughly dried in the bath and allowed to cool in the exsiccator.

Hydrochloride.—*a.* 33·79 grs. water at 10° C. dissolved 1·31 grs. morphia hydrochloride ($\overset{+}{M}.HCl.3H_2O$). This makes the solubility 1 in 25·79.

b. 34·54 grs. water dissolved 1·34 grs. $\overset{+}{M}.HCl.3H_2O$, which gives a solubility of 1 in 25·77.

Of course the residue left by evaporating a solution of the muriate on the water-bath is the anhydrous hydrochloride, so that it is necessary to convert the numbers obtained into the corresponding proportion of hydrate, then to subtract the latter number from the weight of the solution, in order to find the amount of water required to dissolve the salt.

Sulphate.—a. 59·02 grs. dissolved 2·56 grs. morphia sulphate ($\overset{+}{M}_2.H_2SO_4.5H_2O$), or 1 part is soluble in 23·05 parts water at 10° C.

b. 53·83 grs. dissolved 2·31 grs. $\overset{+}{M}_2.H_2SO_4.5H_2O$, or 1 part is soluble in 23·30 parts water at 10° C.

When an aqueous solution of the sulphate is evaporated to dryness on the water-bath, the residue consists of the 2-hydrate. The salt as crystallized from water is the 5-hydrate.

Acetate.—a. 18·21 grs. water at 10° dissolved 8·77 grs. morphia acetate ($\overset{+}{M}.\overset{-}{A}.3H_2O$), or 1 part is soluble in 2·07 parts water.

b. 20·82 grs. water at same temperature dissolved 9·80 grs. $\overset{+}{M}.\overset{-}{A}.3H_2O$, or 1 part is soluble in 2·02 parts H_2O.

The solution of the acetate must be evaporated very gently, and finally taken to dryness in the exsiocator, as it is readily decomposed by heat.

Meconate.—a. 54·73 grs. H_2O at 12° C. dissolved 1·97 grs. morphia meconate ($\overset{+}{M}_2\overline{Mec}.5H_2O$), making the solubility 1 in 27·78.

b. 94·10 grs. H_2O at 12° dissolved 3·38 grs. $\overset{+}{M}_2\overline{Mec}.5H_2O$, making the solubility 1 in 27·83.

Tartrate.—a. 162·685 grs. water at 14° C. dissolved 18·03 grs. neutral tartrate of morphia ($\overset{+}{M}_2\overset{-}{T}.3H_2O$), or 1 part of the salt is soluble in 9·02 parts water.

b. 117·67 grs. water at 14° C. dissolved 13·08 grs. $\overset{+}{M}_2\overset{-}{T}.3H_2O$, or 1 part is soluble in 9·00 parts water.

The solubility of the *acid* tartrate is much less. It is indeed rather sparingly soluble in water.

Citrate.—a. 80·85 grs. water at 10° C. dissolved 4·14 grs. di-morphia citrate ($\overset{+}{M}_2.\overset{-}{C}.5H_2O$), or 1 part is soluble in 19·52 parts water.

b. 41·67 grs. water dissolved 2·13 grs. $\overset{+}{M}_2\overset{-}{C}.5H_2O$, giving a solubility of 1 in 19·56.

Valerate.—a. 8·31 grs. water at 12° C. dissolved 1·93 grs. morphia valerate ($\overset{+}{M}.\overset{-}{V}.H_2O$), which makes the solubility 1 in 4·30.

b. 69·89 grs. water dissolved 16·23 grs. $\overset{+}{M}.\overset{-}{V}.H_2O$, making the solubility 1 in 4·32 parts water.

Like the acetate the valerate is liable to a certain amount of decomposition by heating. The solution ought, therefore, to be evaporated, and the residue dried without exposure to a high temperature.

The comparative solubility of the above-mentioned salts near the ordinary temperature may be seen by reference to the annexed table:—

Acetate	1 in 2	parts water.
Valerate . . .	1 in 4⅓	„
Tartrate . . .	1 in 9	„
Citrate	1 in 19½	„
Sulphate . . .	1 in 23	„
Muriate . . .	1 in 25¾	„
Meconate . . .	1 in 27¾	„

MORPHIA ACETATE.

BY D. B. DOTT.

In the Pharmacopœia instructions for the preparation of acetate of morphia it is directed to "evaporate the solution with the heat of a water-bath until it concretes on cooling," and finally to "dry the salt with a gentle heat." These directions render the composition of the product somewhat uncertain, as by continued exposure to a moderate heat a portion of the combined water will be driven off; but it is probably intended that the salt should only be dried until it is not sensibly moist.

In order to ascertain the composition of acetate of morphia prepared by the B.P. process, a sample of that preparation was examined in manner as follows:—

(1.) 14·44 grs. exposed under bell-glass over sulphuric acid lost in weight 0·99 grs. = 6·85 per cent. Then transferred to water-bath the 13·45 grs. lost 1·65 grs. = 12·26 per cent. The total loss being 18·28 per cent. The dried salt was treated with water and left undissolved, 5·66 grs. = 39·12 per cent. The morphia in the solution was precipitated by ammonia and dried under 100° C. It weighed 4·74 grs. = 32·82 per cent.

(2.) 50 grs. of the same sample dissolved in water left 2·67 grs. morphia, equivalent to 5·34 per cent. The dissolved morphia obtained by precipitation weighed 34·30 grs. = 68·60 per cent.

(3.) 15·935 grs., exposed in the air-bath at 110° C., lost 4·49 grs. = 28·17 per cent. The residue weighed 11·445 grs. = 71·82 per cent. This did not dissolve to an appreciable extent in water and evidently consisted of pure morphia, the combined acid and water having been driven off.

(4.) 12·75 grs. of another sample when dried in exsiccator lost 1·015 grs. = 7·96 per cent. The dried salt was then treated with water and left undissolved, 0·78 grs. = 6·11 per cent. To the solution excess of ammonia was added and the precipitate collected. After drying it weighed 8·41 grs. = 65·96 per cent.

(5.) 50 grs. of the same dissolved in water left 3·03 grs. of uncombined morphia, equal to 6·06 per cent. The combined morphia precipitated from the filtrate weighed 33·46 grs. = 66·92 per cent.

(6.) The loss in exsiccator in three samples was estimated with the following results:—

11·63 grs. lost 0·96 = 8·25 per cent.
13·32 „ „ 1·23 = 9·23 „ „
13·43 „ „ 1·07 = 7·96 „ „

Now it is evident from the results of experiments (4) and (5) that the decrease of weight by exposure in the exsiccator is almost entirely due to loss of water, as the increase in the amount of uncombined morphia after drying is only 0·05 per cent., indicating that no noteworthy proportion of the acid had been eliminated. From experiment (1) we see that the acetate loses weight in the water-bath after it has ceased to do so in the exsiccator; but it is evident from the results of (1) and (2) that this is partly due to loss of acid, seeing that the uncombined morphia had increased from 5·34 to 39·12. If we deduct the percentage of free morphia originally present from that obtained after drying we get the number 33·78. Now the weight of acetic acid equivalent to that amount of morphia is 6·68. But the loss of weight in the water-bath is 12·26, so that 5·58 is due to loss of water. The third experiment proves that by exposure to a temperature of 110° C. in the air, the whole of the water and acid is driven off, leaving the anhydrous alkaloid.

In drawing conclusions from these results, it must be borne in mind that we are not working with pure acetate, but with an acetate containing an admixture of free morphia, and also that the whole of the combined morphia is not obtained by precipitating with ammonia.

The average loss of weight in exsiccator is 8·05 per cent.

$C_{17}H_{19}NO_3.C_2H_4O_2.3\ H_2O$ for the loss of $2\ H_2O = 9·02$ per cent.

The loss of weight at 110° C. is 28·17 per cent.

$C_{17}H_{19}NO_3.\ C_2H_4O_2.\ 3\ H_2O$ gives a percentage of 28·82 of acid and water.

The residue left by drying at 110° C. is=71·82 per cent. of the salt.

$C_{17}H_{19}NO_3.C_2H_4O_2.3H_2O$ gives a percentage of morphia=71·42 per cent.

It is, therefore, evident from what has been said that acetate of morphia, prepared by the Pharmacopœia process, contains 3 molecules of water, and that the formula ought to be given as $C_{17}H_{19}NO_3.C_2H_4O_2.3H_2O$. The official formula is defective in so far as it omits the water of crystallization. It is interesting to notice from a posological point of view that the percentage of morphia in the acetate is nearly the same as in the muriate and sulphate. If the acetate were dispensed as an anhydrous salt, an appreciably larger dose of morphia would be given than by the same weight of muriate. All samples of morphia acetate which we have examined approximate more or less closely to the composition above given. Such a salt ought to yield by precipitation with ammonia not less than 72 per cent. of morphia hydrate.

Mr. J. Nesbit, Pharmaceutical Chemist, Portobello, followed with "Notes on the Solubility of the Sulphate of Beberia." Mr. Nesbit exhibited numerous specimens illustrative of his experiments.

NOTES ON SULPHATE OF BEBERIA.

BY J. NESBIT.

This preparation, which has long had a place in Edinburgh pharmacy, has always been a source of difficulty to the dispenser, from its partial solubility. The Pharmacopœia states that water forms with it a clear brown solution; this, we all know, does not apply to the article we are invariably supplied with. It is certainly soluble in the proportion of one part of the salt in six or eight parts of water, forming a clear and permanent solution; but when this is diluted, or a larger quantity of water is used, a muddy looking mixture is formed, which on standing deposits a bulky precipitate. This peculiarity being so contrary to my experience of the solubility of alkaloid salts, I looked up the various works on pharmacy, but in none could I find any reference to the decomposition which evidently occurs.

Dr. Maclagan thought he had found another alkaloid, sipirina, in the commercial salt but on a subsequent examination he came to the conclusion that this was not an alkaloid, but an oxidation product of beberia, and this I have always considered the precipitate to be.

The following experiments were undertaken to elucidate this point:—

A solution of the salt, in proportion of one part in fifty of distilled water, was prepared and after standing for twenty-four hours was filtered. The filtrate on being tested with litmus gave no acid reaction.

The precipitate was also examined for acid, but with a negative result, and after washing with distilled water it was dissolved in rectified spirit and tested for sulphuric acid, of which it gave no indication.

The filtrate, after standing some days, during which time it retained its brilliant transparent brown colour, was evaporated on a water-bath to a syrupy consistence and scaled without artificial heat. On re-dissolving this it gave nearly as turbid a solution as the salt from which it had been originally prepared. No doubt the very moderate heat of a water-bath had caused some decomposition, or possibly that combined with the influence of the atmosphere had effected the oxidation before alluded to.

The Pharmacopœia, in the process for its preparation, directs that the sulphuric acid be added in slight excess, an instruction which does not seem to have been adhered to in this case, as the filtrate was decidedly basic and the precipitate gave no indication of acid either free or combined.

To satisfy myself of the correctness of this, fifty grains of the sulphate were dissolved in a small quantity of water and precipitated with chloride of barium; the beberia, however, went down with the sulphate of baryta, and after considerable washing it was found impossible to separate the latter in a sufficiently pure state for weighing.

Other fifty grains were now mixed with nitrate of potash and carbonate of soda and ignited, the residue dissolved in distilled water, acidulated with nitric acid and $BaCl_2$ added; the precipitate weighed 11 grains, which on calculation is equal to 7·5 per cent of SO_3 in the sulphate of beberia.

Another portion of 50 grains was dissolved in distilled water and precipitated with ammonia; the filtrate and washings were estimated as in the previous experiment. The precipitate in this case weighed 12 grains, equal to 8 per cent. of SO_3 in the sulphate of beberia, the mean of the two experiments being 7·75. Now, the theoretical quantity of SO_3 in the Pharmacopœia salt is 11·73 per cent., thus showing a deficiency of nearly 4 per cent. in the commercial article. How far this conclusion is correct you may judge from the preparation I now submit to you. In the first place a solution of the ordinary salt was made and the estimated deficiency of SO_3 added, the solution evaporated and rescaled. The scales have the usual brown translucent appearance and dissolve readily in water, giving a clear solution; but after standing for forty-eight hours a deposit takes place, which I have no doubt arises from the oxidized product existing in the original salt, the result of its evaporation when in the basic condition. Another quantity of the basic preparation was now dissolved in 50 parts of water and after standing for twenty-four hours, 4 per cent. of SO_3 added, the solution filtered from the insoluble portion of the precipitate, the filtrate evaporated and scaled. The result is a salt soluble in water in all proportions giving a clear brown solution, and otherwise answering the description of the officinal preparation.

The conclusions from the foregoing experiments are that the commercial salt is deficient in sulphuric anhydride to the extent of 4 per cent.; that in a strong solution the uncombined beberia is dissolved by the sulphate, but on dilution is precipitated; and further that there is no difficulty in making a preparation perfectly soluble, and in every way answering to the tests of the Pharmacopœia.

In a discussion which followed, Mr. Dott remarked that sulphate of beberia was a mixture of several alkaloids, etc., and not a definite chemical compound, and that no formula ought to be placed opposite the name, the formula given in the British Pharmacopœia being wrong. Mr. Gilmour also made a few remarks with reference to his experience of the article.

Provincial Transactions.

MIDLAND COUNTIES CHEMISTS' ASSOCIATION.

The annual *soirée* of this Association was held in the Town Hall, Birmingham, on Friday evening, January 21, and was attended by a large number of visitors. The orchestra was decorated with shrubs, and a number of industrial processes, chemical experiments, and interesting exhibits were shown.

The east upper corridor was occupied by Messrs. Southall, Brothers and Barclay, who showed an extensive collection of specimens illustrating the composition of various kinds of waters, saline and fresh. The different kinds of common salt were included in the exhibit as being derived from ancient seas, through the medium of rock salt and brine liquor, and several aquaria were also shown with living specimens in salt water, made from a mixed sea salt containing the various salts as found in real sea water. The rest of the corridor was occupied by the manufacture of essence of lemon. Messrs. Southall, Brothers and Barclay, assisted by their correspondents, showed the sponge process conducted by native Italian girls. The partly ripe fruit is peeled into three slices. After standing a day, it is gently squeezed, and the exuding essence is absorbed by a sponge lightly passed over it. The sponge is squeezed out when full. A second quality of essence is made from the remaining peel by distillation. In the great gallery, the same firm showed a large collection of rare and curious drugs.

Messrs. Harris and Co., Bull Ring, Birmingham, showed some Japanese products, some much more potent in medicinal properties than the corresponding European ones. There were also some papaw leaves, which have the power of rendering tough meat tender and digestible, and duboisia leaves which have properties similar to belladonna, but are said to be three times stronger.

Messrs. Wyleys and Co., Coventry, exhibited a number of American drugs and new preparations, and in addition a number of educational microscopic slides.

Messrs. Evans and Son, Liverpool, showed a case containing all the drugs of the British Pharmacopœia, and a collection of all the varieties of Turkey opium which are now known in the market; also a collection of twenty-two derivatives of opium furnished by Mr. A. H. Mason, F.C.S., which were discovered in the course of experiments, undertaken with the view of building up morphia. The harnonograph and the umbragraph, which much interested the visitors, were here exhibited by Messrs. Drittler and Iles.

In the west corridor a series of experiments were shown, under the direction of Dr. Tilden and Mr. C. J. Woodward, B.Sc. The image of a soap film was projected on a screen, the beautiful prismatic colours being much admired.

Mr. Holbrook showed the lengthening of a bar of iron by being magnetized, and an apparatus illustrating the cause of the phenomenon.

Mr. A. N. Cresswell showed apparatus for sorting shot, etc.

Dr. Tilden lent some vacuum tubes, and exhibited the beautiful spectra of many gases, nitrogen, silicon fluoride, etc.

In the lower corridor, Professor Poynting showed Chladni's vibration figures in sand, and the figures produced by floating magnets, which attracted much attention. Here the process of electro-plating was shown by Messrs. Barker, Brothers, and many articles were plated for the visitors.

Mr. H. Muller, Mary Ann Street, Birmingham, also showed a machine for making alpha gas.

The opposite lower corridor was occupied by Messrs. Hinde, Brothers, Suffolk Street, Birmingham, who showed the various processes of brush making,—the cutting of the backs and stocks, the sorting and fixing of the bristles, drilling, polishing and finishing,—all in operation. The raw materials were also displayed and the finished goods. Among the samples of hair shown was some said to have been cut from the heads of massacred Bulgarians.

In a dark room by itself was shown by Messrs. Ihlee and Horne, Aldermanbury, London, Balmain's luminous paint. Substances painted with this paint and exposed to plenty of light during the day are distinctly visible in the night.

The practical working of the telephone was shown by the Midland Telephone Company (Limited) in a room under the orchestra, which was largely visited.

During the exhibition a military band performed a selection of popular music. Soon after half-past nine dancing was commenced, and was kept up to an early hour. All the arrangements worked very satisfactorily, and a most enjoyable evening was spent.

LEEDS CHEMISTS' ASSOCIATION.

The third meeting of the present session was held in the Chemistry Lecture Theatre, Mechanics' Institute, which had been kindly lent for the purpose, on Wednesday, January 19, at half-past eight o'clock, p.m., the President, Mr. Councillor Stead, in the chair, when a lecture was given on—

Phosphorus and its Compounds.

BY A. J. REID, B.A.

The lecturer said the ultimate source of phosphorus is the old granitic rocks, those rocks which are termed "amorphous" by geologists; not amorphous because they are not crystalline, for as a rule they are highly crystalline, but because they are unstratified; in these rocks it occurs mainly in the forms of the minerals, apatite and phosphorite. It is also found in the lavas of volcanoes, both active and extinct, and in coprolites, which are the fossilized dung of huge lizards that existed during the secondary ages of geology. And here it may be remarked in passing that both the excrement and urine of animals contains phosphorus, and that the excrement of birds and reptiles is particularly rich in this element. By the disintegration of the primitive rocks, and the transport of their particles by the various water courses which traverse the surface of the globe, the compounds of phosphorus are disseminated through the soil and give rise to the fertile plains. Phosphorus is never found in the earth in a free state, but always in the form of a metallic phosphate, most usually phosphate of lime.

From the soil plants extract and concentrate in their tissues the compounds of phosphorus, and this element has been found to be indispensable to vegetable life. Soils which have been exhausted of their phosphorus compounds are unfit for the support of plants, and the practice of manuring has mainly for its object the supplying of phosphorus compounds to the impoverished soil. Phosphorus is found in all parts of the plant, but more particularly in the seed; and in some plants more than in others, the cereals being particularly remarkable for the large percentage of phosphorus they contain.

The quantity of phosphoric anhydride (P_2O_5) per cent. in the burnt residue of different vegetables is—

Ash of turnips	6·1
„ potatoes	11·3
„ oats	14·9
„ wheat	16·4[*]

Phosphorus is further concentrated in the bodies of animals, having passed into them from plants, for every animal is supported, either directly or indirectly, by the vegetable kingdom. It is particularly characteristic of the soft bodies of marine mollusca and crustacea, and in the vertebrata it is collected in large amount in the bones in the form of phosphate of lime, while its existence in an unoxidized or free state has been demonstrated in the blood, brain and nervous tissues generally. This free phosphorus appears to be essential to the exercise of the higher functions, for the amount of it in man is found to be greatest at the period of greatest mental vigour, and in infancy, old age and idiotcy the proportion is much less, while in insanity, where there is a morbid excess of nervous energy, the amount of unoxidized phosphorus is also abnormally excessive.

The proportion of phosphorus per cent. in brain matter is stated to be—

Brain of idiots	1 to 1·5
„ sane persons	2 „ 2·5
„ madmen	3 „ 4·5[†]

It is also a well known fact that the loss of phosphorus from the system in the excretions is considerably increased under protracted nervous excitement or during periods of excessive brain work. Within comparatively very recent times the internal administration of free phosphorus as a restorer of failing nervous energy and in the treatment of diseases arising from a loss of nerve power, such as phthisis and certain fevers, has come much into vogue among medical practitioners, and there is no doubt of its being a most effectual nutrient tonic to the nervous system. The two preparations of free phosphorus employed in pharmacy are "oleum phosphoratum," or phosphorus dissolved in almond oil, and "pilula phosphori." From the extremely poisonous character of yellow phosphorus, which is the only form employed as a remedial agent, great care is necessary that its administration is confined only to medicinal doses, the maximum being about the sixth part of a grain.

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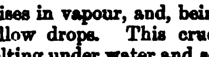
[*] From Tidy's 'Modern Chemistry.'

[†] From Tidy's 'Modern Chemistry.'

Phosphorus was accidentally discovered by Brandt, an alchemist of Hamburg, while attempting to extract the philosopher's stone from urine, in 1669; he sold the secret of its preparation to one of his countrymen for 200 dollars. In 1768, Gahn, a German chemist, discovered phosphorus in bones, and, in the following year, Scheele invented a ready process for extracting it from bones, which was substantially the same as that which is now employed. By this process "bone-ash," the residue which is obtained when bones are burnt in an open fire, and which consists almost entirely of tricalcium phosphate [$Ca_32(PO_4)$], is treated with concentrated sulphuric acid; the result is a soluble superphosphate of lime [$CaH_42(PO_4)$] and insoluble sulphate of lime, and the two are separated by filtration. The acid solution of superphosphate is then evaporated to a syrupy consistence, mixed with charcoal and heated to redness in a retort; the phosphorus rises in vapour, and, being led into water, condenses in yellow drops. This crude phosphorus is purified by re-melting under water and squeezing through wash-leather, and is then usually cast into sticks.

The element phosphorus is remarkable for two circumstances, viz.: (1) its abnormal vapour density, and (2) its allotropic modifications.

(1.) The atom of phosphorus is pentavalent, that is, it has a five-fold atom-fixing capacity, as is seen in the formula for phosphoric chloride, PCl_5, and the weight of this atom, as compared with the weight of an atom of hydrogen is 31, for in all the combinations of phosphorus this element is present either in the proportions of 31 parts by weight or some simple multiple of 31; in other words, its atomic weight or combining equivalent is 31. When, however, the weight of a litre of vapour of phosphorus is compared with that of a litre of hydrogen, the former is found to be sixty-two times as heavy as the latter. In order, therefore, that phosphorus should be brought into conformity with Ampère's law that "the molecules of all bodies, simple as well as compound, occupy the same space under like conditions," we are led to the conclusion that the molecule of phosphorus is composed of four atoms, and we accordingly write its formula P_4, or represent it pictorially, thus—



(2.) Phosphorus occurs in several allotropic forms. In addition to the ordinary yellow phosphorus, the preparation of which has been described, we have a white opaque form resembling porcelain, known as Rose's variety, and obtained by the action of light on common phosphorus kept under water; a black viscous form, known as Thénard's phosphorus, produced when common phosphorus is melted and suddenly cooled to a low temperature; and a red form, known as Schrötter's variety. But only two of these are of practical interest, viz., yellow or common phosphorus ($P\alpha$) and the red or amorphous phosphorus ($P\beta$).

$P\alpha$ is a soft, translucent, waxy-looking solid, but brittle at low temperatures; its specific gravity is 1·84; it melts at 44° C., but, if melted under an alkaline liquid, it may be cooled far below that temperature without solidifying. If, however, in this state it be touched by a solid point, such as the end of a file, it suddenly solidifies, and the temperature rises to 44° C.; it boils at 290° C., of course, in an atmosphere incapable of acting upon it chemically (as hydrogen or carbonic acid), and forms a colourless vapour. It is insoluble in water, but dissolves sparingly in ether, chloroform, benzol, oil of turpentine, and the fixed and essential oils, and readily in carbon bisulphide, phosphorous chloride and chloride of sulphur. It may be obtained in crystals of rhombic dodecahedra by evaporating its solution in carbon bisulphide in an atmosphere of carbonic acid. It fumes in moist air, giving off white vapours of a garlic odour, which in a dark room are luminous. In this action a portion of the oxygen of the air is changed into ozone, and the fumes are said to consist of ammonium nitrate formed by the action of the ozone on the air and aqueous vapour. Their luminosity is prevented by the presence of inflammable vapours, such as olefiant gas, ether, naphtha, etc. The fumes of phosphorus, if continually inhaled, produce a caries or decay of the lower jaw, and to this distressing malady the *employés* in match manufactories are, from their circumstances, exposed. $P\alpha$ has very powerful chemical affinities; its great affinity for oxygen makes it extremely inflammable. It takes fire in open air a little above its melting point, and impurities, such as oxide of phosphorus, render it more inflammable; it also takes fire when placed in contact with chlorine, bromine, iodine and melted sulphur. To its chemical activity is also due its extreme reducing action. A stick of phosphorus placed in a solution of silver nitrate or gold chloride is speedily encased in a covering of reduced silver or gold. $P\alpha$ is an active poison when taken internally, and is the principal ingredient in the phosphorus paste employed for killing vermin. The symptoms of phosphorus poisoning are severe nausea and vomiting and general gastro-intestinal irritation, and the only remedial measure to be adopted is the immediate application of the stomach pump or an emetic. Cases of phosphorus poisoning are unhappily not uncommon, from little children being allowed carelessly to suck the heads of lucifer matches. The detection of phosphorus in cases of death by phosphorus poisoning is effected by boiling the contents of the stomach or the suspected substance in a flask with water in the dark, if any free phosphorus is present luminous flashes will be seen. Another test for the presence of phosphorus is the green colour which it imparts to the cone of the hydrogen flame when any substance containing it is introduced into a Marsh's apparatus; this effect, however, is also produced by $P\beta$, hypophosphites and phosphites.

$P\beta$ is made by heating $P\alpha$ in a flask filled with carbonic acid to a temperature between 230° C. and 240° C.; this is known as Schrötter's method. It can also be prepared by acting upon $P\alpha$ with just a trace of iodine, a little iodide of phosphorus is formed, and the remainder of the $P\alpha$ is converted into $P\beta$; this is known as Brodie's method.

$P\beta$ is obtained as a reddish-brown friable mass with conchoidal fracture. Its specific gravity is 2·1. It melts at 260° C., and is then reconverted into $P\alpha$ and bursts into flame; serious accidents have occurred at Birmingham, where $P\beta$ is manufactured on a considerable scale according to Schrötter's method, owing to the temperature being inadvertently raised to the point of reconversion. It is insoluble in carbon bisulphide, phosphorous chloride and chloride of sulphur. It is very inert compared with $P\alpha$; chlorine acts upon it, but it does not take fire, and it may be swallowed without producing any poisonous effect.

The principal consumption of phosphorus is in the manufacture of matches. In an ordinary lucifer match the head of the match consists of a mixture of phosphorus with either nitre, when we have the "silent match," or chlorate of potash, when we have the "detonating match," the mixture being held together by strong glue; such a match ignites when rubbed upon any rough surface. In safety matches, however, the head of the match consists of a mixture of chlorate of potash, antimony sulphide, and finely powdered glass, while the prepared surface consists of Pβ and powdered glass, all held together as before by strong glue. When such a match is struck a little of the Pβ from the prepared surface adheres to the end of the match, and, in contact with the chlorate of potash, takes fire, setting fire also to the antimony sulphide, both burning at the expense of the chlorate of potash. The antimony sulphide is not ignited by the heat of friction alone, hence the match cannot be struck upon any ordinary rough surface.

The lecturer illustrated his lecture by experiments, and went through the various compounds of phosphorus, enumerating their properties, describing their mode of preparation and characteristic reactions, as well as illustrating by graphic symbols the manner in which the molecules of these compounds are supposed to be constructed, taking the opportunity to draw the attention of his audience to the analogy between phosphorus on the one hand, and nitrogen, arsenic, antimony and bismuth on the other.

Mr. E. Yewdall proposed a vote of thanks to the lecturer, which was seconded by Mr. Ferguson, and carried with acclamation.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The third meeting of the session was held in Anderson's College, George Street, on Wednesday, January 19, Mr. Paris, President, presiding. After a few introductory remarks from the chair, Mr. George Gilmour was called upon to read his paper on "Analysis of the Metals," of which the following is an abstract:—

Mr. Gilmour, after making a few introductory remarks, advised those who had not already begun to study to do so at once, as the difficulties were far more apparent than real, and said the young student should begin by taking a salt of each of the five groups of metals, such as lead nitrate for the first, corrosive sublimate for the second, alum for the third, magnesium sulphate for the fourth, and common salt for the fifth. By making solutions of these compounds in distilled water and putting each into a clean test tube and placing these tubes in a stand, the student would get a better idea of the groups than he would by listening to any number of lectures, in this way:—To each tube he should add a few drops of dilute hydrochloric acid; this would give a precipitate in the first tube, which would represent the first group, Ag, Pb, Hg,′ the latter in the mercurous state. The other four tubes would remain unaltered. To these add sulphuretted hydrogen gas dissolved in water. Number two would now give a precipitate, and represent the second group of ten metals, Cu, Bi, Cd, Pb, Hg″ (in the mercuric state), As, Sb, Sn, Au, Pt; the third, fourth and fifth tubes remaining unchanged. Now add ammonia (to neutralize the acid), and then sulphide of ammonia, when a precipitate in the third tube will show that it belongs to the third group containing Fe,″ Fe,‴ Ni, Co, Cr, Mn, Al, and Zn. To the two remaining tubes now add acid phosphate of sodium; the precipitate in the fourth tube shows it to be of the fourth group, while the absence of any precipitate after the reagents have been applied in this order shows that the fifth tube contains one of the fifth group. The fourth and fifth groups consist of four metals each, viz., Ba, Sr, Ca, and Mg, in the fourth; NH_4, Na, K and Li in the fifth.

Mr. Gilmour now showed how the student, having got the group, should proceed to find which metal of the group it was, stating that one test should never be considered enough, and that there should be at least three, one for the group and two confirmatory. He then gave a short *résumé* of the various flame tests and dry tests, as they are called, mentioning the more important ones in each class.

A warm and favourable criticism followed, in which Messrs. Adams, Illingworth, McDonald, Laing and Paris took part. Votes of thanks to the lecturer and President ended the meeting.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, January 20, Professor H. E. Roscoe, President, in the chair.

The following certificates were read for the first time:—F. N. Benjamin, J. J. Eastick, C. A. McMunn, W. G. McMillan, Toyokichi Takamatsu, P. Vieth.

The President then announced that the Faraday lecture would be delivered by Professor Helmholtz, on April 5, at the Royal Institution. The subject of the lecture would be "The Modern Development of Faraday's Conception of Electricity."

The President then called on Mr. Vivian Lewes to read a paper on—

Pentathionic Acid.—In March last the author, at the suggestion of Dr. Debus, undertook an investigation on pentathionic acid, the existence of which has been denied. The analyses of the liquid obtained by Wackenroder and others by passing sulphuretted hydrogen and sulphur dioxide through water are based on the assumption that only one acid is present in the solution, and consequently do not establish the existence of pentathionic acid; as for example, a mixture of 1 molecule of $H_2S_4O_6$ and 1 molecule of $H_2S_6O_6$ would give the same analytical results as $H_2S_5O_6$. Moreover, no salt of pentathionic acid has been prepared in a pure state. The author has succeeded in preparing barium pentathionate thus:—A Wackenroder solution was about half neutralized with barium hydrate, filtered, and the clear solution evaporated *in vacuo* over sulphuric acid. After eighteen days crystals, which proved to be barium tetrathionate with 3 molecules of water, formed. These crystals were separated, and the liquid further evaporated, when a second crop was obtained, intermediate in composition between the tetra- and pentathionate. These were separated, and the mother liquor on standing deposited some oblong rectangular crystals. These on analysis proved to consist of baric pentathionate with 3 molecules of water. This salt dissolves readily in cold water; the solution is decomposed by strong potassic hydrate, baric sulphite, hyposulphites and sulphur being formed. By a similar method of procedure, the author obtained potassium pentathionate, anhydrous, and with 1 or 2 molecules of water. The author promises some further results with some other salts of the higher thionates.

The President said that the Society had to thank the author for a very complete research on the subject of pentathionic acid. He, however, begged to differ from him as to his statements concerning the researches of Messrs. Takamatsu and Smith. In his opinion these authors had proved the existence of pentathionic acid. He hoped that the crystals (which were very fine) would be measured.

Dr. Debus said that no one had previously been able to make the salts of pentathionic acid, and expressed his sense of the great merit due to the author for his perseverance and success. The paper opened up some highly interesting theoretical speculations as to the existence of hexathionic acid. If potassium tetrathionate was dissolved in water it could be recrystallized; but potassium pentathionate under similar circumstances splits into sulphur and tetrathionate; but a mixture of tetrathionate and pentathionate can be recrystallized. It seemed as if the sulphur when eliminated from the pentathionate combined with the tetrathionate.

Dr. Dupré asked Dr. Debus how it was that a molecule of tetrathionate with a molecule of pentathionate could be recrystallized, whereas 2 molecules of pentathionate, which should when half decomposed furnish a molecule of tetra- and a molecule of pentathionate, could not.

Dr. Armstrong then read a preliminary note—

On some Hydrocarbons from Rosin Spirit.—After giving an account of existing knowledge of rosin spirit, the author described the result of the examination of the mixture of hydrocarbons remaining after heating it with sulphuric acid, and diluting with half its volume of water, and steam distilling. Thus treated, rosin spirit furnishes about one-fourth of its volume of a colourless mobile liquid, which after long continued fractional distillation is resolved into a variety of fractions, boiling at temperatures from 95° to over 180°. Each of the fractions was treated with concentrated sulphuric acid, and the undissolved portions were then refractioned. The hydrocarbons dissolved by the acid were recovered by heating under pressure with hydrochloric acid. Besides a cymene and toluene, which have already been shown to exist in rosin spirit, metaxylene was found to be present. The hydrocarbons insoluble in sulphuric acid are apparently all members of the C_nH_{2n} series. They are not, however, true homologues of ethylene, but hexhydrides of hydrocarbons of the benzene series. Hexhydrotoluene, and probably hexhydrometaxylene, are present besides the hydrocarbon $C_{10}H_{20}$, but it is doubtful if an intermediate term is also present. It is by no means improbable, however, that these hydrocarbons are, at least in part, products of the action of the sulphuric acid. Cahours', Kraemer's and Godzki's observations on the higher fractions of crude wood spirit, in fact, furnish a precedent for this view. Referring to the results obtained by Andersen, Tilden and Renard, the author suggests that rosin spirit perhaps contains hydrides intermediate in composition between those of the C_nH_{2n-6} and C_nH_{2n} series, also derived like the latter from hydrocarbons of the benzene series. Finally, Dr. Armstrong mentioned that the volatile portion of the distillate from the non-volatile product of the oxidation of oil of turpentine in moist air furnishes ordinary cymene when treated in the manner above described. The fact that rosin spirit yields a different cymene is, he considers, an argument against the view which has more than once been put forward that rosin is directly derived from terpene; probably rosin and turpentine, though genetically related, are products of distinct processes.

The next paper was—

On the Determination of the Relative Weight of Single Molecules. By E. Vogel, of San Francisco.—This paper, which was taken as read, consists of a lengthy theoretical disquisition, in which the author maintains the following propositions:—That the combining weights of all elements are one-third of their present values; the assumption that equal volumes of gases contain equal numbers of molecules does not hold good; that the present theory of valency is not supported by chemical facts, and that its elimination would be no small gain for chemistry in freeing it of an element full of mystery, uncertainty and complication; that the distinction between atoms and molecules will no longer be necessary; that the facts of specific heat do not lend any support to the theory of valency. The paper concludes as follows:—"The cause of chemical action is undoubtedly atmospheric pressure, which under ordinary conditions is equal to the weight of 76 cubic centimetres of mercury, one of which = 6·145 mercury molecules, so that the whole pressure = 467 mercury molecules. This force which, with regard to its chemical effect on molecules, can be multiplied by means of heat, is amply sufficient to bring about the highest degree of molecular specific gravity by the reduction of the molecular volumes. To it all molecules are exposed and subjected unalterably and if not accepted as the cause of chemical action, its influence has to be eliminated to allow the introduction and display of other forces."

The next communication was—

On the Synthetical Production of Ammonia by the Combination of Hydrogen and Nitrogen in Presence of Heated Spongy Platinum (Preliminary Notice). By G. S. Johnson.—Some experiments, in which pure nitrogen was passed over heated copper containing occluded hydrogen, suggested to the author the possibility of the formation of ammonia; only minute traces were formed. On passing, however, a mixture of pure nitrogen (from ammonium nitrate) and hydrogen over spongy platinum at a low red heat, abundant evidence was obtained of the synthesis of ammonia. The gases were passed, before entering the tube containing the platinum, through a potash bulb containing Nessler reagent, which remained colourless. On the contrary, the gas issuing from the platinum rapidly turned Nessler reagent brown, and in a few minutes turned faintly acid litmus solution blue; the odour of NH_3 was also perceptible. In one experiment 0·0144 gram of ammonia was formed in two hours and a half. The author promises further experiments as to the effect of temperature, rate of the gaseous current, and substitution of palladium for platinum. The author synthesized some ammonia before the Society with complete success.

The President referred to the synthesis of ammonia from its elements recently effected by Donkin, and remarked that apparently the ammonia was formed in much larger quantities by the process proposed by the author of the present paper.

Mr. Warington suggested that some HCl gas should be simultaneously passed with the nitrogen and hydrogen and that the temperature of the spongy platinum should be kept just below the temperature at which NH_3 dissociates, in order to improve the yield of NH_3.

On the Oxidation of Organic Matter in Water. By A. Downes.—The author considers that the mere presence of oxygen in contact with the organic matter has but little oxidizing action unless low organisms, as bacteria, etc., be simultaneously present. Sunlight has apparently considerable effect in promoting the oxidation of organic matter. The author quotes the following experiment:—A sample of river water was filtered through paper; it required per 10,000 parts ·236 oxygen as permanganate. A second portion was placed in a flask plugged with cotton wool, and exposed to sunlight for a week; it then required ·200. A third portion after a week, but excluded from light, required ·231. A fourth, boiled for five minutes, plugged and then exposed to sunlight for a week, required 0·198. In a second experiment with well water a similar result was obtained; more organic matter was oxidized when the organism had been killed by the addition of sulphuric acid, than when the original water was allowed to stand for an equal length of time. The author also discusses the statement made by Dr. Frankland "that there is less ground for assuming that the organized and living matter of sewage is oxidized in a flow of twelve miles of a river than for assuming that dead organic matter is oxidized in a similar flow."

Analyses of Queensland Soils. By Professor Liversidge.—These analyses are of interest, as the soils include samples from localities which were exempt from the disease which was prevalent in the sugar plantations around. Analyses of the organic and mineral constituents of the surface and sub-soils are given.

On the Volumes of Some Compounds of the Benzene, Naphthalene, Anthracene and Phenanthrene Series. By W. Ramsay.—The author has determined the volume of a number of these substances in a perfectly pure state by the method given in *Chem. Soc. Journ.*, 1872, 473. The numbers are in every case smaller than those calculated. The mean of the differences in the benzene series, 3·92. The author has also determined the differences in the naphthalene and the anthracene series, and finds that there is a certain proportionality observable in the condensation of members of the benzene, naphthalene and anthracene series.

On the Atomic Volume of Nitrogen. By W. RAMSAY.—The author discusses the very slender grounds on which the accepted value of nitrogen in the amines (2·3) rests. From experiments with anilin, toluidin, dimethylanilin, he concludes the value of nitrogen to be about 7, a number which is more probably true for several reasons discussed by the author.

On a New Theory of the Conversion of Bar Iron into Steel by the Cementation Process. By R. S. MARSDEN.—The explanation of this phenomenon is to be found in the diffusion of carbon in an impalpable powder into the heated iron. It is analogous to the penetration of a red hot porcelain crucible by carbon in an impalpable powder, observed by the author, 'Proc. Roy. Soc.,' Edinburgh, x., 712, the carbon diffusing into the bars of iron while in an expanded and softened state. Silicon can apparently diffuse in a similar way through iron.

On the Action of Sulphydrate of Potassium on Chloral Hydrate. By W. W. J. NICOL (Preliminary Note).—The chloral hydrate was obtained from Kahlbaum. Some freshly prepared sulphydrate of potassium was placed in a flask and some chloral hydrate added; at first the crystals dissolved quietly, then gas was evolved, and the solution became more coloured and a light yellow flocculent body separated: when this body appeared equal in bulk to the liquid, the fluid was filtered and the residue washed and dried *in vacuo*. Bisulphide of carbon extracted from it 3 per cent. of sulphur, the residue gave on analysis the formula $C_3H_4S_2O_4$, which agrees very closely with that of a mixture of thioglyoxylic acid and thioformic acid in molecular proportions. A lead and barium salt were obtained, containing respectively 54·5 per cent. Pb and 43·2 per cent. Ba.

The Society then adjourned to February 3, when the following papers will be read:—"On the Estimation of Organic Carbon in Air," by A. Dupré and H. W. Hake; "On the Action of the Copper-Zinc Couple upon Nitrates," by M. W. Williams.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association, held at 32A, George Street, Hanover Square, January 12, the President, Mr. F. W. Branson, in the chair, a paper was read by Mr. A. P. Luff, on "The Physical and Chemical Properties of Blood."

The author commenced with a brief description of the circulation of the blood and its uses as a medium for the conveyance of nutritive materials to the tissues, and for the removal of the products of waste from them. The physical characters of the red and white blood corpuscles and of the liquor sanguinis or blood plasma were next considered. The cause of the clotting of blood when shed was fully considered, together with the reasons for its not clotting in the vessels of the living body, the synthesis of fibrin being shown experimentally. The chemical properties of blood were next discussed, references being made of the analyses of Playfair and Bœckmann to show that dried blood and dried flesh are practically identical in ultimate composition. The gases present in the blood, the causes of their retention and removal, and the importance of the hæmaglobin or colouring matter of the red corpuscles were next brought under consideration.

The paper concluded with the chemico-microscopical test for blood in stains.

The paper was illustrated by diagrams and microscopic preparations, the circulation of blood in the living frog's web being also shown.

After a discussion, in which several members took part, a hearty vote of thanks was passed to the author for his most interesting paper.

Parliamentary and Law Proceedings.

THE WEIGHTS AND MEASURES CASE.

This case, in which Mr. Whittle was convicted for having illegal glass measures in his possession, was in the list of appeal cases before the Westminster Sessions, on Saturday the 22nd inst. Mr. Besley appearing for the appellants and Mr. Poland for the respondents. When the case was called Mr. Poland stated that it was a very important one and would probably take some hours, as there were scientific witnesses on both sides, and suggested that it should stand over until some convenient day which the court might appoint for hearing it. It could hardly be reached on that day, and if it were it could clearly not be finished. It was only a fine of 6*d*.

The Assistant Judge said he supposed it was a question of principle.

Mr. Besley said it was more than that, it was really an enormous question.

The Assistant Judge said they might say it was an enormous principle. He would order it to be postponed, to be mentioned on the next day on which the court sat.

Mr. Besley said the appellants were really the Chemists and Druggists' Trade Protection Society of Birmingham; and the York Glass Company was also very materially interested, as 15,000 of these measures had been made, and if they were false they were liable to a £50 penalty. The solicitor was a Birmingham solicitor and amongst the witnesses were Professor Redwood and also a witness from the Board of Trade, and one from York, so that it would be most convenient if the court would allow notice to be given of the day when it would be convenient to try it, so that it should not be necessary to come prepared with all the witnesses simply to hear it mentioned.

The Assistant Judge said that was only reasonable; it was doubtful if it would be taken on the next day on which the court sat for hearing appeals; but if there was any reasonable prospect of its being taken, sufficient notice should be given to allow of the witnesses being summoned.

The case has since been set down for hearing on Saturday, the 29th inst., at 10·30 a.m.

Review.

POISONS: THEIR EFFECTS AND ANTIDOTES. By A. B. PRESCOTT, M.D., F.C.S., of Ann Arbor, Mich., Professor of Applied Chemistry in the University of Michigan, etc., etc.

In opening this work, which appears to be a reprint from a cyclopædia, general or particular, we were at once attracted by the plates of plants, and examined it with interest, in the expectation of finding a contribution to the history of the poisonous plants of the United States. We were, however, doomed to disappointment. Either the flora of the United States is blessed with a singular absence of toxic vegetables, or the writer has failed to record them. The only plant figured which is not generally familiar to either the pharmacist or the horticulturist of this country is *Arum triphyllum*, "Indian turnip, dragon root, Jack-in-the-pulpit, wake Robin," but as it is the spathe of the *Arum maculatum* that is represented under this name, we are not much the wiser. The other American plants figured are, *Rhus toxicodendron* and *venenata*, *Veratrum viride*, *Gelsemium sempervirens*, *Lobelia inflata*, *Podophyllum peltatum*, *Kalmia latifolia* and *Ampelopsis quinquefolia*. The beautiful kalmia, which is known by the names of laurel, big-leaved ivy, calico bush, or sheep laurel, is accused of killing sheep and rendering the flesh of partridges poisonous. The Indians formerly used a decoction of it for the purpose of suicide. The *Ampelopsis*—the well-known Virginian creeper—is stated, on the authority of this

Journal, July, 1876, to have poisoned children who chewed the leaves. The remaining figures are those of plants indigenous to both countries, or which are naturalized or cultivated in America. Amongst these we have henbane, which is said to grow in "waste places in Northern United States, where the soil is very *rich*." We are told that "children have been poisoned with the berries (*sic*), and the young shoots have been mistaken for *parsley* and eaten as a salad," which latter certainly shows great want of discrimination. Hemlock is naturalized in some states. Foxglove and deadly nightshade are cultivated. The opium poppy is not mentioned as cultivated. The indigenous poisonous plants mentioned, but not figured, are *Aconitum reclinatum*, a trailing species, with white flowers, *Cicuta maculata*, *Phytolacca decandra*, poke, scoke, garget, known here as Virginian poke weed, a handsome plant, which bears a profusion of dark purple berries, the plant itself colouring purple as they colour. It is occasionally seen in gardens in this country, and is quite worthy of cultivation. The young shoots are edible when cooked. The root is emetic in doses of 10 to 30 grains, poisonous in larger. The berries have the same properties to a less extent. *Spigelia Marilandica*, Carolina pink, formerly used in this country as a medicine for worms, now almost obsolete. This is also a handsome "herbaceous plant," sometimes cultivated here. *Oxytropus* (*Oxytropis*) *Lamberti*, "crazy weed of Colorado, yarrow, milfoil;" this grows abundantly in Colorado. "It is a belief that cattle and horses acquire a taste for this plant, and their appetite for other food fails; they become emaciated, partly demented, etc." "It is also said to have been used for a beer, and to affect man in much the same manner." This plant has been subjected to a thorough chemical analysis by Miss C. M. Watson, and physiological experiments have also been made with it, without as yet very determinative results. It will be noted, from some of the vernacular names of plants we have quoted, in what a haphazard manner old country names have been bestowed upon new country plants, which must sometimes be perplexing to Americans themselves.

Under the head of "Poisoning by the Stings and Bites of Animals," stings of insects and bites of serpents are treated of, but bites of dogs affected with rabies are not mentioned. We are not in a position to state whether the risk is greater or less in the United States than in England, but we presume it exists.

In allusion to the laws of this and other European countries in relation to dangerous adulteration of foods, as by colouring matters, etc., our author somewhat loftily remarks, "In this, as well as in many other things, a fully informed people may protect themselves without the aid of law. If, in this country, we are not able to guard the purity and integrity of food by legal restrictions as well as they do in Europe, we should be as well able to do the same thing in a better way, by the self-protective ability of well apprized citizens." How soon this general apprizement is likely to be arrived at is matter for speculation, but if we may judge from the actual teaching, and the impetus to acquiring general knowledge now given by our board schools, we are certainly less likely to be so backward in this country as we formerly were.

In the remaining half of the work, which treats of inorganic poisons, the author appears to tread upon much surer ground and has given a useful epitome of the various chemical poisons used in arts or manufactures, employed about the person as hair dyes, etc., or used in food or confectionary for flavouring or colouring purposes. Sugars and "table syrups" appear to have been subject to grave suspicions in the United States and many varieties have been examined, but with the exception of iron in excess no injurious chemicals have been found.

Alarm has also been excited by the enormous quantities of Paris green employed for the destruction of the Colorado beetle, more than 100 tons of this arsenical green having been sown in the soil of Michigan in a single year. Very careful analysis by good chemists has failed to detect arsenic in growing plants, and a course of experiments by Professor Kedzie, of the Michigan Agricultural College, seems to have clearly established the fact that the water supplies are not liable to be poisoned by its use.

The work concludes with a useful table directing what is best to be done in cases or accidental poisoning before the physician takes charge. The most noticeable introduction is the free use of fresh charcoal in cases of poisoning by opium or vegetable alkaloids. Charcoal is directed to be obtained in a way that would be seldom available in this country, namely, "by quickly pounding coal from a wood fire," but from the great absorptive power that charcoal has upon alkaloids its usefulness would appear to be pretty clearly indicated.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE DRAFT PHARMACY ACTS AMENDMENT BILL.

Sir,—In your issue of the 15th inst., I was sorry to see Mr. Sandford taking what I regard as an unstatesmanlike position.

This week I must say I feel considerably disheartened at the narrow and selfish tone of several correspondents.

I do not expect my words to have weight with those who look to Parliament to help them out of their difficulties, yet I feel that I ought to put on record my conviction that legislation in favour of the druggist is not a thing to be looked for nor wished for.

It is not unreasonable that a man who fits himself for public requirements should hope to derive some benefit from regulations adopted for the public good; but no one should expect national laws to be made or modified for individual or class interests.

It is contrary to national interest that the sale of simple drugs should be restricted to the hands of scholarly men, but it is necessary, for the national good, that the sale of poisonous drugs should be so restricted. Insomuch as the scholarly man can deal in all the drugs his customers require, he derives a personal benefit from this legal restriction of their sale, and with this advantage, small as it is, he must be content.

If ignorant men can sell, as well as he, the common drugs, and be content with small profits, then must the qualified man consult his individual interests and resources in determining how he must meet this competition.

If it be sufficient for public safety that a qualified assistant carries on a shop for an unqualified person, then pharmacists have no reason to object to that being the law in all cases, whether widows or corporate companies, or any other persons be the owners. If public safety require that the owners of pharmacies be qualified men, and I quite think this is the case,—then neither corporations nor widows nor any other power should be permitted the licence to do public wrong. It is the duty of the Pharmaceutical Society to see that they be not allowed to sin in this particular, and it is the duty of the widow's personal guardians to see that she be not subject to needless suffering.

The first step towards the latter object is that a pharmacist having a wife liable to be dependent upon, but not qualified to conduct his business after him, should insure his life for such an amount as would, together with her other resources, enable her to carry on some other business not involving the same responsibilities and probably better suited to her habits.

I believe widows would generally be saved from loss if compelled to sell the business within twelve months; but this is no valid part of the argument.

I may add in conclusion that no pharmacist ought to be allowed to habitually leave his business in the management of an unqualified assistant. If a man has two shops he ought not only to be qualified himself, but should have a qualified assistant in each.

To enter into the arguments of my position would be too large a task at present. I must be satisfied with the simple statement, which in truth I think will be readily appreciated by most readers who are not under the shade of self-interest. I would rather that pharmaceutical legislation were indefinitely delayed than that we should attempt it while we are divided among ourselves. If we are to apply to Parliament at all, let us do it with humbleness and honesty of purpose, with clean hands and a pure heart.

Grey Street, Newcastle. BARNARD PROCTOR.

Sir,—I think it would have been more candid on the part of Mr. Sandford had he stated in his letter how often the "widows' clause" had been discussed, and how often he had been in a minority in such discussions both in committee and Council.

However, as he has thought proper to appeal from the decision of his colleagues to that of the trade, by all means let the question be discussed in public; but let it be clearly understood what hangs upon the conclusion to be arrived at, and who is to be held responsible for the result.

If the executors, etc., etc., of a deceased pharmaceutical chemist or chemist and druggist are to be allowed to carry on a business indefinitely with the aid of a registered assistant, why may not a limited company do the same? To ask the first, and disallow the last, would be held by disinterested persons to be blowing hot and cold with the same breath, and would, in the opinion of the majority of the Council, ruin our chance of obtaining an amended Act which would satisfy the trade, and which is called for from all sides.

Mr. Sandford's sympathies must be with widows owning large businesses, as a small trade cannot possibly keep a qualified assistant and leave a sufficient income for the proprietor. In the great majority of cases it is far wiser to sell at once.

When the cry about spoiling widows' houses is raised, let it be remembered that there are also wives' houses to be considered. The widow can be provided for by a widows' fund; but in the event of our obtaining an Act so mutilated as to be worthless, perhaps Mr. Sandford will tell us how the needs of wives and young families are to be satisfied.

GEORGE S. WOOLLEY.

Sir,—To those who have awaited long and patiently the advent of the Pharmacy Acts Amendment Bill it is scarcely reassuring to find that there exists within the Council itself so antagonistic a feeling upon what must be considered the vital section of the amendment that it has already produced not only a skilful attack upon the part of the Leader of the Opposition, but also a powerful defence by none other than the chief officer of our present Government, ably seconded by one of his most earnest fellow-workers.

Bearing in mind the import of the recent legal decision, it is scarcely possible to account for this wide difference of opinion upon the part of those entrusted with the framing of the amendment, and unless the situation speedily changes, to the vast body of members its mere existence will be disastrous in the extreme.

The Pharmacy Act of 1868 was designed to create an individual responsibility in what was contended to be an exceptionally responsible calling; that Act has, to all intents and purposes, been annihilated by the indefinite character of the words used to define that responsibility. The draft amendment before us, in few unnecessary phrases, again attempts the creation of an individual (or in the case of firms) corporate qualification and its attendant liabilities, and apparently with more chances of ultimate success. But let us once admit a clause in the interest of our widows, and from that moment the amendment will be doomed, sooner or later, to the ignominious fate of its predecessor. To his friends, the widow and children of a deceased chemist (if he has neglected life assurance and all other provident measures) is a legacy of the most serious description, but to the general public a thing of no importance whatever, and, probably, any advocate of less than average ability could easily persuade the softest-hearted judge in England that a business could be conducted in a more business-like manner by a miscellaneously constituted corporation under a qualified managership than by a widow in a like position.

Should a saving clause to the amendment be introduced, its opponents would certainly use this argument before the Parliamentary Committee, and it is not reasonable to suppose that we could gain for private interests what we cannot grant for public convenience.

I would suggest that immediately after the result of the Council meeting in February is made public a special general meeting of members should take place, in order to consider, first, the 5th section of the amendment and the advisability of special legislation for branch businesses, and afterwards the less important sections of the amendment, as may be thought proper. The correspondence upon this subject has already been sufficient to show the existence of distinctly opposite views, but, as a means of expressing opinion, it feebly compares with that obtained by the assembling together of men whose future position is imperilled and who recognise the essential character of the point at issue.

A general meeting of the members of the Pharmaceutical Society at this critical juncture, attended as it would be by representatives of the Birmingham Association and delegates from our provincial societies, will do more to prove to the Council the grave earnestness and ready sympathy of its constituents, as the difficulties with which they contend are one by one explained, than a whole volume of journalistic controversy.

Kilburn. CHARLES B. ALLEN.

Sir,—As discussion is invited and is very desirable on so important a question, I submit a few remarks on the proposed Pharmacy Acts Amendment Bill.

In my opinion the President and Mr. Symes are nearly right in their views on the "widows' clause," for, under existing regulations, who is the responsible party in case of an accident? Not the qualified assistant, who after all is but an assistant, and surely not the widow who knows nothing about the business she is the owner of. This evidently is not conducive to the "public safety."

I should suggest that the clause should make it absolutely illegal for the business of a deceased chemist to be carried on for more than three years under any circumstances (a much shorter time would suffice to arrange its transfer, etc.).

I beg to differ from P. M., and think every pharmacist should be entitled to have as many shops as he has capital and business tact to conduct, provided that each branch is under the superintendence of a legally qualified assistant, the owner, of course, bearing all responsibility.

Such a clause as M. P. S. proposes, so obviously opposed to free trade in commodities in universal use, would certainly cause the rejection of the whole amendment. To ask for a monopoly over "drugs and chemical compounds" (*e.g.* gum acacia, alkali, "soda") would be absurd.

An Act affording reasonable protection in return for the anxiety of the examination room is undoubtedly needed, but an arrangement between medical men and chemists, as proposed by Dr. Williamson, would do more to improve our condition than any legislation could do, and be more satisfactory to medical men and the general public.

Tiverton. FRED. TAYLOR.

Sir,—I wish to express an opinion through the medium of the *Pharmaceutical Journal* as to the proposed amended Pharmacy Act regarding the "patent medicine clause," and would venture to suggest that those containing scheduled poisons be sold only by duly qualified chemists (not necessarily to be labelled "poison") stated on each package; the proprietors or makers also to be qualified. Other descriptions of nostrums might well be classed with compounding and dispensing medicines, which appears to me compounding in a wholesale form, and should bear some amount of responsibility.

GEO. W. SARGENT, M.P.S.

17, Church Street, Kensington, W.

Sir,—Much interested in the discussion of this subject in your columns, I venture to express my sympathies with some of your correspondents in thinking that the projected Bill is not a sufficiently bold one.

To be consistent with its purposes undoubtedly it should include a clause respecting branch businesses, compelling all such to be superintended under the proprietor by a qualified assistant only. The suggestion, also, of Mr. Blackman merits attention, that assistants to civil service and limited liability companies should not be admitted to or excluded from the Register.

The patent medicine clause will open a mine of difficulties to individual chemists with their own proprietary articles, and it is just a question whether the substitution of the word "poisonous," might not modify in a degree the terrifying effect that the ominous word, "poison" would be sure to convey to a large number of the public.

I wish also to submit that it is a fair time to ask for the exclusive right of pharmaceutical chemists and chemists and druggists to deal in drugs by retail. At present a course of training is undergone, certain examinations are made compulsory, only for what? The exclusive right to deal in a few poisons. Why should not the restrictions now be extended to all substances used in medicine, which for the public welfare surely are best dealt with by those whose knowledge of them has been tested by examination. With this would necessarily be included the exclusive sale of (pure and simple) patent medicines.

STAFFORD.

Sir,—Can it be said we are approaching Parliament with an amended Pharmacy Act for the safety of the public, with the object of prohibiting corporate bodies and other unqualified persons from encroachments upon our profession, and then insert a clause whereby unregistered widows and executors (who are ignorant of the business) can carry on the trade independent of any qualification at all? Surely this would ruin our chance of success. The Legislature would ridicule such a one-sided scheme. It is personal qualification we must aim at as proprietors, otherwise common sense must admit that the public are as safe in the hands of one unqualified person as another.

The provision which relates to all scheduled poisons and their preparations, whether as patent medicines or otherwise, being labelled poison, and only sold by registered persons, is quite proper; moreover, after the proposed amended Pharmacy Act has been so thoroughly discussed and revised on behalf of the profession by the experienced Council of the Pharmaceutical Society, and also satisfactorily passed on behalf of the trade by the Law and Parliamentary Committee of the Trade Association, the proposed Act should at once be submitted to Parliament. If such a variety of opinions are entertained we are in great danger of the new Bill never reaching Parliament.

M. P. S.

Sir,—The opinions of members being invited on the Pharmacy Acts Amendment Bill, the following suggestions may not be deemed unworthy of consideration.

Although the Amendment Bill to a certain extent provides for the qualification of individual proprietors of chemists' businesses, still clause 13 fails in supplying a remedy for preventing unqualified persons having an interest in chemists' businesses, either in the form of partnerships or from trading under the titles of defunct firms.

If it be the object of the Pharmaceutical Society to endeavour to raise the status of a chemist to that of a profession (which the present qualifications warrant), then surely the example of the higher branches of the medical profession should be followed. When from death or other causes a surgeon's or physician's practice is transferred, we never find another practising under his or their names. Why, therefore, should it be otherwise in the case of a chemist, when there are ample opportunities of properly using his predecessor's name for identification by his patrons without actually trading under it.

So long as this increasing evil of trading under other names is permitted to exist amongst ourselves, so long do we offer an advantage to unqualified persons for trading under any deceased firm's name by simply employing a qualified manager, the manager being registered and represented as the sole proprietor. Under such circumstances the present Amendment Bill is inert.

Strongly do I suggest the insertion of a clause so framed to prevent evasion and with an appended severe penal clause compelling the registration of all individuals in business as chemists, trading separately or as partners, and further enforcing them to have their names in full, as they appear on the register, placed in the usual manner over their respective establishments in such a way as may be deemed satisfactory by the Council.

Respecting clause 5, I consider the original proposition of one year sufficient for the disposal of a deceased chemist's business. In connection with the very strong reasons brought to bear on this point by Mr. Greenish in his very able letter of last week, it also appears most inconsistent that unqualified widows should be allowed to hold the position of chemist, after the Council very wisely have decided to admit women to qualification and membership; also unjust to the members of the Society in general, and more particularly to those of the opposite sex who have already qualified.

The philanthropic view taken by some concerning the "widows' clause" is quite foreign to the question of whether an Act be just or unjust, or necessary for the safety of the public. It is generally admitted by many of the writers of the recently published letters, that the number of cases in which the effects of the amended clause might be severely felt would be comparatively small, and if the present condition of the Benevolent Fund is inadequate, certainly a little extra exertion on the part of the Local Secretaries would only be wanting to further develop it to meet all reasonable requirements.

WARWICKSHIRE.

SPIRIT. AMMON. AROM.

Sir,—You must be heartily tired, as I am, at the unnecessary and profitless prolongation of this discussion, and I am sorry to have to encroach once more on your space, but it is for the last time, and I will be very brief. I must remind you that this discussion has arisen in consequence of the charge brought against the B.P. process, that owing to distillation, and consequent loss of CO_2, the finished product contains a varying quantity of free ammonia, an excess giving an undesirable causticity to the spirit. My contention is, that proper precautions being taken, there is no such loss of CO_2, and that practically speaking unvarying proportions of free ammonia and neutral carbonate can be obtained.

Evidently I ought to have been more explicit, and if it will give your correspondent any satisfaction, I am quite ready to acknowledge that I am very stupid; but I never dreamt of being misunderstood, as I took it for granted that no one who had once made spirit. amm. arom. by distillation could ever suppose I referred to conservation of CO_2 beyond these limits.

I need hardly point out that saying I abstained from going too much into detail because I was writing for fully fledged pharmacists is a very different thing from saying, as I am accused of saying, that the Journal should not be used as a means of conveying information to students. Surely such a perversion is little less than childish.

C. E.

THE FROST.

Sir,—As showing the severity of the frost during the present winter, perhaps the following may not be unworthy of being brought under your notice. Last week I observed the contents of two bottles of zoedone and a bottle of Rose's lime juice frozen into solid blocks of ice, which were without taste. The stopper of the lime juice bottle had been thrown out, otherwise, the bottles were intact. On breaking the bottles, and melting, first the zoedone, the liquid obtained was perfectly colourless and tasteless, no gas being developed. With the lime juice ice, the solution was perfectly neutral, in fact the whole tumblerful could have been quaffed without the least facial disturbance, owing to the entire absence of acidity. Could you or any correspondent tell me the cause of this?

11, *Union Place, Aberdeen.* WM. HENRY BISSET.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Summers, Roberts, Barclay, Bannister, Calvert, Blyth, Spilsbury, Atkinson, Expectorant, Argos, Pax and Bellum, Mucilago, Apprentice, Sub Flor, J. A. S., C.

The Pharmaceutical Journal.

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SATURDAY, FEBRUARY 5, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE CHARGE AGAINST A CHEMIST AND DRUGGIST UNDER THE WEIGHTS AND MEASURES ACT.

THE result of the appeal in Mr. WHITTLE's case against his conviction for an alleged infringement of the Weights and Measures Act is so far satisfactory that it is now decided Mr. WHITTLE was not guilty of an offence under the Act. We cannot, however, avoid expressing some regret that this decision was arrived at upon technical grounds, and not by a consideration of the case upon its merits. So far as Mr. WHITTLE is individually concerned, it is sufficient that the Assistant Judge and bench of magistrates were of opinion that there was no proof that he had in his possession for use in his trade false or unjust measures within the meaning of the 25th section of the Act of Parliament.

According to their view of the matter it was indeed immaterial whether the four measures in question were really accurate or inaccurate in any sense, for inasmuch as they bore the stamp of an inspector authorized under the Act, and the 45th section of the Act provides that a weight or measure duly stamped by an inspector under the Act shall be a legal weight or measure throughout the United Kingdom unless found to be false or unjust, Mr. WHITTLE was held to have been innocent of any offence. The measures on account of which Mr. WHITTLE was summoned before the magistrates at Marylebone Petty Sessions came within the provision of the 45th section by having the stamp of verification of the York inspector upon them, and even if they were in fact incorrect and had been improperly stamped by the York inspector there was no use or possession of the measures after they were found to be false or unjust—if, indeed, the dictum of the Marylebone inspector is to be accepted as constituting such a finding,—and consequently no offence was committed under the 25th section of the Act.

Mr. WHITTLE may therefore congratulate himself upon the proof now afforded that the course he adopted with a view of placing himself loyally in conformity with the law was sufficient for his own protection, and the trade generally may gather from the decision of the Court of Appeal some reason for a feeling of security against interference, provided they follow his example. It is held that the finding a duly stamped weight or measure to be false or unjust is not to have a retrospective action, but that it is only the use of such a weight or measure after having been found false or unjust which constitutes an offence under the 25th section of the Act.

But though there is reason for some satisfaction at the issue of this case, we apprehend that possible danger of inconvenience to chemists and druggists still remains in regard to the carrying out of the work of inspecting the weights and measures used by them. Inspectors of weights and measures appear too much inclined to follow the example of public analysts by acting upon their own construction of the Act and assuming the position of public prosecutor. In doing so we think they would be making as great a mistake as public analysts have done. Both classes of officials are capable of rendering really good service to the public with credit and advantage to themselves; but it is not by determined hobby riding, or by the attempt to enforce crotchets of their own, that this can be done. The superfine precision that assumes the possibility of absolute purity or absolute accuracy is to be regarded as rather the indication of theoretical ignorance and deficiency of experience than of anything more respectable, and in the case now referred to there has been too much evidence that these conditions have obtained.

It is for this reason that we regret there was no inquiry into the real facts of the case so as to determine with certainty whether the measures in question were properly graduated or not. It was contended by some of the witnesses that measures of the kind could be graduated with such accuracy that the several measurements were within one-tenth of a minim of the absolute volume, also that the results obtained in testing such measures ought to agree within one-tenth of a minim, this proposition being, in fact, but a corollary of the former one. But a comparison of the results arrived at by the Marylebone inspector, by Dr. WYNTER BLYTH, and by the Board of Trade does not furnish much reason for accepting these opinions as well founded. Some of the data of these observers are as follows:—

No. 1. 240 *m. Conical Measure.*

Graduation.	Marylebone Inspector.	Dr. Blyth.	Board of Trade.
5 m. . .	−1	−0·36	−0·3
10 m. . .	−1·5	−0·31	−0·1
15 m. . .	−2·0	−1·67	−1·8
20 m. . .	−1	−0·93	−1·1
25 m. . .	−1	−1·79	−1·1
No. 2. 240 *m. Conical Measnre.*			
10 m. . .	−1·0	−0·01	−0·5
15 m. . .	−2·0	—	−1·3
20 m. . .	−2·0	−0·92	−1·0
30 m. . .	−1·0	−1·19	−0·9
No. 4. *Cylindrical* 60 *m. Measure.*			
10 m. . .	−1·0	−0·29	+0·3
15 m. . .	−1·0	−0·43	+0·4

From this comparison it will be seen that in most instances there is a difference of much more than one-tenth of a minim. Moreover, there is not one instance in which any one of the results obtained by Dr. BLYTH or the Board of Trade agrees exactly with those obtained by Mr. TIBBEY, the Marylebone inspector, and there are several instances in which the results of Dr. BLYTH and of the Board of Trade agree in differing from those of the Marylebone inspector.

Dr. BLYTH stated that he had bestowed great care upon his observations, taking a quarter of an hour to each reading, using a carefully levelled telescope, etc., but still there were such sensible discrepancies between the results he gave before the Marylebone magistrates and those stated at the hearing of the appeal, that we must here again infer that there is some misconception in regard to the idea that it is possible to obtain results agreeing so closely as it has been represented they ought to.

In our opinion the differences obtaining between the results of different observers in testing these measures are chiefly to be ascribed to errors of observation, and in the case of those larger differences between the results of the Marylebone inspector and of others to defective observation by him. It is fortunate that we have the opportunity of comparing these different series of observations upon the measures in question, and we think it important to call attention to the fact that there are differences between almost all of the results. That this should be the case will also be apparent enough, when it is remembered that as the standards of the Board of Trade do not admit of the measurement of less than one minim the fractions of minims recorded can only be approximately correct. It may be possible to tell the difference between three-quarters of a minim and a quarter of a minim, but it would be much less easy to distinguish between four-tenths and six-tenths of a minim, so that even in this way alone errors may arise of greater magnitude than one-tenth of a minim.

We cannot close our remarks on this case without expressing our opinion that the Marylebone authorities would have acted more wisely if they had sought counsel from the Board of Trade before instituting proceedings against Mr. WHITTLE instead of afterwards, and that they would have done better to accept the opinion of that department as to the sufficiency of the measures for purpose of trade than to have acted as they did in accordance with Dr. BLYTH's opinion that the Board of Trade officials do not understand their business.

THE EVENING MEETING.

IN consequence of the length of the reports of the Council Meeting and the Legal Proceedings we are compelled to defer the publication of Professor REDWOOD's paper and the discussion upon it until next week.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, February 2, 1881.

MR. THOMAS GREENISH, PRESIDENT,

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present—Messrs. Andrews, Atkins, Bottle, Butt, Churchill, Frazer, Gostling, Hampson, Hills, Mackay, Radley, Richardson, Robbins, Sandford, Savage, Squire, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

The SECRETARY read a letter from the Secretary of Mason's College, Birmingham, thanking the Society for the Journals and other publications sent in accordance with the resolution passed at the previous Council meeting.

Mr. SAVAGE, as the member who moved the resolution referred to, drew attention to a paragraph on the subject which had appeared in the *Chemist and Druggist*, and expressed his opinion that when next the writer of it felt disposed to put pen to paper, he had better take a blue pill and a black draught, for he must certainly have been in a very bilious state when he wrote it. It was as glaring an instance of bad taste as he had ever seen.

The PRESIDENT was glad Mr. Savage had alluded to this matter. His attention was called to the paragraph shortly after it appeared, and he certainly considered it to be in extremely bad taste. He hoped the privilege accorded to any member of the press to be present at the deliberations of the Council would not be used or abused in that manner on any future occasion.

THE GLASS MEASURES CASE.

The PRESIDENT said that since the last meeting of the Council the conviction of a chemist and druggist for having false glass measures in his possession had, through the action of the Chemists and Druggists' Trade Association, been quashed. The trial lasted from half-past ten to half-past four, and the Assistant Judge, Mr. Edlin, who tried it, was most emphatic in his statement with regard to the position in which a chemist was placed by the use of measures which he had no opportunity of testing for himself, and which he purchased verified. Mr. Edlin said he looked upon it as a trap for tradesmen, and that the Legislature could never have intended that chemists purchasing a measure verified by a local inspector under the Act should be convicted of using a false and unjust measure. It was possible that there might be a further appeal, but it was very refreshing to hear a common sense view of the meaning of the Act. The effect of the decision was that a verified measure was not false or unjust until it had been determined so to be by a competent authority. If it were used after that, no doubt the chemist would be liable to conviction, but not before.

Mr. ROBBINS, who had also been present at the hearing of the appeal, added a few words on the case.

MEMBERS OF THE COUNCIL WHO RETIRE.

The lot being taken in the usual manner for the seven members of the Council who should retire in May next, the following names were drawn:—

Gostling.
Greenish.
Hampson.
Hills.
Radley.
Sandford.
Symes.

The following, who remained in by lot last year, now retire by rotation:—

Bottle.
Butt (*vice* Shaw resigned).
Churchill.
Richardson.
Robbins.
Williams.
Woolley.

The following remain in office for another year:—

Andrews.
Atkins.
Frazer.
Mackay.
Savage.
Schacht.
Squire.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Davies, Richard	London.
Gostling, John Henry	Halesworth.
Hardwick, Arthur	London.
Slater, William Martin	Ipswich.
Wood, Robert	Hull.

Chemists and Druggists.

The following registered chemist and druggist, who was in business on his own account before August 1, 1868, having tendered his subscription for the current year, was elected a "Member" of the Society.

Joah Fawthrop	Bolton.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Brooker, Algernon	Forest Hill.
Brewerton, Thomas	Padiham.
Brown, John	Rugby.
Cocksedge, George Bloomfield	Wokingham.
Creer, George	Castletown.
Field, William	Rotherfield.
Gordon, John	Knaresborough.
Heslop, Henry Hills	Kingswinford.
Ray, William Frederic	Greenwich.
Ronchetti, Thomas Angelo	South Stockton.
Senier, Harold	Tulse Hill.
Sumner, John J.	Birmingham.

Modified.

Biss, John William	Bedford.
Lancaster, John Bulgin Snow	London.
Younger, Robert Edward	Ipswich.

ASSOCIATES.

The following having passed their respective examinations, and tendered their subscriptions for the current year, were elected "Associates" of the Society.

Bakewell, William Whitehorn	Uttoxeter.
Beaulah, William	Manchester.
Bevis, Walter	Newport, I. W.
Bilson, Frederic Estall	Newark.
Carter, William	St. Neots.
Edwards, James John	Coventry.
Eunson, John	Kirkwall.
Garland, Thomas William	Acock's Green.
Goldby, Frank	Abingdon.
Hornby, Alfred	London.
Jones, Edmund	Hanley.
Last, Alfred John	Rochford.
Lawrence, George Richard	Boston.
M'Dougall, Rea Ireland	Edinburgh.
Palmer, Edwin Thomas	Hammersmith.
Patterson, Thomas	Preston.
Power, William	Greenwich.
Quick, William Thomas	Brompton.
Suart, George	Lancaster.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Ashton, Frederick William	Market Harborough.
Bailes, Henry C.	Newcastle-on-Tyne.
Bearpark, Charles Frederick	Scarborough.
Billington, John	Northwich.
Booth, Charles Henry	Walsall.
Bostock, Samuel	Hyde.
Bostock, Thomas Henry	Eastwood.
Briggs, Alfred Henry	Blackburn.
Buck, Anthony Smith	Liverpool.
Campbell, William John	Dundee.
Clegg, George	Accrington.
Cook, Samborne	Nottingham.
Davis, Albert Edward	London.
Eastes, Ernest John	Deal.
Eden, Thomas Watts	Evesham.
Fargher, Charles	Douglas.
Fisher, George	Wigton.
Fotheringham, Alexander K.	Dumfries.
Gammie, William	Turriff.
Gardiner, David	Dundee.
George, William A. W.	Hirwain.
Godwin, Frederick James	London.
Goodall, Arthur Abraham	Fallowfield.
Gowans, John Bruce	Perth.
Hall, John Thomas	Manchester.
Handford, Thomas Edward	Torrington.
Harvey, Robert Rose	Cardiff.
Hay, Alexander	Montrose.
Healy, Joseph	Leicester.
Holloway, William Alfred	Redruth.
Holyoake, William Wringrose	Leicester.
Hornby, Robert William	London.
How, Thomas M.	Kerriemuir.
Hudson, Alfred George	Nottingham.
Humphries, Charles Josiah	Ipswich.
Jones, Llewellyn John Walter	Swansea.
Kelly, Philip Alfred	London.
Lay, William George	Clevedon.
Lewis, James William	Pontgarreg.
Leyland, Thomas William	Prescot.
McIntyre, William	Wakefield.
McNaughton, Henry B.	Ballinluig.
Mayor, John Beecham	Manchester.
Miller, Henry	Sutton-in-Ashfield.
Newdick, John	Ashford.
Oldham, Arthur	Stamford.
Price, Henry Thomas	Shrewsbury.
Price, Joseph	Bilston.
Proudman, Edward William	Leominster.
Richards, Arthur	Swansea.
Robinson, Richard Fredk. Wm.	Manchester.
Rushton, Martin	Liverpool.
Shairp, William	Glasgow.
Skinner, Alfred James P.	Seaton.
Smith, John	
Smith, Joseph de Carle	Norwich.
Snowdon, John	Gainford.
Southall, Wilfred Francis	Birmingham.
Taylor, Joseph John	Sittingbourne.
Thompson, John Park	Alston.
Tite, John Reynolds	Towcester.
Todd, John William	Peebles.
Turner, Ernest	Cheltenham.
Turney, John Davy	Plymouth.
Watts, Francis W.	Banbury.
Watson, Edward	London.
Weston, George, jun.	Sleaford.
Wheeldon, William Henry	Derby.
Whiteley, John William	Gainsborough.
Williams, George Alfred	Shrewsbury.
Williams, George Rowland	Hitchin.
Williams, Herbert Edward	London.
Wood, Arthur Graham	Bingham.
Woodruff, Albert Edward	Sandwich.
Wright, Joseph Pretty	Burton-on-Trent.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

REGISTRAR'S REPORT.

MEMBERS, ASSOCIATES, AND APPRENTICES OF THE SOCIETY FOR THE YEAR 1880.

	Life Members.		Subscribing Members.		Associates in Business.	Associates not in Business.	Apprentices.
	Pharmaceutical Chemists.	Chemists & Druggists.	Pharmaceutical Chemists.	Chemists & Druggists.			
Number in 1879	241	2	1742	812	965	...	..
„ restored, 1880 ...	...	...	4	2	5	...	...
„ elected, 1880 ...	...	...	65	24	137	...	...
	241	2	1811	838	1107	...	...
Deaths, Secessions, etc. ...	4	...	82	35	82	...	...
Total Strength of the Society	**237**	**2**	**1729**	**803**	**1025**	**840**	**1074**
Summary:—							
1879	241	2	1742	812	965	827	1071
1880	237	2	1729	803	1025	840	1074
Increase	...	...	...	...	60	13	3
Decrease	4	...	13	9	...	...	...

COMPARATIVE STATEMENT OF THE NUMERICAL STRENGTH OF THE SOCIETY FOR 5 YEARS: 1876-80.

MEMBERS.—PHARMACEUTICAL CHEMISTS.

	1876	1877	1878	1879	1880
Restored to Membership ...	6	5	5	7	4
Elected ...	64	56	45	67	65
(Total additions) ...	70	61	50	74	69
Deaths, Secessions, etc. ...	82	84	79	91	82
Decrease ...	12	23	29	17	13
Total Number of Subscribing Members	**1811**	**1788**	**1759**	**1742**	**1729**

MEMBERS.—CHEMISTS AND DRUGGISTS.

	1876	1877	1878	1879	1880
Restored to Membership ...	1	2	4	1	2
Elected „ ...	36	23	25	19	24
(Total additions) ...	37	25	29	20	26
Deaths, Secessions, etc. ..	36	34	31	33	35
Increase ...	1	...	...	...	...
Decrease ...	...	9	2	13	9
Total Number of Subscribing Members	**836**	**827**	**825**	**812**	**803**

ASSOCIATES IN BUSINESS.

	1876	1877	1878	1879	1880
Restored	2	3	1	3	5
Elected	160	159	153	133*	137
(Total additions) ...	162	162	154	136	142
Deaths, Secessions, etc. ...	32	54	69	70	82
Increase ...	130	108	85	66	60
Total Number of Associates in Business	**706**	**814**	**899**	**965**	**1025**

ASSOCIATES NOT IN BUSINESS.

	1876	1877	1878	1879	1880
Increase ...	...	18	...	19	13
Decrease ...	70	...	24	...	...
Total Number of Associates not in Business	**814**	**832**	**808**	**827**	**840**

APPRENTICES OR STUDENTS.

	1876	1877	1878	1879	1880
Increase ...	82	120	...	31	3
Decrease ...	...	...	14	...	...
Total Number of Apprentices of Students	**934**	**1054**	**1040**	**1071**	**1074**

LIFE MEMBERS.

	1876.	1877.	1878.	1879.	1880.
Pharmaceutical Chemists	**251**	**247**	**243**	**241**	**237**
Decrease	10	4	4	2	4
Chemists and Druggists	**3**	**2**	**2**	**2**	**2**
Decrease	....	1	...	...	...

* 134 were elected, but 1 afterwards passed the Major, and was elected a Member.

ANALYSIS OF EXAMINATIONS FOR THE YEAR 1880.

FIRST OR PRELIMINARY EXAMINATION

Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year	Average Number of Candidates at each Examination.	Average Number of Rejections at each Examination.	Percentage of Rejections.
1227	638	589	4	306·75	147·25	48·0

MAJOR, MINOR, AND MODIFIED EXAMINATIONS.

ENGLAND AND WALES.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations... 26
Average attendance of the Members of the Board of Examiners at each Meeting ... ... 13·92

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	116	53	63	6	19·33	10·5	54·31
Minor	551	250	301	6	91·83	50·16	54·62
Modified	10	4	6	6	1·66	1·00	60·00

SCOTLAND.

Number of days on which the Board met for conducting the Major, Minor, and Modified Examinations... 9
Average attendance of the Members of the Board of Examiners at each Meeting 7

Examinations.	Number of Candidates during the Year.	Number of Successful Candidates during the Year.	Number of Rejections during the Year.	Number of Examinations during the Year.	Average Number of Candidates at each Meeting.	Average Number of Rejections at each Meeting.	Percentage of Rejections.
Major	9	5	4	4	2·25	1·0	44·4
Minor	102	61	41	5	20·40	8·2	40·2
Modified	3	1	2	2	1·50	1·0	66·6

THE REGISTERS OF PHARMACEUTICAL CHEMISTS AND CHEMISTS AND DRUGGISTS, 1880.

Additions during the year:—

Number of persons who have passed the Modified Examination		5
Minor „		311
Major „	58*	
Number of persons registered on payment of the Registration Fee, having been in business before August 1, 1868................................		16
Number of persons restored to the Register on payment of a fine		15
Placed on the Register by virtue of restoration to Membership—Pharmaceutical Chemist...		1
An Associate of the Society before July, 1842, restored and elected a Member—Pharmaceutical Chemist		1
An Associate of the Society before July, 1842, was elected a Member—Pharmaceutical Chemist		
Decrease of numbers on the Register		89
		438

Erasures during the year:—

Deaths:—	
Notices from Registrars	203
Other sources	67
Erased at the request of registered persons themselves................................	6
Erased by order of the Council	2
Erased by the Registrar in pursuance of the provision set forth in section 10 of the Pharmacy Act, 1868, after sending two registered letters to which no answer has been given................................	160
	438

* These having already been included in the number who passed the Minor, do not increase the numbers on the Register.

Number of Pharmaceutical Chemists on the Register, December 31st, 1880	2,308	
„ „ Chemists and Druggists	11,154	
		13,462

The Registrar's Report.

The Secretary laid on the table his report for the past year, including a comparative statement of the strength of the Society during the past five years. (See pp. 632 and 633).

Mr. Bottle said the report contained very important figures, and he wished he could see more associates coming forward to pass the Major examination, and take their places as members of the Society, so as to qualify themselves for taking seats at that Board. The Society did not appear to lose numerically, but it certainly did not increase in membership as it should. He should be glad if he could say anything which would stimulate young men, not to be satisfied with passing the Minor examination, but that before entering on the active business of life, they should continue their studies a little longer, so as to take the higher qualification, which would enable them at no distant date, perhaps, to occupy seats around that table.

Mr. Atkins was quite sure the remarks of Mr. Bottle ought to be supported by the whole of the Council, but he thought nothing would tend more to attain the desired result than clearing the atmosphere of pharmacy, and giving pharmacists a more assured position.

It was resolved that the Registrar's report be entered on the minutes and published.

Register and Calendar for 1881.

The Secretary laid on the table a copy of the Register and of the Calendar for 1881.

Reports of Committees.

Finance.

The report of this Committee, including a recommendation that sundry accounts be paid, was received and adopted.

House.

This Committee had had under consideration the proposition to place on a tablet in the hall the names of donors to the Benevolent Fund, and recommended the Council to rescind the resolution passed on this subject on January 5, and that in lieu thereof, it be resolved that the name of any person giving twenty guineas in one, or not more than two, sums be placed on the tablet. It further recommended, after full discussion and due consideration, that the names of firms who are donors to the Fund should not be inscribed on the tablet.

An estimate for preparing the tablet was submitted and recommended for adoption.

On the motion for adopting the report,

Mr. Savage said he did not approve of the alteration proposed by the Committee. He saw no objection to the names of firms who subscribed being placed on the tablet.

Mr. Symes thought it rather unfortunate, as this matter was not sent to the Committee, that the Committee should have undertaken to offer any further recommendation. The Council was pretty unanimous in the matter, and he did not see what right the Committee had to rediscuss it. It seemed to him a waste of time. An important point had been mentioned by Mr. Atkins last month, that firms would often give sums of money, when individual members of those firms could not. He would move as an amendment,—

> "That the recommendations of the House Committee be received and adopted with the exception of that portion which refers to donations to the Benevolent Fund."

Mr. Savage seconded the amendment.

Mr. Hampson said he was responsible for moving the resolution in Committee; it might not be a very important matter, but he did not think it at all unfortunate that the Committee which had the practical carrying out of this affair should have offered a suggestion to the Council. He thought the recommendation was one which might be fairly supported. He supported it on the ground that benevolence was an individual act; and the donation of £20 by six persons forming a firm was very different from the gift of a similar amount by an individual.

Mr. Robbins thought the recommendation was not of so much importance with regard to firms as it was with regard to the amount which might be subscribed. According to the resolution passed last month, a person who gave a donation of a guinea per annum for twenty years would be entitled to have his name placed on the board, whilst one who subscribed £5, or £3, or £2 annually several years would not. If this were adhered to, it would entirely alter the character of the fund, because donations would be given instead of subscriptions, which would be a very serious thing, as donations were obliged to be funded. He thought at any rate donations should be given in not more than two sums, to entitle a person to have his name placed on the board.

Mr. Bottle said he was probably bound by the resolution of the Committee, of which he was a member, although he was not present when it was passed. Had he been present he should certainly have opposed it. The Council had decided the matter, and for a committee to undertake to reverse that which the Council had decided was rather going out of its way; moreover, if it was for a committee at all, it should be left to the Benevolent Fund Committee to make any recommendations.

Mr. Williams said he was unfortunately prevented attending the meeting of the Committee or he should have opposed the resolution. He could not understand three or four gentlemen meeting together, and undertaking to reverse the decision of the Council.

Mr. Hampson remarked that the Committee had not attempted to do so. It simply made a recommendation.

Mr. Williams said if it was the opinion of the Council that the resolution of last month should be rescinded he should bow to it, at the same time he could see no good reason for doing so. There seemed to be some confusion in the minds of some of the speakers as to the distinction between subscriptions and donations, and it must be remembered that subscriptions only could be used for current expenses; the donations have to be invested.

Mr. Robbins said that made it all the more necessary to alter the resolution.

Mr. Gostling, as a member of the Committee, did not feel that it was reversing the decision of the Council, only it was felt by the members of it that the suggestions now made were really worth consideration once more before the resolution was acted upon. He did not think it was ever the intention of the Council, as pointed out by Mr. Robbins, that twenty separate donations of a guinea should entitle a person to have his name placed on the board.

Mr. Symes would be very sorry to endeavour in any way to limit the action of the Committee, but the Committee having made a report to the Council, and the Council having passed a resolution upon it, there was no occasion to re-discuss the subject. He hoped the effect would be to get a much larger number of substantial donations than the Secretary informed the Council had hitherto been made. If any individual were so persistent as to go on giving a donation of one guinea for twenty years, he was fully entitled to have his name inscribed on the board.

Mr. Richardson expressed his astonishment at the action of the House Committee, of which he was a member, but he had taken no part in this discussion. When the Council deliberately passed resolutions, and passed them on to a committee to carry them out, it was the duty of that committee to do so, unless there were some very exceptional state of circumstances to prevent it being done. He believed Mr. Hampson objected to the course adopted by the Council, because it would lead to firms giving donations by way of advertising themselves. But if it were to be so, who would benefit by it? Only their poorer brethren who came and asked for assistance. He was astonished that any feeling of petty jealousy should lead to an objection to any system of gathering money. He hoped this practice would not be followed in future, and that the Council would affirm by a large majority the resolution come to last month.

Mr. SANDFORD thought the Council was in a muddle altogether on this subject, because it should, he thought, have been referred to the Benevolent Fund Committee to consider what names should be put on the Board. It had been said that the Committee had reversed the decision of the Council; but that was a mistake, as it only asked the Council to reverse its own decision. He did not think it would do to allow the names of donors of twenty separate guineas to be published; but that was a point on which he should like to have the opinion of the Benevolent Fund Committee.

The VICE-PRESIDENT pointed out with regard to the argument that benevolence was an individual feeling, that no doubt that was correct, yet individuals could not always carry out their benevolent feelings; on the other hand, a firm might feel itself impelled to a course of benevolence where an individual might not, and from considerations which were perfectly legitimate. He could well imagine that a wholesale firm might feel called upon to assist the weaker members of the trade from which it derived its profits; it might not be so much a matter of private benevolent feeling as of duty in such a case. This was not a new question; it had been settled, and unless a very strong case were made out it should not be altered. As to the supposed case of a person giving a guinea annually for twenty years, he would remind the Council that at the end of that time his donation would really be worth a good deal more than £20. If a man were in the least degree impelled by such a consideration at all, he would point out, that the longer he went on, the stronger would be his inducement to continue his donations until the end of the twenty years. An ordinary subscriber could discontinue at any time.

Mr. ATKINS did not at all share the feeling that the Committee had in any way interfered with the functions of the Council in suggesting that the matter should be reconsidered. Still he had not heard any reason given why it should be reconsidered. It very often happened that benevolence was of the official character to which reference had been made; for instance his own name figured on such a board as donor of £100 to a hospital, although he had only handed over the money as executor.

The amendment of Mr. Symes was then put and carried.

Some discussion then arose as to the carrying out of the original resolution, objection being made to the wording of it, and

Mr. SANDFORD moved:—

"That the question of deciding the regulations to be observed in recording donations to the Benevolent Fund on the tablets to be placed on the walls of the Society's house be referred to the Benevolent Fund Committee for consideration.

Mr. CHURCHILL supported the suggestion. There was no doubt the Council dealt with the matter rather hurriedly, and it seemed to him a dangerous thing for any inducement to be held out to a man to change his subscription into a donation.

The PRESIDENT said practical difficulties came before the Committee, which was almost unanimous in its recommendation to the Council to reconsider the matter. Mr. Sandford's suggestion would meet the difficulty.

Mr. RICHARDSON thought as the Council had decided on the amounts, it would be irregular to send the question back again to a committee. No doubt there was a clerical error in the original resolution, as it seemed to negative the idea of the donation being given in one sum; but that could easily be corrected.

Mr. MACKAY thought it very desirable that this question should go back to the Benevolent Fund Committee, especially for consideration as to whether the regulation should be made, as he understood was intended, retrospective. It seemed to him rather curious to have a board at all, but it would certainly be a very weak point to go back any number of years.

The motion was then agreed to.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow of a registered chemist, age 71. Applicant has received four previous grants.

£15 to the widow of a former member, who is now suffering from chronic disease.

£15 to the widow of a member, aged 83.

£10 each to two of the unsuccessful candidates for annuities at the late election.

£10 to a former member who had received six previous grants of £10 each.

Two other applications, one of which had reference to aid in getting an orphan into an asylum, were deferred for further information.

The report and recommendations were unanimously adopted.

LIBRARY, MUSEUM AND LABORATORY.

Librarian's Report.

The Librarian's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
December	Day	215	15	3	9 nearly.
	Evening	95	11	1	6 nearly.
Year 1880	Day	3037	22	0	·10
	Evening	1564	17	1	8 nearly.

Circulation of books.	Town.	Country.	Total.
December	163	119	282
Year 1880	1773	1347	3120

Carriage paid		
	December	£2 0s. 1d.
	Year 1880	£25 17s. 0d.

The following donations to the Library had been received:—

American Journal of Pharmacy, 1880.
From the PHILADELPHIA COLLEGE OF PHARMACY.
Analyst, 1880. From the EDITOR.
Archiv for Pharmaci og technisk Chemi, 1880.
From the PUBLISHERS.
Canadian Pharmaceutical Journal, 1880.
From the ONTARIO COLLEGE OF PHARMACY.
Chemical News, 1880. From the EDITOR.
Chemist and Druggist, 1880.
Chemists' and Druggists' Diary, 1881.
From the PROPRIETORS.
Chemist and Druggist; Australasian Supplement, 1880.
From the PHARMACEUTICAL SOCIETY OF VICTORIA.
Chemists' Journal, 1880. From the EDITOR.
Education, Journal of Trinity College, London, 1880.
From the COLLEGE.
Educational Times, 1880.
From the COLLEGE OF PRECEPTORS.
Journal of the Chemical Society of London, 1880.
From the SOCIETY.
New Remedies, 1880. From the EDITORS.
Ny pharmaceutisk Tidende, 1880.
From the PUBLISHERS.
Journal of the Photographic Society of Great Britain, 1880. From the SOCIETY.
Pharmacist, 1880.
From the CHICAGO COLLEGE OF PHARMACY.
Zeitschrift des allgemeinen österreichischen Apotheker-Vereines, 1880. From the VEREIN.
Anzeiger der kaiserliche Akademie der Wissenschaften in Wien, mathematisch-naturwissenschaftliche Classe, 1880. From the AKADEMIE.
Proceedings of the Royal Institution of Great Britain, 1880. From the INSTITUTION.
Newcastle-upon-Tyne Chemical Society, Transactions, 1880. From the SOCIETY.

Journal of the Linnean Society of London, 1880.
From the SOCIETY.
Bulletin de la Société Botanique de France, 1880.
From the SOCIETY.
Medico-chirurgical Transactions, vol. 63.
Proceedings of the Royal Medical and Chirurgical Society of London, 1880. From the SOCIETY.
Proceedings of the Royal Society of London, 1880.
From the SOCIETY.
Victoria University and Owens College Calendars, 1880. From the COLLEGE.
Royal College of Physicians of London, List of Fellows, etc., 1880. From the COLLEGE.
Journal of the Institute of Actuaries, 1880.
From the INSTITUTE.
Year-Book of Pharmacy, with Transactions of the British Pharmaceutical Conference, 1880 (2 *copies*).
From the CONFERENCE.
Transactions of the Botanical Society [of Edinburgh]. 1880. From the SOCIETY.
Proceedings of the Literary and Philosophical Society of Manchester, vol. 16–19.
Memoirs of the Literary and Philosophical Society, vol. 26. From the SOCIETY.
Tommasi (D.), Réponse à une note de M. A. Riche sur la réduction du chlorure d'argent, 1880.
Tommasi (D.), Sopra una nuova modificazione isomera del triidrato alluminico, 1880.
From the AUTHOR.
Tilden (W. A.), Introduction to Chemical Philosophy, 2nd ed., 1880. From the PUBLISHERS.

The Committee recommended that the usual letters of thanks be sent to the respective donors.

The Committee also recommended the purchase of the following works:—

Botany of California, vol. 2, 1880.
Cooke (M. C.), Illustrations of British Fungi.

The Librarian had drawn the attention of the Committee to the great falling off in the attendance in the Library.

Curator's Report.

Attendance.		Total.	Highest.	Lowest.	Average.
	Morning	264	17	3	10
	Evening	36	8	0	2

The following donations were reported:—

Specimen of young Quebracho Bark.
From Messrs. CORBYN, STACEY AND CO.
Specimen of Star-Anise Bark from Singapore.
From Messrs. T. CHRISTY AND CO.
Specimens of Calisaya, Crown, and Red Cinchona Barks, from Jamaica. Also a specimen of Calisaya Bark, cultivated in Bolivia.
From Mr. T. WHIFFEN.
Specimens of Moravian Rhubarb Root; Liquorice Root, and Inspissated Juice prepared from the same; Galls of *Pistacia Terebinthus*; large Hungarian Oak Galls; lesser Hungarian Galls; Vaseline and Ozokerite, from Galicia; Austrian Oil of Turpentine; Polish Oil of Turpentine; Oil of *Pinus Pumilio* (Oleum Carpathicum).
Herbarium specimens and dried roots of *Aconitum Napellus*, *A. variegatum* and *A. lycoctonum*; *Gentiana cruciata*, *G. pannonica* and *G. asclepiadea*, and *G. cruciata*, collected on the Alps.
From Dr. A. VOGL, of Vienna.
Samples of Japanese Star-Anise and varieties of Linseed. From Mr. H. B. COCKSEDGE.
Specimen of Japanese Star-Anise.
From Messrs. BURGOYNE, BURBIDGE, CYRIAX & FARRIES.
Specimens of pure Aspidospermine, Citrate and Sulphate of Aspidospermine.
From Herr E. MERCK, Darmstadt.
Specimen of Quebracho Bark.
From Mr. W. B. CRANWELL.
Specimen of the Rusa Grass, from which the oil previously sent was distilled.
From Dr. DYMOCK, Bombay.
Specimen of leaves and stem of Guaco, and Para Tonquin Beans.
From Messrs. SYMES and Co., Liverpool.

Duplicate specimens had been distributed to:—
The North British Branch.
Leicester Chemists' Assistants' Association.
Professor Bernardin, Melle lez-Gand.
Professor Maisch, Philadelphia.
Professor Fristedt, Upsala.
Professor Dubois, Ghent.
Dr. Morel, Ghent.
Herr Dittrich, Prague.
University College Hospital.
Royal Botanical Gardens, Regent's Park.
Mons. Chantre.

The specimens for the Bristol Museum were now ready for despatch, with the exception of a few of those asked for, of which the Curator had no duplicates.

The Professors had attended and reported favourably of their respective classes.

Professor Redwood had reported that he had been furnished with the necessary materials and apparatus for his dispensing class, which was progressing favourably.

A letter had been received from a member suggesting the desirability of placing in the Society's Museum two or three inexpensive microscopes of low power for the use of students. The subject had been discussed, and the further consideration of it deferred.

Mr. WILLIAMS said the falling off in the attendance in the Library was a very serious matter. Had any explanation of it been laid before the Committee?

Mr. HAMPSON said the Committee was very much concerned at this falling off, but was not able to assign any cause for it, except a lack of interest on the part of the members resident in London and the suburbs. It was true that more books were now circulated than formerly, but these went principally into the country. It was a deplorable fact that the Library was not so much appreciated as it ought to be. It was unique in character, and was probably the best pharmaceutical library in the world. It contained a vast quantity of very valuable books, and it was very disappointing to find that chemists in London did not take more advantage of the treasures it contained.

Mr. RICHARDSON hoped that the suggestion which had been made for placing a few microscopes in the Museum would be adopted and carried out in a liberal spirit. The Committee thought this would be the means of inducing young men to study the microscope, and would be the means of bringing them more into the Library.

The PRESIDENT said it might be as well to give the figures of attendance in the Library during 1879 and 1880. In 1879 the day attendance was 5201; in 1880, 3037. Evening, 1879, 2264; 1880, 1564. Showing a great falling off in the attendance both in the day and in the evening. Possibly it might be only temporary, but the Librarian was, equally with the Committee, unable to account for it.

A resolution adopting the report and recommendations of the Committee was then carried unanimously.

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor as to the conduct of cases in his hands. Several fresh cases of alleged infringements of the Pharmacy Act had been under consideration, in some of which it was recommended that proceedings be commenced.

The report was considered in committee as usual. On resuming, the report of the Committee was adopted.

During the sitting of the Council a second letter was received from the Solicitor, reporting that a prosecution against

A. J. Wright, 76, South Castle Street, Liverpool,

for an infringement of the Act, by assuming the title of a druggist, had been successful, the defendant being fined £5 and 29*s*. costs.

THE PRELIMINARY EXAMINATION.

The **SECRETARY** read the report of the London Board of Examiners on the Preliminary examination held in January.

The next business was to consider the following resolution of the Board of Examiners:—

> "That in the opinion of this Board, power should be taken in the new Act to discontinue the holding of the Preliminary examination by this Society through the medium of the College of Preceptors, and in all cases to accept in lieu thereof the certificate of having passed the examinations of other examining and educational bodies, previously approved by the Board and Council."

Mr. **MACKAY** asked if the word "Board" ought not to have been in the plural? Had the Scotch Board considered the matter? He understood that both Boards had similar powers with regard to the examinations, whether preliminary or scientific.

The **PRESIDENT** said this was a report of the Board of Examiners in London on the Preliminary examinations, which were never placed before the Board in Scotland.

Mr. **MACKAY** asked if he were to understand that the Board in London could do anything in connection with the examinations without the concurrence of the Board for Scotland? If so, it was a novelty altogether. They in Scotland thought the two Boards were working in harmony, and their efforts for many years past had been to render the two Boards as much alike as possible. Not only as a matter of right, but as a matter of courtesy, there should have been some communication with the Scotch Board on this matter before any resolution was sent to the Council. Preliminary examinations were held in Scotland the same as in England. He should like to know why this exceptional course should be taken.

Mr. **SYMES** asked how the resolution came before the Council? Was it an annual report? He sympathized with the observations of Mr. Mackay.

Mr. **WILLIAMS** said the Board of Examiners in London met four times a year to receive the results of the Preliminary examinations which were conducted by the College of Preceptors. He believed the question had never been raised of sending it to the Scotch Board.

Mr. **MACKAY** said that was another matter altogether. These were specific meetings for specific purposes; but here he understood a special meeting of the English Board had been held, at which a resolution had been proposed and sent to the Council. The two things were quite distinct.

The **SECRETARY** said the resolution was passed at a meeting of the Board of Examiners held on January 19 to receive the report from the College of Preceptors as to the Preliminary examinations. He would again read this report and the resolution passed by the Board of Examiners upon it.

Mr. **MACKAY** said he should ask the Council to delay the consideration of the resolution until a copy had been sent to the Board of Examiners in Scotland for consideration. He asked that more particularly because he could see a great deal of difficulty even in discussing it, and still more in carrying it. It was a strange resolution in some respects, because it opened such a very wide field. There were various examining bodies, both in Scotland and England—universities, colleges and other institutions. He would move—

> "That the resolution proposed by the London Board of Examiners be referred back, with a request that the Scotch Board be consulted before the matter is discussed by the Council."

Mr. **SAVAGE** seconded the motion.

The **VICE-PRESIDENT** said he should support the motion. He only wished to point out that this meeting of the London Board of Examiners was exceptional in this respect, that it was not a meeting for the purpose of examination, and therefore neither the President nor Vice-President were present.

Mr. **BOTTLE** quite admitted that there was a slur on the Scotch Board in the way this had been done. At the same time he thought the recommendation was unnecessary, as the Council had power to take the examinations of as many bodies as it liked. It did not need to go to Parliament for authorization.

Mr. **WILLIAMS** pointed out that the recommendation was to take power to discontinue the Society's own Preliminary examination, which was quite a different thing. Probably the Board of Examiners had passed the resolution in this hurried way because it considered there was not time to consult with the Board in Scotland, and it knew that a Bill was to be discussed, which would probably receive its finishing touches at the Council meeting of that day, and he could well understand that the London Board desired to bring its views before the Council. By the strict letter of the law there was no such thing as a Preliminary examination at all, and therefore there would be great difficulty in drafting any clause which would meet the requirements of the London Board of Examiners.

Mr. **ATKINS** was very sorry to find the slightest difficulty had arisen at this early stage, and he entirely sympathized with Mr. Mackay, but if this delay should at all imperil the adoption of the principle he should much regret it.

Mr. **SANDFORD** said he always wished to act with the greatest respect towards the Board of Examiners, but it was quite clear to him that this matter had been done hastily, and that the Board had assumed a right which never belonged to it. It was the function of the Council to approve of the bodies whose examinations should be received, but the Board of Examiners not only asked to be allowed to share in this, but put itself first. One or two things he had seen lately had shown him that the Board of Examiners had taken a wrong view of the certificates which went to it by the authority of the Council.

Mr. **FRAZER** was very glad to hear what had been said by Mr. Sandford. He had had occasion from time to time since he had been on the Council to inform the Examiners that they were appointed by the Council, which made the regulations, and that it was not for the Examiners to alter those regulations.

The motion was then put and carried unanimously.

The **ASSISTANT-SECRETARY** said now the discussion was over he might be permitted to state that he was in attenance at the meeting of the Board of Examiners and an inquiry was made when the Scotch Board would meet. He answered that the ordinary meeting of that Board would not take place until the middle of February, and members of the London Board then concluded, therefore, there would be no opportunity to consult their Scotch colleagues before the meeting of the Council. It was understood the Bill would be settled that day, and the London Board was anxious that its views should come before the Council before the Bill was completed.

The **VICE-PRESIDENT** was very glad to hear this statement, because he could not believe it possible that the London Board meant any disrespect to the Scotch Board.

Mr. **MACKAY** remarked that the Scotch Board had never shown any indisposition to hold a special meeting whenever it was required in the interest of the Society.

EXHIBITION OF PHARMACEUTICAL AND CHEMICAL APPARATUS, ETC.

Mr. **SYMES** then moved the following resolution of which he had given notice:—

> "That an Exhibition of Chemical and Pharmaceutical Apparatus and other objects of special interest to pharmacists be held in the Society's Rooms at the period of the annual meeting in 1881, or at the meeting of the International Pharmaceutical Conference or Congress in August; and that the Library and Museum Committee be requested to consider and report on the best means of carrying out the same."

Mr. RICHARDSON seconded the motion.

Mr. WILLIAMS suggested that the proposition should be withdrawn, as far as it referred to the meeting of the International Conference or Congress in August, as there was nothing definitely fixed with regard to that.

Mr. HAMPSON said that there would be no objection to leaving it to the Committee to decide at which of the two meetings it was most advisable to hold the exhibition.

The PRESIDENT said there was no question there should be an exhibition, the only question was when it would be most useful and convenient. That should be better decided by the Committee.

The motion was put and carried unanimously.

THE DRAFT PHARMACY ACTS AMENDMENT BILL.

The PRESIDENT said the next business was to consider certain resolutions passed at Edinburgh, Glasgow, and elsewhere, and if any gentleman had any similar documents to bring forward, they should be read, and then the discussion would take place upon them in committee.

The SECRETARY read the following communications:—

"To the President and Council of the Pharmaceutical
"Society of Great Britain.

"Extract of minutes of meeting of the Council of the North British Branch, held in the Society's rooms, in Edinburgh, on the 18th January, inst.

"The Council took up for consideration 'The Pharmacy Law Amendment Act.'

"Clause 1. In the course of the discussion on this clause it appeared that the Council here fully appreciated the intention of inserting it, which they believed to be a more perfect assimilation in the working of the two Boards by having the power to appoint examiners other than Scottish on the Scotch Board. But they believed that the means would not be found capable of accomplishing that result, even admitting that the occasion existed; and besides, they regarded the *converse* side of the arrangement, viz., the representation of Scotland on the London Board—which they presume is also contemplated—as quite impracticable. And on the other hand, they held that the Scottish constitution of the Edinburgh Board was an essential part of the understanding arrived at on the occasion of the passing of the Act, 1852, that this arrangement has worked quite satisfactorily ever since, and to change it now, as proposed in the clause, would have the appearance of implying a want of confidence in the Scottish Board, and might be regarded as such by that Board. In these circumstances the Council unanimously resolved to oppose this clause.

"Clause 2. It was moved by Mr. Kinninmont that the words 'with the sanction of the Privy Council' be inserted after the words 'Great Britain.' This was seconded by Mr. Ainslie and agreed to. The insertion was thought desirable as a check on hasty legislation.

"Clause 5. The Council were strongly opposed to restricting, in any manner, the provisions of section 16 of the Act, 1868, and the discussion showed that they would rather favour an expansion of these provisions and the special adoption of them to the case of widows.

"The other clauses gave rise to a good deal of discussion, but there was no amendment or opposition proposed to any of them.

"JOHN MACKAY,
"*Honorary Secretary.*"

"*Edinburgh*, *27th Jan.*, 1881."

"Edinburgh, January 25, 1881.

"A meeting of the chemists and druggists of Edinburgh and neighbourhood was held at Edinburgh on the 21st inst., to consider the Pharmacy Law Amendment Act.

"The meeting was numerously attended, there being fifty or sixty present. Mr. Gilmour was voted into the chair, and it was agreed to read the clauses one by one, and to take the sense of the meeting on them separately.

"The clauses were accordingly read, and gave rise to lengthened discussion, and were approved of, with the exception of the 1st and 5th.

"It was moved by Mr. Mackenzie, seconded by Mr. Ewing, and unanimously agreed to, 'That the first clause should be deleted from the Bill.'

"With regard to the 5th clause, there was a consensus of opinion that it was more unfavourable to the interests of the widows than the clause in the 1868 Act, while it was also felt that by raising the question at all, the principle of personal qualification would be more jeopardized than it is at present. It was therefore unanimously agreed that the wisest course would be to delete this 5th clause also from the Bill, and it was resolved accordingly.

"It was further agreed that the foregoing resolutions should be laid before the Council in London.

"(Signed) W. GILMOUR,
"*Chairman.*"

"GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

"At a general meeting of the trade, convened by public notices in the newspapers, which was held in Anderson's College, 204, George Street, on January 25, 1881, at 11 a.m., Mr. Robert Brodie, Vice-President, in the chair, the following resolutions on the various clauses of the proposed Pharmacy Act Amendment Bill were approved of, after a varied discussion, in which Messrs. Kinninmont, White (Brown Bros.), R. Brodie, J. C. Steel, John Walker, Adam, and J. C. Hunter took part.

"Preamble. Approved.

"Clause 1. That the Examinations in Scotland should be conducted as they are now, by Scotch Examiners.

"Clause 2. That by consent of the Privy Council should be inserted after the words Great Britain.

"Clause 3. No objection.

"Clause 4. That Section XI. should not be repealed.

"Clause 5. That it should be struck out.

"Clause 6. Approved.

"Clause 7. Approved.

"Clause 8. Approved.

"Clause 9. It was the opinion of the meeting that we in Scotland should have a trial in prosecuting offenders against the Pharmacy Act by the Public Prosecutor instead of by the Pharmaceutical Society.

"Clause 10. It was the opinion of the meeting that the name of the active poison in any patent medicine should be mentioned; also it should be labelled distinctly "poison," if it contained any.

"Clause 11. This clause being very obtuse, it was considered just that the penalty ought to be recovered from the maker of any patent medicine containing poison or poisons who had not fulfilled the regulations of the Act.

"Clause 12. No objection.

"Clause 13. No objection.

"Clause 14. That it should be struck out, in case the privilege of pharmaceutical chemists in England who are exempt be taken away.

"Clause 15. No objection.

"(Signed) ROBERT MCADAM,
"*President*,
"JOHN C. HUNTER,
"*Honorary Secretary.*"

"Registered Chemists' Trade Association of Liverpool,
"31, Old Hall Street,
"Liverpool, 28 Jan., 1881.

"E. Bremridge, Esq.,

"Dear Sir,—I have to acquaint you that the Registered Chemists' Trade Association of Liverpool have held *two* meetings to consider the amendments to the Pharmacy

Acts as proposed by the Pharmaceutical Society, at which each clause was taken seriatim and discussed.

"The Committee have instructed me to convey to you their approval of the proposed amendments and their willingness to render any aid in their power to get them passed into law. "I am, dear Sir,

"Yours, very truly,

"(Signed) J. HOCKEN,

"*Hon. Sec.*'

"Rochdale and District Chemists' Association.

"Rochdale, Jan. 31st, 1881.

"Resolution adopted at a meeting of the Rochdale Chemists' Association, on Wednesday evening, Jan. 26th, 1881.

"That the Secretary be requested to write to the Pharmaceutical Council giving a general approval of the proposed Bill, but at the same time respectfully suggesting that in case the clause prohibiting the practice of dispensing by co-operative stores should be rejected by the Legislature, that relating to the question of widows be withdrawn or expunged, and also to draw your attention to the fact that under the existing law, branch shops can be and are conducted without qualified assistants, contrary to the spirit of present and also of proposed legislation: and further to suggest the propriety of urging the Local Associations or members of the trade throughout the country to use their influence with their respective parliamentary representatives in favour of the Bill.

"(Signed) J. W. BAMFORD,

"*Hon. Sec.*"

"Sheffield Pharmaceutical and Chemical Association,

"17th January, 1881.

"The President and Council of the Pharmaceutical

"Society of Great Britain.

"Sir and Gentlemen,—I am instructed to forward you a copy of a resolution passed by the above association, on the 12th January, proposed by Mr. E. R. Learoyd, seconded by Mr. W. Ward, F.C.S., and unanimously carried:—

"'That this meeting, after due consideration of the proposed Pharmacy Law Amendment Bill, cordially approves of the provisions of the same, and pledges itself to actively support it.' "I am, Sir, and Gentlemen,

"Yours respectfully,

"G. T. WILKINSON NEWSHOLME,

"*Hon. Sec.*"

"South Hackney.

"Gentlemen,—We, the undersigned, respectfully suggest the following few slight alterations in proposed amendment to Pharmacy Act:—

"Preamble.

"After the words 'open shop,' add the words 'within the meaning of the Pharmacy Acts in any part of Great Britain.'

"Clause 1. After the words 'any fit and'—'qualified persons residing in any part of Great Britain.'

"Clause 7. After the words 'delivered at any open shop,'—'or other establishment.' After the words 'medical prescriptions,'—'or domestic receipts, or drugs, or chemicals.' 'Keeping the open shop'—'or other establishment.' 'Selling poisons,'—'drugs, or chemicals.' 'Business at the open shop,'—'or other establishment.'

"Clause 8. After the words 'keep open shop,'—'or other establishment.' 'Medical prescriptions or'—'family receipts.' Fifth line, after the word 'poisons,'—'drugs or chemicals.'

"Clause 13. After the words 'or to medical prescriptions,'—'or drugs or chemicals.'

"Respectfully yours,

"ROBERT OWEN FITCH, M.P.S.G.B.
200, Well Street, South Hackney.
"JOHN ADOLPHUS CLARK, M.P.S.G.B.,
11, Duncan Place, London Fields, Hackney."

"To the Council of the Pharmaceutical Society of Great Britain.

"We, the undersigned pharmaceutical chemists and chemists and druggists residing in Brighton and Hove, Sussex, desire to record our decided disapproval of clause 5 of the proposed amendments of the Pharmacy Act, whereby 'It shall not be lawful for any executors, administrators, or trustees of a deceased pharmaceutical chemist or chemist and druggist to continue the business of such pharmaceutical chemist or chemist and druggist for a longer period than three years, unless by permission of the Council of the Pharmaceutical Society of Great Britain.'

"We consider that such a law would in many cases prove seriously detrimental to the interests of the trade, and therefore appeal to the Council to erase the said clause entirely from the proposed amendments.

"Edwin B. Vizer.
"Charles C. Watts.
"Edward Henry Moore.
"George G. Muston.
"Charles Barton.
"Henry Barton.
"L. C. Perress.
"Thomas Glaisyer.
"Philip Walton Blacklock.
"John Field.
"Edward Histed.
"Edward R. Harris.
"Joseph Edwards.
"Frederick Warneford.
"W. H. Gibson.
"George Bright.
"Thomas Billing.
"Wm. Else.
"J. H. Fairbank.
"Kinneard Metherell.
"John Padwick.
"George Hickley.
"Richard Cargill.
"W. R. H. Sprackett.
"John Phillips.
"Thomas Jeeves.
"Charles H. Wavell.
"G. G. Hornsby.
"John Arnold.
"Robert Walmsley.
"J. Smithson.
"Isaac Garrett.
"Fredk. Wm. Salmon.
"Thomas Bullen.
"Wm. Cornish.
"Marshall Leigh.
"Thomas Robson."

A letter from Mr. Sutton, of Norwich, was read, asking if anything could be done in his district to assist in securing the passage of the Bill.

At the conclusion of the reading of these communications—

Mr. SANDFORD said he had also two letters, which he would not take up time by reading. One was from Mr. Keen, of Fenchurch Street, drawing particular attention to sections 1 and 5, which he thought objectionable, and section 7, in which he thought there should be provision made for branch establishments. The other letter was from Mr. Balkwill, of Plymouth, drawing attention to the injustice of the 5th section.

The following communication was also read from the Council of the Pharmaceutical Society of Ireland:—

"68, Grafton Street,
Dublin, *January* 12, 1881."

"To the Registrar, Pharmaceutical Society of Great
"Britain.

"Sir,—In behalf of the Pharmacy Act Amendment Commitee of the Pharmaceutical Society of Ireland, I beg to bring under your notice a resolution unanimously adopted at the last meeting of the Council of our Society, held on the 5th inst.

"'Resolved. That the Committee appointed for the purpose of considering amendments of the Pharmacy Act (Ireland) be requested to place themselves in communication with a similar Committee, appointed by the Pharmaceutical Society of Great Britain, with a view to cooperation between the two Societies upon points of common interest to both.'

"Our Committee was formed some two years ago to consider certain difficulties in the working of our Act and to suggest amendments. After considerable discussion of the amendments proposed, those of which I enclose copy were accepted by the general Annual Meeting of the Society in October, 1879.

"They were then laid before the permanent officials of the Irish Government, by whom they were favourably received. Unfortunately, the position of Irish affairs has ever since rendered it impossible for the Government to take up the question in the House of Commons, and it is hopeless to expect any Government action upon it for some time to come.

"The necessity for the first seven amendments arises from the fact that certain vested rights were reserved to individuals under our Act, and it has become desirable that the names of all persons claiming such rights should be placed on record by requiring to come in and register. In the absence of such a provision 'The Sale of Poisons Act' is virtually a dead letter in Ireland at present.

"The proposed interpretation clause (No. 8) was adopted by our Society long before the decision in the London and Provincial Supply Association case.

"The amendments to which our attention has been directed have their reference principally to the working of the Irish Act in matters peculiar to itself; but beyond and beside these we are not unmindful of the fact that amendments may be introduced when our Act strictly follows the lines of the Act of the English Society.

"We have learned with satisfaction that the Pharmaceutical Society of Great Britain have taken up and discussed several such amendments, and in accordance with the resolution above referred to, we now beg to place ourselves in communication with your Committee, and hope that an interchange of views may tend to the carrying out of such amendments as may be desirable, as well as to encourage a feeling of co-operation between the two Societies.

"We are fully prepared to accept the fact that no amendments in the direction of trade protection, pure and simple, will be advisable to propose, nor will such be likely to be accepted by the Legislature, but we are satisfied that after the experience of so many years amendments may be suggested which will tend to the safety and convenience of the public, as well as to the advancement of the profession of pharmacy in this and in the sister kingdom.

"I am, Sir,
"Faithfully yours,
"(Signed) J. E. Brunker, M.A.,
"*Honorary Secretary of Committee.*

"Proposed Amendments in Pharmacy Act (Ireland), 1875, adopted at General Meeting of Pharmaceutical Society of Ireland, October 1, 1879.

"1. That it is desirable that the Pharmaceutical Council should seek powers which will enable them to compel all persons to register their names who, under section 31, have their right to sell poisons preserved to them.

"2. Also to compel all chemists and druggists actually engaged in the sale of poisons or poisonous drugs at the passing of the Pharmacy Act, 1875, on making a declaration to that effect and giving reasonable proof thereof, to be registered on payment of a fee not exceeding three guineas, and that such persons shall be styled 'registered druggists.'

"3. That a list of such registerered druggists shall be published from time to time by the Council of the Pharmaceutical Society.

"4. That it shall be illegal for any person to sell poisons or poisonous drugs, or to style himself a registered druggist, except he shall be so registered, save and except he be a qualified medical practitioner or duly registered by the Pharmaceutical Society of Ireland or otherwise exempt under the provisions of the Pharmacy Act.

"5. That it shall be unlawful for any registered druggist to keep open shop for retailing, dispensing, or compounding medical prescriptions.

"6. That the penalties for infringement of these clauses, and the modes of recovering same, shall be the same as provided in the Pharmacy Act.

"7. That all bye-laws or rules for registration shall be approved by the Privy Council prior to their being put in force.

"That in reference to the Pharmacy (Ireland) Act, 38 and 39 Vict., c. 57, and more especially in reference to section 30 of said Act, the word 'person' shall be held to mean and imply any association of persons, whether as a partnership, society or company (limited or otherwise), of which one or more members shall not be qualified under the provisions of the said Act."

The Council then went into committee to consider the memorials which had been received, and in connection therewith the clauses of the proposed Bill which were affected by them.

On resuming,

Mr. **Frazer** rose to move, according to notice, certain amendments in the proposed Bill, and asked leave to read his remarks, which was accorded to him.

He then moved:—

> "In the Preamble, to omit 'and medical prescriptions,' or if these words are retained, insert after them in each case 'containing scheduled poisons.'"

In moving this amendment, I acknowledge at once that I am aiming at the overthrow of one of the root principles that underlie this whole Bill, namely, the extension to non-poisonous drugs, when in the form of prescription, of the restrictive principle that has hitherto applied to only a limited number of poisonous agents. Though this newly proposed restriction does exist in the Irish Pharmacy Act, it has not hitherto had a place in any of the numerous Acts that apply to this country. It is to this innovation that I venture to offer my strongest protest here in open Council, as I have done on three previous occasions when the Council sat in committee. I do not seek to disguise the fact that I myself am quite conscious that this is a strong step to take, and one that should not be taken lightly. I hope, therefore, that you, Mr. President, will permit me, as briefly and as concisely as I can, to lay before yourself and the Council some of the arguments by which I have felt myself shut up to move as I am doing. My first speech was made, and my first vote given in this Council nearly ten years ago, almost immediately after listening to a speech by Mr. Richard Reynolds, and to other speeches by several friends still, like myself, here. That speech, like that of Mr. Reynolds, was made and that vote given against the imposing by legislative enactment of additional restrictions to those contained in the Act of 1868 upon myself and my fellow-tradesmen throughout the kingdom in carrying on our business as dispensing chemists. Where I stood then, I stand now, and in giving notice of the long list of amendments standing opposite my name in the agenda paper of to-day, I believe that I acted in entire harmony with the principles that guided my action then. I most earnestly decline now, as I declined then, to forge with my own hands additional chains for my already sufficiently burdened limbs. In addition to the moral obligations, as well as the civil responsibilities, under which we all act in carrying on a most onerous, as well as honourable business, we carry it on under the restrictions imposed upon us by the Act of 1868. I act, I hope, loyally within the lines laid down for the conducting of our business by that Act. But I decline to be myself instrumental in narrowing still further these lines. I draw the line at "scheduled poisons,"—I do not wish my liberty as a dispenser of medicines where these do not enter to be restricted by Acts of Parliament. I demur to the "safety of the public" calling for such additional legislation as is sought for by this Bill, even at the call of some of those friends with whose action ten years ago I so heartily agreed. It will be replied to this, I know, that the chains I object to are not intended to encumber our limbs, but those of others outside of our Society, whether these be "persons" such as the family grocer, or "corporate bodies" such as the Civil Service or other stores. But chains they are, notwithstanding, and we cannot get them imposed on others and leave ourselves free. The restrictions upon the sale or dispensing of "scheduled poisons" were imposed by Parliament in the interests of the public and for their safety, but Parliament will, I believe, refuse to put obstacles, not now existing, upon the public in obtaining non-poisonous drugs, where no call in their interests exists for such further legislation. And if Parliament refuses to sanction this restriction, I feel sure that it will refuse to sanction the restrictions sought in this Act to be imposed not only upon the makers, but upon the retailers also of patent medicines containing "scheduled poisons." It will greatly surprise me if, when they come to understand it, the trade itself throughout the country consents to be entangled in the conducting of its business by such restrictions as are sought for now, and which, if obtained, would greatly limit, as well as hamper, the sale of proprietary articles—the said trade being itself at once their makers and retailers. In conclusion, let me say with all seriousness that I would not have ventured to take up the ground I have here done, had I not been possessed with strong fears that if this Act does reach Parliament as it now stands, and should there be carried into law, its operations will be felt to be so oppressive by ourselves, and so antagonistic to the interests of the public (as was the case with the Old Apothecaries' Act of Ireland, and from which they have only recently been in a measure delivered), that the next great movement in this Council will be to seek its removal from the statute book of the country.

Mr. **Butt** said he would second the amendment formally, in order to give the Council an opportunity to express its opinion upon it, not that he agreed with it.

Mr. **Bottle** asked the seconder if he could tell him what it meant. Mr. Frazer had put his name to certain amendments to the Bill, but his speech appeared to him to be in favour of rejecting the Bill altogether.

The amendment was then put and negatived.

Mr. **Frazer** then moved the second amendment, namely, to omit clause 1 of the Bill.

This had been already discussed by the Council in committee, and was carried on division by 11 votes to 6.

The clause was therefore struck out.

Mr. **Frazer** then moved that in clause 2, the words "with the consent of the Privy Council," be inserted after the words "Great Britain," but in deference to the opinion of the Council, it having been explained by the Solicitor that the words were unnecessary, he withdrew the amendment.

The **Vice-President** then proposed certain verbal amendments in clause 2.

Mr. **Williams** said he was very much inclined to move to omit the clause altogether, because the Council was committing itself to what it did not clearly understand.

Mr. **Symes** said these amendments had already been discussed in committee.

Mr. **Williams** said he had a right to discuss them in open Council.

Mr. **Symes** said the clause was permissive, it was not compulsory.

The motion that the clause as amended form part of the Bill, was then put and carried by 12 votes to 2.

The clause as amended is as follows:—

"*Bye-laws to further regulate Examinations.*

"2. It shall be lawful for the Pharmaceutical Society of Great Britain from time to time by any bye-law to alter or amend the regulations respecting examinations by dividing or sub-dividing the same and requiring and regulating intervals of time between examinations or any divisions of the same and by requiring and authorizing a course of study to be gone through and other evidence or tests of knowledge and of practical experience for the efficient carrying on of their business on the part of the candidates and to regulate the notices to be given and the fees to be paid by candidates on the giving of notices for the passing of examinations or the several divisions of the same but the Council of the said Society may on application in that behalf allow the intervals of time or any or either of them to be shortened or waived in favour of any person or persons named in any resolution for that purpose."

Mr. **Frazer** then moved that clause 5 be erased.

Mr. **Sandford** seconded the motion. He said he had on several occasions expressed his opinion of the injustice and cruelty of this clause, and he trusted that now it would be erased, and not go to the House of Commons to be disputed over there. He should be very sorry to see it left in the Bill. He knew well enough the Council was told it should look at the question in a catholic spirit, but he preferred to look at it in a Christian spirit. This was not a widows' clause, although it had been called so; the omission of it would not allow a widow to come in simply as a widow, but if the clause were carried it would prevent a widow, either as executrix or administratrix, or her husband's executors, carrying on the business for her or for the benefit of her family. He had a letter from Mr. Balkwill, who told him how it would have applied to his own case. His father died when he was ten or eleven years old; there were two brothers, and the business was carried on for their benefit, and it was now a flourishing one, whereas it must have been shut up entirely had such a cruel clause as this been put in force. Then he asked the Council to attend to the expression of opinion from Brighton, where every chemist, he believed, but two, had signed the memorial against the retention of the clause. Then, again, the Council should consider its friends north of the Tweed, where the feeling was very strong against the clause, both in Edinburgh and Glasgow. He might appeal to the evidence which had been given in the Journal and elsewhere against such a provision. On the previous occasion the clause was carried by the casting vote of the President, and then it was said by Mr. Symes in a letter that he (Mr. Sandford) had not fairly stated the case, because the provision for three years was carried by a large majority. He would remind Mr. Symes that the three years against one was carried by a large majority, but when the absolute withdrawal of any limit of time was voted upon the Council was equally divided. Some one suggested two years, Mr. Williams suggested twenty-two, then a shorter term was named, and ultimately the three years was carried in opposition to the one, not in opposition to the non-existence of the clause at all. Those who opposed him had chosen to publish the reason, the only reason they could possibly bring against allowing executors to carry on a business by means of qualified persons: it was simply because they thought it was admitting the thin end of the wedge of deputed qualification. He was exceedingly sorry when he saw it put forward in print that if the Society were asked to allow an executor to carry on business by means of a qualified person, it could not in fairness prevent the stores and other bodies carrying on business also. It did not rest with him to bring forward such an argument, and he was very sorry it had been published to the world. It was that feeling which was now preventing the Council doing justice to the widows and families of deceased chemists, and he hoped the Council would vote for Mr. Frazer's motion and erase clause 5 from the Bill entirely.

Mr. **Mackay** supported the motion. He said there was evidence before the Council of the strong feeling which existed in Edinburgh against the insertion of such a clause. The feeling in Edinburgh went not only to exclude the clause altogether, but would have gone even a step further and recognized widows in a more emphatic way. That there had been extreme cases of hardship in connection with widows having been left to struggle on with a family, and having been obliged to relinquish a business, and being reduced from comparative comfort to almost beggary, was undoubted. He himself could not see the reason for inserting clause 5 to the exclusion of a clause which he thought was an extremely mild one, but which fulfilled all that was desired, namely, clause 16 of the Act of 1868. He had never heard any argument raised against retaining the clause, excepting one which carried no weight and certainly carried no conviction, which had been alluded to by Mr. Sandford, that if the business were allowed to be carried on on behalf of a widow by a qualified assistant, then the stores and all other parties must be allowed to do the same. Those who advanced such an argument, must forget altogether that the widow of a chemist stood in a very different position indeed to that either of a corporation or a party having no interest but that of making money. He was pleased to know that the omission of the clause was lost by such a narrow vote as the casting vote at the last meeting, and he hoped when it came to the vote again it would be expunged altogether from the new Act.

Mr. Savage said he could not be silent on this occasion. He had hitherto supported the views so ably expressed by Mr. Sandford, and had never yet heard a single argument why this clause should not be obliterated. It had been said that if it were omitted the co-operative stores must be admitted to the trade. The cases were totally dissimilar. There might be a legal point in it, but that would simply arise from bringing the subject forward in this clause. If the clause were left out no question whatever arose; the position was simply left as it was before.

Mr. Woolley said the members of the Council had several times lately been subjected to Mr. Sandford's hard knocks, and his charges of inhumanity and want of Christianity, and other epithets of that description, and now he was quarrelling with them because some of them ventured to put forward their reasons why they supported this clause. He could not see what harm was done by stating publicly that they considered the public safety was endangered by widows being allowed to carry on the business by means of a qualified assistant. It had been said that Edinburgh was in favour of Mr. Sandford's view of the case, but against that there were Liverpool, Birmingham, Sheffield and Rochdale. All those places saw that if they allowed this clause to go, and allowed widows to carry on the business indefinitely, the Bill would be utterly lost, and they had not the slightest chance of carrying it. There might occasionally be a hard case made out with respect to a widow, but that might be met by providing for them a widows' fund. On the other hand, in the statistics of the state of trade at present, there were something like 13,000 members of the trade, all of whose businesses were suffering by the present state of the law. It was acknowledged on all sides that the law wanted altering, and that by the state in which it now was business was suffering, the result being that the number of indigent widows was being increased. He held that the step which Mr. Sandford wished to take would directly tend to increase the number of indigent widows. It was said that the case of the widows was entirely different from that of the stores. How anybody could advance such a statement seemed to him beyond belief. If widows were allowed to carry on business with the aid of a qualified assistant why should not anybody else do the same? If this clause were expunged the chance of obtaining an Act would be utterly and irretrievably gone.

Mr. Hampson said Mr. Sandford laid great stress on the Christianity of the matter, as if he considered that one side were Christians and the other heathens. But there was such a thing as a heathen having a sense of justice and propriety, and he was willing to put himself in that class. He believed it was a just thing to put this clause in the Bill. It was essentially a matter of principle and public safety. He entirely demurred to Mr. Sandford's idea that it was purely a matter of selfishness. It was nothing of the kind. He maintained that a business was much better conducted when the proprietor himself was qualified than when it was conducted simply by a qualified servant. When the principal was qualified the public were safer than when there was only a qualified assistant, who might be here to-day and gone to-morrow. Again, supposing there was an assistant, supposing he did not do the right thing, and he was discharged, there would be no one to attend to the shop at all. To be consistent, Mr. Sandford ought to have included widowers as well, because there were now several lady pharmacists, and if they died their widowers ought to be considered. He seemed to be bewitched by these widows. He had always been opposed to the admission of maids to the Society; but he clung to the widows with the greatest pertinacity. Another reason for objecting to the clause being altered was that, even in legislating for widows, it would simply benefit those who had a large business; the poor unfortunate widow, who really ought to have their sympathies, was beguiled into the trap of carrying on the business which would ultimately be her ruin. A rich widow in a large business could dispose of it to good advantage, and that was the best thing she could do. His main argument, however, was that the public interest was better served where the principal was himself qualified, and if he died, his business, as in the case of other professions, should fall into the hands of other qualified persons.

Mr. Squire said he should vote against the retention of the clause as a matter of common sense. It was put in because it was considered not to be for the benefit of the trade that a trustee or widow should be allowed to carry on business with a qualified assistant, in other words that it was wrong to do so; but if it was wrong to do so at all, it must be wrong to do so for three years.

Mr. Williams said the result of expunging the clause would simply be that clause 16 of the old Act would remain in force, and many members of the Council might think it would be better to leave the law as it stood rather than introduce a new clause which would disturb things and do mischief.

Mr. Robbins said the clause for which this was to be substituted had worked very well for a number of years, and he had been opposed to this clause all along. If there had been unanimity he would, however, have voted in favour of it; but when Edinburgh and Glasgow, which really meant all Scotland, and Brighton were opposed to the clause, how could the Council hope to carry it. He therefore thought the Council could not do better than drop it at once. If he thought there was any chance of carrying the Bill by retaining it he would have submitted to the majority, but there would be no hope of carrying it against the opposition raised outside.

Mr. Symes thoroughly endorsed what Mr. Hampson had said with regard to the supposed injury to poor widows. He had come to the conclusion that no charge of want of sympathy for widows or orphans could be brought against those who supported this clause. It was legislation for rich widows, if any, rather than poor. A widow with a large business could afford to pay a handsome sum for an efficient man to carry on the business of her deceased husband, but not so with a poor widow. A small business bringing in £200 or £300 a year could not possibly pay a well qualified business man who would be in every way capable of carrying on the business on his own account; and that was the only class of man who could usefully be employed in such a case. There would not be subsistence for these unfortunate people if such a man were fairly paid for doing the work. To commence an argument on this Act by appealing to sentiment was quite outside the logic of the question. It was said he had charged Mr. Sandford unfairly with making an incorrect statement. He was very sorry to find a man like Mr. Sandford, who had the rules and laws of the Society at his fingers' ends, departing so much from those rules as to publish in the public press what had occurred there in a private committee. He himself should have hesitated to do anything of the kind, and he was very sorry that Mr. Sandford had set such a very bad example. The public knew nothing at all of one year as the period at which the executors were to close the business. The Bill which the Council invited public discussion upon, and which Mr. Sandford must have referred to in his letter, was one published in the previous week's Journal, in which three years was the period named.

Mr. SANDFORD said the Bill had been sent to the President of the Birmingham Association, and was before the Council at its last meeting with a period of one year in it.

Mr. SYMES said that had not been published. The only one printed in the Journal and to which reference could publicly be made was the one which mentioned three years. The public knew nothing until after the publication of Mr. Sandford's letter that one year had been before the Council at all.

Mr. SANDFORD said the Bill the Council had been considering was one with one year in it, and that Bill had been sent to Birmingham by the President.

Mr. SYMES said he would ask the Secretary to read clause 5 of the Bill as published.

Mr. WILLIAMS thought this point need not be discussed, as it had nothing to do with the question before the Council, or else the sitting might last all night.

Mr. SYMES said it was a question of challenging the truth of the statement he had made. He did not know there was any limit as to the time when the Council should cease its meetings. If he were charged with making an untruthful statement he had a right to defend himself, and to speak for three hours if necessary. He must repeat that the only Bill open for discussion was the one with a period of three years, and that Bill was published before Mr. Sandford's letter.

Mr. SANDFORD said the period of one year was discussed at that table.

Mr. ATKINS suggested that it was not essential to Mr. Symes's argument to continue this discussion.

Mr. SYMES said it was essential to show the truthfulness of his statement, which Mr. Sandford attacked.

Mr. ATKINS said no one doubted his truthfulness.

Mr. SANDFORD remarked that they could discuss that point between themselves privately.

Mr. SYMES said he supported the clause on the principle of personal qualification. It was for the protection of the public that there should be a qualified proprietor of a chemist's business or of a branch business. He knew it was said that this was protection, and it had been said on high authority that the presumption was always against protection; that no interests were worth protecting unless they could protect themselves. But he maintained that at the present time there was more protection in England than there had ever been before. This clause gave protection in the interests of the public, and because it also happened to protect a class it was no reason for disagreeing with it. He should support it on the ground that public protection was thereby attained. To introduce confusion by throwing out the clause would be fatal to the Bill altogether. He maintained that those who were antagonistic to it took a much narrower view than those who supported it.

Mr. RICHARDSON said it was his intention to vote for the retention of the clause, and expressed his astonishment that Mr. Sandford had set the bad example of writing to the papers and telling the public what was done in committee. It was not, however, for him to read a homily to Mr. Sandford, who was one of the fathers of the Society, but he maintained it was very wrong for those who occupied the position of members of the Council to be constantly writing explanations of what occurred in committee. He would only mention one circumstance, and that was in support of his vote. Some ten years ago he was consulted, on the death of a chemist in Leicestershire, as to what the widow should do in reference to her business, when he strongly recommended her to dispose of it. At that time it was an exceedingly good one, and she might have obtained a very fair price for it; unfortunately she did not take his advice; she was a very intelligent and clever woman, capable of carrying it on, but, what with bad assistants and one thing and another, in about five years she could not dispose of the business at all, because it was all gone, and she could not even dispose of the fixtures, and was now living on charity.

Mr. ATKINS said he must explain his vote on this question, because he was obliged to make a change of front as a matter of principle. On the previous occasion he had voted against this clause, but he felt bound now from what he heard to dismiss the matter of sentiment altogether and to vote for its retention. He did not go into the matter of sentiment; but he might say it was no use attempting to minimize the hardship which the clause would no doubt involve, for he knew particular cases in which the action of it would almost justify the use of the word cruel. On the other hand, he had no doubt there were cases, such as Mr. Richardson had alluded to, where it would be well for a widow with a small business to relinquish it. Still, the question was, for what were they going to Parliament? What was the object of this contemplated legislation? If it were the one principle of endeavouring to establish the necessity of personal qualification, to that they must adhere, however hard the incidence of the law might be in particular cases. It was simply nonsense to refer to the 16th clause of the former Act, because the Council would not require to go to Parliament at all if that Act gave all that was required. If the carrying on of businesses by widows were legalized it would be legalizing it for private firms and individuals, and having listened to all the arguments which had been brought, he felt bound to record his vote in favour of retaining the clause.

Mr. ANDREWS said anything which appealed to a body of English gentlemen in behalf of charity to widows and orphans, and especially the widows and orphans of those engaged in their own occupation, must be treated with the greatest respect and sympathy, and he sympathized with the objections of Mr. Sandford, and for many years past had advanced the very same arguments. But when he was appointed on the Committee to consider the Amendment of the Pharmacy Act, he felt it his duty to obtain more information on the subject than he had previously possessed, and the result was that his opinion was entirely altered. He was aware of cases in which hardships would no doubt be inflicted if this clause were carried. But the Council must look to the large mass and not to individual and private cases. He was quite convinced that in the majority of cases it would be far better for the widow to sell the business as quickly as possible, and in exceptional cases, where it might be wiser to retain them, it would still be lawful for the Council to permit the widow to carry on the business; as, for instance, in the case of a son nearly of age. Again, he would refer to the fact mentioned by Mr. Hampson, that wealthy widows were protected, but not poor widows. The Council would be astonished to know the vast number of chemists' businesses carried on by the proprietor alone, without any assistant, and which, therefore, would not afford to pay for an assistant in case of the proprietor's death, and if the Council were to take the principle of charity and kindness into consideration, it must take the worst cases. These arguments, however, sank into entire insignificance compared with this fact, that the rejection of this clause would entirely go against the great principle and fundamental doctrine of the Bill, which was that of the personal responsibility of the owner of the business, and that no one should be able to shield his own incapacity under the qualification of another person. Injurious as this might be in individual cases, it would only be felt by a few widows of chemists, and they would suffer in company with the widows of clergymen, solicitors, medical men, and many others.

The VICE-PRESIDENT said he could not vote for the clause without saying one word. It had been said by Mr. Squire that if it were wrong to limit the period during which executors should carry on the business it must be wrong to allow it at all, and there was a certain amount of logic in that. He had before voted in favour of the time being limited to one year, and he would not have gone so far but that without it an absolute pecuniary loss would be inflicted in the peculiar case of the chemist's trade. The chemist's was a business partly professional and partly absolute trade; notwithstanding he had a qualification, he was bound to supply himself with materials; he might have a £1000 worth of stock upon which he had to exercise his brain power. That was so much absolute property, and a margin of time must be given for the realization of that property, and that took it out of the category of a purely professional calling. That alone justified the Council in putting into the Bill a power of carrying on the business of a deceased chemist at all, even for five minutes after his death. The question was at what point should that cease. His own opinion was it should be one year, and he believed further that had the voting taken place from one year upwards the Council would have stopped at two years, but as it happened to come down from twenty-two years it stopped at three. He should take the sense of the Council on that point whether it should not again be altered to one year.

Mr. Gostling said the question was an important one, and he wished just to explain his vote. He voted on this principle alone, that the principle of the Act being a personal qualification of the proprietor, the Council was only doing justice to all the members of the trade by insisting on that. As Mr. Hampson had properly observed, it was doing a greater act of kindness by enabling men to provide for their widows than reserving their sympathy and allowing them to carry on business after their husbands' death. He had advised his own wife in case he should die first to dispose of the business immediately, rather than attempt to carry it on.

Mr. Bottle said very much had been said on both sides of this question, and no doubt much more might be said, but there was such a thing as expediency, and if the Council was desirous of going to Parliament with any prospect of carrying the Bill, it was expedient that it should, if possible, be unanimous in sending it there. It had already expunged clause 1 in deference to the expression of opinion from Scotland, and he would appeal to it to treat No. 5 in the same way. If it had been a question of inserting clause 16 of the old Act he should say that it would not for a moment stand, and the Council could not go to Parliament to ask permission for a widow to carry on business, and at the same time ask for a personal qualification in others. But there was the old clause which, in his opinion, there would be no objection to. Even if this clause passed, who was to take the responsibility of saying which widow should have permission to carry on business longer than the prescribed time? If widow No. 1 came for permission, and it were accorded, it would be impossible to refuse Nos. 2 and 3, and so it would go on until the clause was absolutely inoperative.

Mr. Frazer, in reply, said Mr. Woolley had contended that if the Council licensed a widow to carry on business, why might not a greengrocer or anyone else open a shop. But the difference was that a greengrocer was a person who could not himself get a qualification. As to the question of the poor and the rich, the rich could protect themselves, but the poor could not. If the widow were so poor that the business would not support a qualified assistant she could not take advantage of the clause. The only other remark he would make was this, in reply to Mr. Andrews, that the question had really been reopened by those who now sought to insert this clause.

The question was then put, when the following voted:—

For omitting the clause:—Messrs. Bottle, Frazer, Mackay, Robbins, Sandford, Savage, Squire and Williams.

For retaining the clause:—Messrs. Andrews, Atkins, Butt, Churchill, Gostling, Greenish, Hampson, Hills, Radley, Richardson, Schacht, Symes and Woolley.

The clause was therefore retained.

The Vice-President then moved an amendment that in clause 5 the word "one" be substituted for the word "three" in the fifth line.

This was seconded by Mr. Gostling, but was lost on a division by 9 votes to 4.

Mr. Churchill then moved to substitute the word "two" for "three," which was seconded by the Vice-President. This on a division was lost by 6 votes to 3.

Mr. Williams then suggested that the discussion should be adjourned, as there were several other important clauses, and it was too late to continue the discussion.

Mr. Hampson submitted that the Bill had substantially received the assent of the Council and had been abundantly considered in Committee clause by clause.

The Vice-President said the Council was somewhat in Mr. Frazer's hands, as he was entitled to move his amendments.

Mr. Frazer said he would, with the permission of the President, move the whole of his remaining amendments together, and then if no one seconded them, of course they would fall to the ground. He accordingly moved the following amendments of which he had given notice, but the motion did not meet with a seconder:—

Clause 7,	page 4,[*]	line 33 and 34	Omit "*whether as Patent Medicines or otherwise, or Medical Prescriptions.*"
„ 7	„ 5	„ 11 „ 12	Omit "*or Compounding Medical Prescriptions.*"
„ 8	„ 5	„ 20 „ 21	Omit "*or Compounding Medical Prescriptions, whether as Patent Medicines or otherwise.*"
„ 10	„ 6	„ 17	Omit "and the word Poison."
„ 11	„ 6&7		Omit the whole Clause.
„ 13	„ 7	„ 12 „ 13	Omit "*whether as Patent Medicines or otherwise, or to Medical Prescriptions.*"
„ 14	„ 7		Omit the whole Clause.

Mr. Hampson then moved that—

> "The Bill as now amended be accepted by the Council as the Pharmacy Law Amendment Bill."

Mr. Andrews seconded the motion, which was carried.

The Vice-President moved:—

> "That the Pharmacy Act Amendment Committee be requested, after full consideration of the best method, to approach the Lord President of the Council, with the view of explaining the provisions of the Pharmacy Law Amendment Bill, as now agreed to, and of endeavouring to induce him to take charge of the Bill in Parliament."

Mr. Atkins seconded the motion.

Mr. Williams said that did not seem to give the Committee any alternative if the Lord President declined to do so.

The Vice-President said in that case the Committee must come back to the Council for further instructions.

The motion was then put and carried.

Mr. Williams then moved that the communication from the Pharmaceutical Society of Ireland be received.

Mr. Andrews seconded the motion, which was carried.

The proceedings of the Council were not concluded until 6 p.m.

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[*] The "page" and "line" have reference to the Bill as printed for the use of the Council.

Parliamentary and Law Proceedings.

THE CHARGE AGAINST A CHEMIST AND DRUGGIST UNDER THE WEIGHTS AND MEASURES ACT.

The appeal of Mr. Whittle against the conviction of the Justices sitting at the Marylebone Court, came on for hearing, on Saturday, the 29th ult., before P. H. Edlin, Esq., and a Bench of Magistrates.

Mr. Besley and Mr. Tickell appeared for the appellant; Mr. Poland and Mr. Mead for the respondents.

Mr. Besley said there was a matter which could be conveniently argued before entering upon the merits of the appeal, viz., the point that the conviction was bad upon the face of it; in other words that the formal conviction returned to the sessions was not in law sufficient. The statute was the 41 and 42 Vict., c. 49, s. 25. Every person who uses or has in his possession for use for trade weights and measures, and so on, which are false or unjust shall be liable to a fine not exceeding £5, or in case of a second offence £10, and so on. It was obvious that this statute was intended to apply to weights, measures or scales kept for use for trade, and if any one had in an attic weights and measures, and used them for the purpose of limiting his diet, as to the quantity of bread or meat he should eat, he would not be liable to any penalty, even although the weights and measures were unjust. Now those words, "for use for trade," were omitted in the conviction.

The Assistant Judge asked if the statute supplied a form of conviction.

Mr. Poland said there was no special form.

Mr. Besley: It simply convicted him for having in his possession in his house, not for use for trade, certain unjust measures. He contended, therefore, that the conviction was bad upon the face of it, and cited the case of *ex parte* Bradlaugh in support of his contention.

Mr. Poland admitted that the conviction was bad upon the face of it, but contended that the Court had power to amend, and cited the case of Reg. *v.* Tomlinson, 8 Law Reports, Queen's Bench.

After a lengthy argument,

The Assistant Judge said the Court was of opinion that it had power to amend the conviction, supposing that it was proved to it that the magistrates at the time of the conviction had evidence before them to show that the measures in question were in use for the purposes of trade. In an ordinary case that evidence might be given in the course of the case, but if Mr. Besley wished it the Court must have that evidence first, so as to amend the conviction before proceeding further.

Mr. Besley said he must not be supposed to give up anything in this case, and if the Court was going to try and make jurisdiction he must let his friend prove the ground upon which he went.

The Assistant Judge said it was a very simple question, namely, Is this man in trade, and was the proof of his being in trade given to the magistrates?

The case then proceeded as follows:—

Mr. Frederick Walter Tibbey sworn. Examined by Mr. Poland.

Are you an inspector of weights and measures for the St. Marylebone Division?—Yes.

I think you have been so since January, 1878?—Yes.

Do you produce an Order in Council of the 14th of August, 1879?—Yes.

Did you, after that Order in Council was issued, see the defendant in this case?—I did.

The Assistant Judge: What is the defendant?

Mr. Poland: He is a chemist and druggist, my lord.

He is a chemist and druggist, keeping a shop; is that so?—Yes.

At No 6, Townshend Road, St. John's Wood?—Yes.

Now when was it you called on him?—At the time of giving notice that these things came within the meaning of the Act of Parliament. I should think about three months after the Order in Council was issued. I could not speak to a day.

What did you tell him about the Order in Council?—I told him that apothecaries' weights and measures would be under inspection the same as ordinary weights.

Did you say anything further to him about it besides?—I told him I should pay him an official visit to inspect his apothecaries' weights and measures at some future date; in fact, I gave that notice to all chemists.

On the 19th of last October did you go to the defendant's shop?—I did.

Did you go behind the counter and test four measures that you found there?—I did.

The Assistant Judge: You found them there behind the counter?—I found them there behind the counter on the dispensing shelves.

Glass measures?—Yes.

Mr. Poland: You tested them?—I did.

Did you find them in your judgment defective?—Incorrect.

Did the defendant see you test them?—Yes.

The Assistant Judge: Is not that sufficient?

Mr. Poland: I think it will save time to complete this witness.

Mr. Besley: I am not acquiescing, my lord, in going on until the amendment is made.

The Assistant Judge: I think we had better not.

Mr. Poland: I will take your lordship's suggestion.

The Assistant Judge: Did you give evidence to the same effect that you have given in the box to-day to the magistrates on the hearing of the original charge against him?—I did.

That is to say, as to his being a chemist and druggist and as to your finding these measures which are alleged to be defective?—I did.

Were you sworn?—I was.

You took the oath before you gave your evidence?—I did.

You gave evidence to that effect before the magistrates?—I did.

Mr. Poland: Was the 25th section read to the magistrates? Was it under this 25th section that the proceedings were taken?—I believe so, I could not say positively.

Were you asked by the Chairman how the measures were used?—I was; at least, for what purpose they were used.

What did you say?—For dispensing drugs.

The Assistant Judge: You say it was under the 25th section.

Mr. Poland: He says the Chairman asked him for what purpose they were used, and he says for dispensing drugs.

The Assistant Judge: "For having in his possession for use" are the particular words. Do you ask us now to add those words? Consider the words you ask us to add, Mr. Poland, please.

Cross examined by Mr. Besley.

Is that a copy of the summons that was taken out by you? (handing the same).

The Assistant Judge: You must know; you need not read that long document through.—It is one of the same style of forms.

Mr. Besley: We have the summons itself, my lord; I am content if Mr. Greenwell gives it to me.

You yourself have never seen anything sold by the measurement of these glasses?—I have seen things sold by the measurement of these glasses.

Of these four particular glasses?—Not of these particular four.

I want to know whether, in regard to these particular four glasses, have you ever with your own eyesight seen anything sold by the measurement of any one of these four glasses?—I have not.

You said very fairly they are used for the purpose of compounding medicines according to the prescriptions of medical men?—Or for the sale of any particular individual drug.

These were upon the dispensing table,—in use on the dispensing table?—In use on the dispensing table. But they would be used for individual drugs as well as compounded drugs. They would be used for the sale of drugs generally.

As a matter of fact you never did see a sale made?—Not by these four measures; I should not be likely to.

With regard to the total of the contents of the glasses, they are actually correct, every one of them, are they not?—I have not summoned on the total capacity.

I say with regard to the total capacity every one of them is correct?—I have never tested them to the total capacity.

The Assistant Judge: Now, Mr. Poland, what words do you wish inserted?

Mr. Poland: My lord, "for having in his house, situate as aforesaid —"

The Assistant Judge: I was going to suggest following the words of the statute; what do you say to these words, "for having in his possession for use in his trade at his shop, situated as aforesaid?"

Mr. Poland: I was going to use the exact words, "for use for his trade as a chemist."

The Assistant Judge: Then the words added are simply "for use for his trade as a chemist," after the words, "in his possession."

Mr. Poland: Yes, my lord.

The Assistant Judge: You know, Mr. Besley, if we have no jurisdiction to make this amendment, you have your remedy.

Mr. Besley: Yes, my lord; I am carefully saving it.

The Assistant Judge: You may; I am not at all afraid of the result.

Mr. Besley: I do not know whether your lordship has considered whether in the amended form you have a conviction before you?

Mr. Poland: Do you raise any further objections to it now?

The Assistant Judge: This is the only objection that has been brought to our notice. I have handed the amended conviction to Mr. Poland for him to see it. Mr. Poland, we have granted the application and we have amended, and now the conviction is before us as amended, and it is for the respondents now to satisfy us that it is well founded, and we call on the respondents to proceed with their case.

Mr. Besley: I only desire not to acquiesce in its being a good conviction now.

Mr. Poland: Now, my lord, I will try and state the facts in this case as briefly as I can. This Act of Parliament, which was passed in 1878, now clearly deals with apothecaries' weights and measures, because the second schedule of the Act contains the Board of Trade standards following, which at the commencement of this Act are stated to be in use under the direction of the Board of Trade. At the bottom of the second column it says, "measures used in the sale of drugs; fluid ounces, 4, 3, 2, 1; fluid drachms, 4, 3, 2, 1; minims, 30, 20, 10, 5, 4, 3, 2, 1." The Order in Council which I have referred to, says that it has been made to appear that a new denomination of standards for apothecaries' weights and measures is required, and they have caused the same to be duly made and deposited in the custody of the Board of Trade. Therefore, by virtue of the power vested in Her Majesty by the said Act, Her Majesty is pleased to approve the said denominations set forth in the schedules hereto, and that the standards for the same shall be the Board of Trade standards in like manner as if they were mentioned in the second schedule in the Weights and Measures Act, 1878. Then it gives the full description of apothecaries' weights and measures. Section 20, sub-section 2, says:—"Drugs, when sold by retail, may be sold by apothecaries' weight." Then, my lord, I need not trouble you with reading the section, the offence is under the 25th section, but of course, the 59th section says, "That if a person has in his possession, when he is carrying on trade, a measure which is incorrect, it is to be deemed to be in his possession for use for trade." That is all I need trouble you with. In this case I wish to state at once that there is no imputation of dishonesty at all against the defendant. He is a chemist of respectability.

The Assistant Judge: He is adjudged to pay the sum of 6*d*. merely because the magistrates did not consider he had committed an offence of a serious character.

Mr. Poland: More than that, he is a gentleman of respectability who, of course, would not intentionally use a false measure, and I wish to state further than that, that he did buy these measures, which have a mark upon them of a public body, of the inspector of York. They are marked at York and they were marked as though they were correct. Therefore he was under the full belief that when he was using these measures he was using measures which were correct, and therefore, so far as he is concerned, there is not the slightest imputation upon him, and the magistrates only inflicted, as your lordship has pointed out, a nominal fine of 6*d*., because they considered that the Act was one of very great importance, and that persons who carry on trade have the obligation cast upon them, by this statute, of ascertaining that the measures are in fact correct measures, and that they cannot, when measures have been in use a long time or a short time, and the Act has been infringed, turn round and say that what they did they did innocently, because the duty is thrown upon them, as traders, of ascertaining that the measures with which they supply articles to the public are correct according to this statute.

The Assistant Judge: Is there any public office at which the standard measures are deposited, which would enable the manufacturers of glass measures to compare what are manufactured with the standards?

Mr. Poland: Oh yes, there is no difficulty whatever.

The Assistant Judge: I should suppose so.

Mr. Poland: In this case, as you have heard, the defendant was told that the apothecaries' measures came within the Act of Parliament, and then the inspector of Marylebone, in the ordinary course of his duty, goes about to various tradespeople, and amongst others he thought the time had come to go to the chemists. When he went to the defendant's shop he found these four measures, which were defective, and he, simply performing what he believed to be his duty, took possession of these measures, and laid the facts before the magistrates. The sole question is, admitting the good faith of the defendant, has he infringed this Act of Parliament? Has he by having in his possession for the purpose of dispensing drugs, that is selling drugs to the public in his shop by these measures, committed an offence? I think the Court will be of opinion that the case is an important one, a very important one, because although the quantities here are very small, yet you are dealing with what may be potent drugs, and the measures themselves dealing with very small quantities, of course, small quantities are of importance. Then there is this also felt, that it is a mere question of price in the manufacture of glass. Of course, there may be variations; but after the thing is manufactured, in marking it, it only requires care and skill. You must pay for care and skill, and if things are sold at a cheap rate, carelessly done, then mistakes occur; but if a higher price is charged for the extra care and attention required accurately to mark these measures, then chemists, like other people, must pay a little extra for these glass measures, which no doubt can be made with perfect accuracy. When I say with perfect accuracy, I mean within almost one-tenth of a minim. Of course, strict actual accuracy may be nearly impossible. Still you must deal with these things as a question of degree. Ordinary and proper care and proper skill being applied in marking these measures, are they so defective as to be within this Act of Parliament? Of course, it is in the interests of chemists themselves that it should be so if they dispense medicines and make them up with these glasses. Two or three words more, and I will call the witnesses. There are two sets of glasses which were taken. One is the one which I now have before me, and it is No. 4. It is a cylinder. The other one I will take is No. 1, which is more convenient to illustrate what I have to say. Nos. 3 and 4 are these two cylinders, and they are marked in fives. There is a figure 10, that means 10 minims, but then below the 10 there is a stroke which shows the half. It has not 5 put against it, but the first stroke is a 5. Then what is intended to be double that is 10. Then it goes up to 20, 30, 40, 50 and 60, there being a mark between each so as to mark the 5. Sixty minims make a drachm, and, as shown in the schedule, 30 make half a drachm. Now these two measures, 3 and 4, are no doubt both of them inaccurately marked, because in some of the instances the measure is too little and in some of the instances, dealing with the spaces representing fives, they are too much. Of course it is very easy to measure a mark for 60, and taking the whole together the 60 is accurate, but when you come to deal with the different divisions they are in some instances too little and in some too much. With regard to No. 4, at the division from 15 to 20 there is 1·1 too little. Now 1·1 in 5 of course is very considerable, and you will find that not taking proper care in dividing these cylinders when they were made, there are these mistakes in these two cylinders. There were two others taken at the same time of a conical shape. Of course, as they taper down those are more difficult to mark. This, my lord, contains 240 minims; that would be half an ounce, or 4 drachms, and that in the same way is divided in tens and in fives by the division between the two tens. It runs up 10, 20, 30, 40 and so on up to 60; then it goes to the larger numbers, and you will find that in measure No. 1 between 10 and 15 there is 1·8 deficiency in 5. That is nearly 2 minims—within a fraction of 2 out of 5. That is about 36 per cent.

A Magistrate: Too little?

Mr. Poland: Yes. Between the next division there is a deficiency of 1·1, and so on. These have been very carefully checked indeed. The inspector is supposed to be a person of very considerable skill; he tested these things at the shop and he tested them afterwards. He had tested them in various ways and his evidence is confirmed by the medical officer of public health of the parish. The public analyst had also tested them most carefully; he is a man of considerable eminence, and I have no doubt that the table of figures I shall put before you is accurate, and that there are these various deficiencies in some instances and in other instances there are excesses.

The Assistant Judge: In 3 and 4 you say there are excesses?

Mr. Poland: In No. 1.

The Assistant Judge: Do you contend, Mr. Besley, that these measures are accurate measures according to the standard?

Mr. Besley: We contend that they are accurate measures.

The Assistant Judge: The respondents, you know, will have to satisfy us that they are inaccurate measures. You meet that allegation by direct denial, and you say we contend that they are accurate measures according to the standard?

Mr. Besley: With this reservation; accurate in the sense that it is impossible to be more accurate, and that the Board of Trade has said they ought not to be found fault with.

The Assistant Judge: That raises a grave question. If you say that they are accurate or that they are inaccurate to such an inappreciable extent that the Board of Trade has permitted these standards to be used——

Mr. Besley: With regard to these four, they have put in writing the opinion that they ought not to be condemned.

The Assistant Judge: Before or after these proceedings?

Mr. Besley: Pending these proceedings.

The Assistant Judge: Pending the conviction before the magistrates?

Mr. Besley: After the first hearing, before the conviction took place, which may account for the 6*d.* The Board of Trade in writing declared that they ought not to be condemned—these four.

The Assistant Judge: That might be a very strong fact in the case, deserving respectful consideration, but would not be conclusive.

Mr. Besley: It was after a communication from the magistrates asking the Board of Trade to let the officers test and report. That report was sent by the Board of Trade, accompanied by a statement that it did not think that these particular four vessels ought to be condemned. Perhaps I may remove a wrong impression from my friend Mr. Poland.

The Assistant Judge: Never mind that.

Mr. Besley: My friend seems to imagine that the measurement takes place between the lines, whereas every measure is taken from the bottom, so that the only difference would be from the bottom to the point where it is measured. They do not take the measure 5, and then put in a drop more and add to the other measurement but take it from the bottom of the glass.

Mr. Poland: If the deficiency is admitted, it narrows it very much indeed.

The Assistant Judge: I think we can scarcely anticipate that Mr. Besley will admit such a deficiency as would amount to a breach of the law, in the face of what he has before him, namely, that the Board of Trade has certified to the correctness of his client's measures. It is an extraordinary proceeding.

Mr. Besley: I must call witnesses in order to inform the mind of the Court.

Mr. Poland: My friend has introduced to the attention of the Court a letter from the Board of Trade, and I need not say to the Court that, representing the magistrates here, I desire that everything which is fairly admissible in evidence should be brought before the Court, and I do not at all object to reading the letter which was written by the officer of the Board of Trade; and it makes the case still more important, because, is it to be the duty of the inspector in each case, when he finds a defect, and a very considerable defect in these small measures, to say, "Oh, I do not think they are sufficiently defective"?

The Assistant Judge: Does it not depend upon the construction of the Act of Parliament? It depends on the actual measure; the Act of Parliament prescribes the measure.

Mr. Besley: My lord, the Act of Parliament does not prescribe the measure. It says nothing about measures for drugs; it says weights for drugs. That will be a point in the case. The statute does not give measures for drugs at all; it gives weights.

Mr. Poland: I have before me the actual figures, which I shall read to the Court, of the deficiencies in these measures. First the statement of errors which the gentleman on behalf of the Board of Trade, who examined these very things, says existed; so that it really is a question upon that. The gentleman I shall call states they are a little under what they make out. For instance, instead of 1·8, they make it 2. But still, whether it is 1·8 or whether it is 2 minims in 5, can that be said to be a correct measure? There is no doubt in these glass measures a certain amount of difficulty in making them, that is in marking them. But I shall call before the Court, if the evidence is admissible, persons who are in the trade, and who will say that the measures can be made with much greater accuracy than these are; not merely by any special care, but with ordinary care and skill in the manufacture that all these measures can be made so as not to have these various defects which undoubtedly exist in these measures. My friend wishes me to read the letter written by the Board of Trade, and I have no objection to do that, although it appears to me to be really not evidence in the case, because the Board of Trade cannot determine this matter; it must be determined in each case by the Court, which is to construe the Act of Parliament. This is the letter, dated 24th November, 1880. [The learned counsel then read the letter sent by the Board of Trade to the magistrates, printed before, p. 516]. I really do not know what that means.

The Assistant Judge: Does that not mean for ordinary purposes these might be measures of sufficient accuracy, but for the limited purpose which an apothecary has to observe in measuring his drugs it might be otherwise?

Mr. Poland: If it means that a chemist makes up a prescription, and he uses one of these glasses, instead of five minims he errs, according to the Board of Trade's own showing, by the deficiency of 1·8.

Mr. Besley: I think not. It is upon 40 minims there is 1·8 deficiency.

Mr. Poland: When you get up to that, of course you start from the bottom, but when you get up to 15, as shown there, if you will just follow that statement of the errors in minims of the four graduated glass measures, Nos. 1, 2, 3, and 4, in the first 5 minims there is a deficiency of ·3; so that they are able to measure it; this shows they are actually able to measure ·3 of a minim, and the Board of Trade officer says that in the first 5 minims there is ·3 minim deficient; add another 5 to that, that is in the first ten there is ·1 minim deficiency. When you get up to 15 it is 1·8

Mr. Besley: Then it falls again.

Mr. Poland: Suppose, therefore, there was a potent drug required to be measured 15 minims by No. 1 measure, instead of giving 15, he would only give 15 minims *minus* 1·8; that is 2 practically. And then if you go on to 20, it is 1·2 reduced again. Then when you get up to 35, you will find that they cure the defect at that point by making it ·1 too much.

Mr. Besley: That is, it is from the bottom of the glass always.

Mr. Poland: At any rate this statement shows that you can actually measure and test to the extent of ·1 of a minim.

The Assistant Judge: Certainly I cannot think that this letter bears out what Mr. Besley stated as to its effect; because Mr. Besley very broadly stated that in the letter of the Board of Trade, the Board of Trade had expressed its opinion that these were proper measures, whereas these words indicate that, in their opinion, for apothecaries' purposes they are measures which should not be allowed.

Mr. Besley: Oh, no.

The Assistant Judge: Let me read the words:—"Although the differences,"—that is the differences pointed out in this statement to the magistrates—"Although the differences from the imperial standards, as shown in the accompanying statement, are larger than should be allowed in other forms of apothecaries' measures." This appellant is a chemist and druggist, a gentleman who dispenses medicine, that is to say, he makes up prescriptions; therefore what you say is certainly not borne out.

Mr. Besley: I hope the Bench will read the letter. I say what I said is borne out. The English language cannot have two meanings.

The Assistant Judge: I do not know that; it is sometimes very ambiguous.

Mr. Poland: In Acts of Parliament it generally has.

The Assistant Judge: You made a broad statement to this effect—that the Board of Trade had written to the committing magistrates expressing its opinion that the impeached measures were sufficient and proper; whereas it appears that they expressed their opinion that for ordinary trade purposes they ought to be deemed so, but for the purposes of apothecaries' use they should not be allowed.

Mr. Besley: That is not so, my lord. That letter begins by apothecaries' measures. It says with regard to other measures, where there is not a difficulty of marking. The difficulty of marking does not exist in some apothecaries' measures, and then you require greater accuracy; but with regard to all cylindrical and conical glass measures, we say, for all ordinary purposes of a chemists' business they are absolutely correct, and we do not think you ought to condemn them.

Mr. Poland: That raises the difficulty—what is an inspector to do under this Act of Parliament? Of course one tenth of a minim might be of no conseqence whatever. It might be the different mode of testing. But when you have heard the ordinary inspector of measures for that parish, who finds they are defective, and the public analyst, who also finds they are defective, the Board of Trade testing their measurement, and saying it is defective, as stated in that table—and I shall show you that it is a mere question of price, that these glass measures are in fact made with perfect accuracy, and can be made with accuracy, then must not a chemist do what can be done, namely, get his measures as accurate as they can be made? Unless you are to draw a line at that, and to say that they must be as accurate as they can fairly and properly be made, what is an inspector to do? Then you leave it to the inspector in every case to say, "I do not think two minims difference is much; I shall not interfere." Another may say, on the other hand, "Four minims difference is not much; I shall not interfere." What is to be done? Is it not obvious that the Act of Parliament intended that they should be as accurate as they could be; of course leaving the magistrates who deal with the facts of each particular case to say whether a penalty should be a substantial penalty of £5, or whether it should be, as in this case, 6*d*.; because the conviction is not for the purpose of punishing the defendant by way of punishment for any moral delinquency, but for the purpose of enforcing the law, and compelling him and the other chemists in future to take care that their measures are as accurate as they can fairly be made to be. That is the object of the conclusion. If this conviction is quashed, it throws the whole thing at large; whereas, if it is confirmed, all that the defendant and other chemists must do, will be to say, "We must go to first class makers and take care that we get our measures accurate, even if we have to pay a little more."

The Assistant Judge: It seems to me a great hardship is imposed on persons who have to use measures under such an Act of Parliament. It would be far better that the Government itself should vend these articles, in the same way that they do postage stamps, where absolute accuracy has to be observed, where persons acting perfectly *bonâ fide* would be subject to penalties, although they may in perfect good faith purchase from a competent manufacturer what they believe to be correct measures. There is a great hardship thrown upon them.

Mr. Poland: They are potent drugs, poisons and medicines.

The Assistant Judge: If it is necessary to protect the public against such minimized differences in matter, let the Government themselves issue proper measures under their stamp.

Mr. Besley: All these measures are under the proper stamp of the official at York, where they are manufactured.

The Assistant Judge: The Government should manufacture them.

Mr. Besley: My friend says it is a matter of expense. That is not so.

The Assistant Judge: They are measures *bonâ fide* issued. The defendant purchased them from a manufacturer recognized as a competent person in the particular trade to supply such articles.

Mr. Besley: And further, my lord, tested.

The Assistant Judge: He uses them in perfect good faith, and then there comes in some day, unexpectedly, an inspector of weights and measures, with a microscope and no end of delicate machines, and finds out he has a minim too much or too little. Then the trader is taken before a magistrate, convicted and fined 6*d*.

Mr. Poland: I should only say that the magistrates who heard this case felt it was one of very great importance, and that on the evidence they could not dismiss the summons. They thought the charge was legally proved, and the Court will have to say whether that decision is right or wrong. If it is right, I venture to submit it will be a very good thing if it is upheld. If it is wrong, the whole matter will be thrown at large, and inspectors will have very great difficulty thrown upon them. Appearing for the magistrates, I need hardly say my desire is that all the facts should be fairly put before the Court, and I will now call the witnesses.

Mr. Frederick Walter Tibbey, recalled, examined by Mr. Mead.

The Assistant Judge: Let him have all the four measures before him, and let him be examined as to the order in which he has spoken in this statement.

Mr. Besley: The statement varies from that of the Board of Trade.

The Assistant Judge: Have you put your statement as to these differences in writing, because in a case of this kind, it would be very convenient that we should have it? Mr. Besley will not object.

Mr. Besley: Not the least.

The Assistant Judge: It would be very much better, or else we shall have to be engaged a very long time in taking a note of all these figures.

Mr. Mead: You are the inspector of weights and measures for Marylebone parish?—I am.

Under the Act of Parliament?—Under the present Act of Parliament.

Have you made the testing of weights and measures your study for some time past?—I have.

You have had great experience?—I think I have had the largest experience of any inspector in England.

You have already referred to the Order in Council of the 14th August, 1879, with reference to apothecaries' measures?—Yes.

You say that three months after that you gave notice to the appellant, Mr. Whittle, that his weights and measures would be liable to be inspected?—Under the Act of Parliament.

The Assistant Judge: He carries on the business of a dispensing chemist, does he?—Yes, my lord.

Mr. Mead: At 6, Townshend Road?—Yes.

On 19th October you went to his shop?—Officially, to test his measures as to their accuracy.

You went behind the counter and you found the four you produce here to-day deficient?—I did.

In what way did you test them in the shop?—I tested them with the local standards issued by the Board of Trade under the Order in Council.

Then under the Order in Council you had received standards from the Board of Trade?—From the Board of Trade.

The Assistant Judge: You had standards furnished to you in your official capacity?—Yes.

Mr. Mead: Those are what are called pipettes?—Pipette measures.

You tested them in the shop with ordinary water, not distilled water?—I did, with ordinary water at the temperature of the atmosphere.

You found them deficient?—I did.

Did you speak to the appellant with reference to that?—I did.

What did you say to him?—I told him I would test them at my office, and if I found them incorrect I should have to take proceedings in the matter—to summon him under the Act.

What did he say to that?—He said he bought them from the York Glass Company and he thought they ought to be right as they bore the York glass stamp.

What did he say?—He produced his bill and said he purchased them from the York Glass Company and he presumed they were correct.

What mark did he say they bore?—He said they bore the York glass mark.

Did you take them to your office and then did you test them?—I did. I tested them with water at the temperature laid down by the Board of Trade, 62° F.

Did you test them by measurement first or by weight?—I am compelled to test them by measure under the Act.

Which did you do?—By measure.

You used pipettes for that?—I did.

Take No. 1 measure first. Have you your notes made at the time?—These were made at the time of the inspection in the office.

The Assistant Judge: Have you not copied them out so as to hand them to us (a copy was handed to the Judge).

Mr. Mead: The first one is conical?—Yes.

Take it from the bottom, it proceeds by steps by fives until you get to 60?—Yes.

Then by tens to 120?—Yes.

Then by thirties?—Yes.

The Assistant Judge: I find here stated the deficits are at 5, 1·2, and at 10, 2.

Mr. Mead: I suppose you filled it with water up to the mark above the 5 minims first of all?—I did.

In the first onset you fill your pipette?—With water at the proper temperature, then lower it from the pipette into the glass until you get the exact line of water in a line with the mark on the measure. What remains in the pipette gives you the deficiency or excess, as the case may be.

You filled the pipette with five minims?—Yes.

Then you filled up that measure up to the first subdivision?—Up to the first line.

The Assistant Judge: Then you stop the running from the pipette?—Yes.

How do you do that?—By the finger. The finger is always at the top.

Mr. Mead: When you fill the measure the water forms a concave surface, does it not?—Yes.

You call that the meniscus?—Yes.

You call it capillary attraction, I think, that forms that?—The meniscus is caused by the capillary attraction of the water to the glass.

Do you take the bottom of the meniscus?—I take the bottom of the meniscus in testing these measures.

That makes it as fair as possible to the appellant?—To his advantage.

What do you say would be the fair line to take, the top of the meniscus or the bottom?—The centre.

These measures are used for tinctures as much as anything?—They are.

And tinctures form a flat surface?—Yes.

The Assistant Judge: There is more capillary attraction, I suppose, with tinctures?—No, my lord, less.

Mr. Mead: Having measured the 5 minims, what deficiency did you find?—On No. 1 measure, I found a deficiency by the pipette of 1 minim.

Now if you will read the result of your testing of the other subdivisions his lordship will check it. What deficiency was there between 5 and 10?

Mr. Besley: There is no deficiency between the 5 and 10; they are all reckoned from the bottom.

The Assistant Judge: He has not said the deficiency between the two. He tested the deficiency in one figure, it makes the deficiency 1 minim out of 5, and 1½ on 10. There is a difference of ½. We need not do that sum; we take the total from the bottom.

Mr. Mead: At 10 minims what did you find?—1½.

At 15 minims?—2.

At 20?—1.

At 25?—1.

Now take No. 2 conical measure.

The Assistant Judge: In another column he has given the deficiency in grains, of course it is a very low decimal, and a very small decimal indeed ·911458 as to 5 minims. Do you want the evidence of the grains?

Mr. Poland: Oh, no.

The Assistant Judge: I should suggest to Mr. Besley whether any question arises on that.

Mr. Besley: My lord, I shall have to do those sums.

The Assistant Judge: Then go on with your second one.

The Witness: No. 2 conical measure was tested in exactly the same form with water at the same temperature as before. Deficiency at 5 minims 1, 10 minims 1, 15 minims 2, at 20 minims 2, at 25 minims 2, at 30 minims 2, at 35 minims 1½.

A Magistrate: Are they all deficiences, or are some in excess?—All deficiencies.

The Assistant Judge: There it ends?—Yes.

Mr. Mead: Take No. 3 in the same way, that is a cylindrical one?—Yes. It was tested in exactly the same way, a deficiency of 1½ on 10, and of 1 on 15.

Now, No. 4?—Tested exactly in the same way, 1 on 10, 1 on 15, 1½ on 20, 2 on 25, 1½ on 30, and 1 on 35.

The Assistant Judge: All deficits?—All deficiencies.

All on the safe side then as far as potency is concerned?—Yes.

Mr. Mead: That is all you have to tell us in regard to the measurements?—Yes.

Did you test them again by weight?—I did.

The Assistant Judge: Do you want it?

Mr. Mead: It depends on my learned friend.

Mr. Poland: He has checked it.

Mr. Mead: You have checked them by weight?—I have.

In the most careful way that it is possible?—Yes.

And you and Dr. Blyth, since you tested them alone, have tested them together?—We have checked them together, and Dr. Blyth did it himself independently of me.

Besides you and Dr. Blyth having tested them separately and independently, you have tested them together?—We have.

And substantially with the same results?—Yes.

The Assistant Judge: With the same results?—Practically with the same results.

Have you got those pipettes with you?—Yes, my lord.

Mr. Mead: There is one other question. You have tested thousands of similar measures, and found them correct?—I have.

So that it is possible they should be correct?—Quite possible.

Cross-examined by Mr. Besley.

Do you know anything about the glass manufacture?—The manufacture of glass?

Have you ever been in any glass manufactory where they make such instruments as these?—I have not.

With regard to the mode of testing, has the Board of Trade given you directions, or advice, if you prefer the word, that to the bottom of the meniscus is the proper way to test?—It has done so now.

Since this case came on it has told you that?—Yes.

And had you previously tested by taking the top of the meniscus?—By taking the centre.

As far as your eye would permit you to take the centre?—You can get a correct line of sight through the centre.

With regard to the figures, did you cease to test these instruments, in the first one for instance, beyond 25?—I did.

You never tested beyond 25?—No—at least, beyond 30 in one or two cases.

Twenty-five on the first?—25 on No. 1.

You have not, since the Board of Trade sent its reply to the magistrates, tested whether it is right in saying that at 35 minims, there is an excess of ·1; at 40 an excess of 1·1; at 45 an excess of 1·9; at 50 an excess of 1·6; at 55 an excess of 1·9; at 60 an excess of 1·4; at 70 an excess of ·5. You do not dispute these figures?—I have never tested them.

Have you not had the curiosity, since the Board of Trade sent this letter, to test them?—I have not, it does not form part of the case.

Do you dispute that at 240 minims the measure was correct?—I have not tested them.

You do not deny that it may be correct at 240?—It may be correct.

Is it quite within the range of possibility that you have put your mark on incorrect measures?—I might have done such a thing, but I think it is very improbable.

The Assistant Judge: I do not follow your question—incorrect pipettes?

Mr. Besley: No, incorrect measures. He is an inspector who has a right to mark.

The Assistant Judge: I do not understand the question. The counsel suggests that it is within the bounds of possibility that you have put your mark on incorrect measures; whose measures, and when, and in relation to what?

Mr. Besley: The Act of Parliament perhaps is not very familiar to the Court.

The Assistant Judge: Do you mean put his mark to condemn them?

Mr. Besley: No, my lord, a mark of approval on them. The 45th section, says, "a weight or measure duly stamped by an inspector under this Act shall be a legal weight or measure throughout the United Kingdom, unless found to be false or unjust, and shall not be liable to be restamped because used in any place other than that in which it was originally stamped."

The Assistant Judge: You mean stamped under the Act. You are a man who stamps measures?—I do.

Mr. Besley: Is it within the bounds of possibility that you stamped measures as accurate which are more inaccurate than these?—I should think it was very doubtful; in fact I should think it was almost an impossibility.

Does not the testing depend very much upon the exact power of the eye to test?—It depends greatly on the line of sight.

It depends greatly on the power of the operator to see the exact line of sight correctly?—Yes.

The Assistant Judge: In order to get the line of sight do you hold it in your hand?—On a level surface.

You do not trust to the hand to hold it?—No, my lord.

There is no possibility of any mistake from any trembling of the hand, or anything of the kind?—No, my lord.

Mr. Poland: It is done with a spirit level.—There is a small table. (The witness produced the stand which he used.)

The Assistant Judge: Perfectly level?—Yes. It must be perfectly level, levelled by means of a spirit level.

Mr. Besley: How do you bring it to your line of sight?—We have to use several means to ascertain it.

I want to know?—By placing myself on an exact level with the stand.

That depends on your ability to do so?—Certainly.

So that if you go down a little too much or not far enough it makes a difference?—But in fine measures like this we generally use a telescope.

Tell me in what way?—I tested these with a telescope.

Tell me by what means?—The measure is placed on a level table with the telescope in front of it, and a spirit level in front, and on the cross of the telescope. You place the measure exactly in front of the mouth of the telescope and by looking through at this end you must get the exact centre.

That would be if the telescope had not a glass larger at one end that the other.—The telescope is made for the purpose.

The Assistant Judge: You do not look through the large part of the glass.

Mr. Besley: If you reflect for a moment you will see that if you are looking through a small aperture of glass and through a larger one at a distance, unless the eye is perfectly true you may, when you are dealing with thousandth parts of an inch, get inaccuracy.

The Assistant Judge: He says he measures this measure with greater accuracy than he could do with the naked eye.

The Witness: Yes, my lord.

Mr. Besley: Then with that assistance you do not deny that the most practised persons may vary in their results?—They may vary to a slight extent.

Now let us see whether you have not varied. Mr. Blyth is the gentlemen who is to support your case?—I am sure I do not know.

Who is Mr. Blyth?—Dr. Winter Blyth is the medical officer of health.

Was he called at the hearing before the justices?—I believe he was.

Do you know that he was called on the part of the prosecution?—I know he gave some evidence before the magistrates.

For instance, are you positive that Dr. Winter Blyth is incorrect when upon instrument, No. 1, on the line with the 5 which you call a deficiency of 1 minim, he calls it a deficiency of ·395?—No, I cannot say.

You have sworn it is 1 minim?—Yes.

If Dr. Winter Blyth has sworn and will swear again it is ·395, do you mean to say he is not just as likely to be correct as you?—Dr. Winter Blyth ascertained his by weight.

Is not weight a more fair test than any other?—I should think so.

Weight is better than volume?—I should think so.

Now having got the information, as you probably have, from Dr. Winter Blyth, that it is not 1 minim, but ·395, what do you say now? Is it ·395 or 1 minim?—I say by the pipette it is 1 minim; by my standard measure issued by the Board of Trade it is 1 minim.

With regard to the standard measure with which you deal, that is dependent on the accuracy of the standard measure?—Certainly.

And do you know that it is almost impossible in marking to mark with absolute exactitude?—It is not impossible, otherwise how do scientific men do with their instruments?

We shall have evidence that they do not do it.—As the standards are manufactured it must be possible to do it.

To your mind all the standards are exactly alike?—They are, within fractions, and that it is enough for me.

The Assistant Judge: You see there is a very material difference in your point of view if you answer correctly. There is a difference between you and Dr. Blyth of ·6, with respect to this particular measure. He only makes it four-tenths, and you say it is an entire minim, or ten-tenths. You say then with respect to one of your alleged deficiencies, according to your own admission, by the pipettes of the Board of Trade where you find a minim, Dr. Blyth finds it ·395?—Dr. Blyth ascertained his results by weight and it is impossible for anybody to ascertain it so corectly by fluid measurement.

Then according to your own admission you will accept Dr. Blyth's as the more accurate?—Most decidedly.

Mr. Besley: Just the same again with regard to Mr. Chaney's, the Board of Trade gentleman, who sent his figures up to the magistrates. You know perfectly well that he, instead of making it 1 minim at that point, makes it ·3?—Mr. Chaney ascertained his result exactly in the same way as Dr. Blyth, by weights.

Then probably he also may be more accurate than you?—Certainly it is by weight.

The Assistant Judge: What is your measurement with regard to that which he says is three-tenths?—1 minim.

The Assistant Judge: Then there is a difference of seven tenths.

Mr. Besley: On the next you suggest there is a deficiency of 1½ minims?—Yes.

Dr. Blyth puts it at ·34?—I am sure I do not know what he puts it at.

·34. There is a wonderful difference there between you and Dr. Blyth, is there not?—There is a difference, and there is a difference between a minim and a grain.

The Assistant Judge: I am not taking a word of this.

Mr. Poland: I shall call Dr. Blyth.

The Assistant Judge: You must consider the time of the Court. If you establish that by evidence, why need we have these hypothetical questions.

Mr. Besley: I will not ask any more. I hope you do not think I intend to waste any time.

The Assistant Judge: These are hypothetical questions and we shall have the positive evidence of Dr. Blyth upon the matter.

Mr. Besley: With regard to measure No. 3, after Dr. Blyth had been engaged you gave up No. 3 altogether as an incorrect measure, did you not?—I am sure I do not know. I know by the pipettes it is, as near as it is possible to obtain it, what I have stated it to be. I know nothing of Dr. Blyth's testing.

Were you present in Court on the re-hearing when Mr. Whittle was told he need not trouble himself about measure No. 3, or when Professor Redwood came to your place to inspect these measures? You were present?—I was.

On the occasion of Professor Redwood and Dr. Paul coming there did you tell them they need not trouble themselves about No. 3?—I did not.

They did not test it?—I said there were only two subdivisions. There were several other subdivisions on the other measure they did not test.

Was it not your suggestion?—I do not think that it was.

Did you suggest they need not trouble themselves about No. 3?—I did not suggest any such thing. It was not for me to suggest. They came there to test the measures, and they tested what they chose.

Did you not by words tell them they need not trouble about No. 3?—Not to my recollection.

Do you say that? Professor Redwood is here and Dr. Paul.—I cannot help that. I have no recollection of saying such a thing.

By words did not you point out to them with respect to No. 3 that it was given up?—No such thing. It was not for me to say it was given up. How should I know it was given up?

You know, do you not, that the Board of Trade order does not refer to any 15 minims at all. There is no such measure at all in the Board of Trade order?—The Board of Trade regulations?

The Order in Council?—By the Order the standards bear 15 minims.

The Order in Council does not recognize anything between 10 and 20.—That I am sure I could not say without refering to it.

Or the schedule of the Act. You know the Act, do you not?—I have read the Act of Parliament.

The schedule of the Act which was read in opening this case?

Mr. Poland: It does.

Mr. Besley: It does not, excuse me. Schedule No. 2 says minims 30, 20, 10, 5, 4, 3, 2, 1. There is nothing about 15 in that at all.—But you will find it referred to in the Order in Council, I think.

Can you tell me this? There are of these graduated marks upon that instrument, something like 21, are there not?—I have not counted them.

There should be?—This is a 60-minim measure, divided into fives.

They are not marked, are they; only you assume they are fives. There is no figure against them?—The figure is against 10, 20 and 30.

Not against the intermediate mark?—No; but I think you will find the Act says where the capacity is so small it is not necessary. They can be passed without.

The Assistant Judge: They are divided into sevenths, according to what you said just now.

Mr. Poland: No, my lord; this is divided all the way up the same — by tens. (The measure was handed up.)

The Assistant Judge: Although there is not a figure there, as he says, it is divided into fives.

Mr. Besley: With regard to all the four, as to the maximum capacity, whether it be 240 minims, or 60 minims. You do not say they are inaccurate?—I have not tested them.

You sent the glasses to Dr. Winter Blyth to support this case?—I did not send them at all. He came to the glasses.

By your wish?—Not by my desire. He was instructed, I presume, by the solicitor or the magistrates.

I believe you were a long time before you admitted that these four glasses were all stamped by the inspector of York. Are they so stamped?

The Assistant Judge: Whereabouts is the inspector of York's stamp?

Mr. Besley: It is the "YK.," a combined letter, my lord, "V.R." and "YK." Do you call each of these a glass measure?—Each subdivision.

Then you call each glass twenty measures. As I understand you, as to measure No. 1, you call it not one but twenty-two measures?—It is a measure at every line that is drawn across it; it constitutes a measure.

Mr. Besley: He says he does not regard the glass vessel before your lordship as one measure but as twenty-two measures.

The Assistant Judge: It is intended to be used for measuring more than one quantity. It is intended to be used for measuring as many quantities as the marks on the glass will admit of?—That is quite correct.

Mr. Besley: Then we should be obliged to contend this, that every mark ought to have the inspector's mark. If it is twenty-two measures, of course there must be twenty-two authentications by the inspector, according to that. My contention will be whether these are really measures within the meaning of the Act. I should say they should be called graduated instruments for the purpose of dispensing.

The Assistant Judge: That is a very difficult question.

Mr. Besley: That arises here.

Re-examined by Mr. Mead.

There is only one point I want to ask you, with reference to the minim and the grain, what is the distinction?—A minim in measurement does not constitute a grain in weight.

But the proportion is given in the Board of Trade order at ·911458; it is roughly nine-tenths. A minim by measurement equals nine-tenths of a grain in weight?—Exactly.

Dr. Alexander Winter Blyth sworn. Examined by Mr. Poland.

Are you medical officer of health for the parish of St. Marylebone?—I am.

And public analyst?—Yes.

I think you are Fellow of the Chemical Society and Vice-President of the Society of Public Analysts?—I am.

I think you have had very large experience in cases of this kind?—Yes.

Just look at these four measures. Before the conviction in this case, were you requested by Mr. Greenwell, the vestry clerk, to examine those four measures?—I was.

And did you afterwards give evidence before the magistrates?—I did.

Just take No. 1. You have in your hand, I think, the notes made at the time. Just take No. 1 and look at those. Do those papers contain your measurements of those four?—These papers contain my measurements of the four measures, but these are measurements that I have made since the conviction.

That does not matter. What do you say now, having made it several times; which do you say are the accurate ones?—I say these are as accurate as it is possible to measure.

In your judgment are those strictly accurate?—They are.

You put it in two ways, but the deficiencies, I think, will be sufficient. Will you read the deficiencies from these papers?—I have them here.

Begin with No 1?—No 1 is a conical measure. In the first five minims, I find a deficiency of ·2; a deficiency on 10 minims, ·5; 15 minims, a deficiency of 2 minims; 20 minims, a deficiency of 1·6; 25 minims, a deficiency of 1·6; 30 minims, a deficiency of ·5.

Now No. 2?—No. 2, at 5 minims, a deficiency of ·5; 10 minims, a very small excess, it may be called accurate; 15 minims, 1·4 deficiency.

The Assistant Judge: I have 1·2.

Mr. Poland: I have the original here; it is miscopied. Now 20?—At 20 minims, 1·2 deficiency.

The Assistant Judge: This is very badly copied.

The Witness: At 25, 1·5; 30, 1·3.

Mr. Poland: Now take No. 3 measure, the cylinder?—No. 3, on the 10 minims, a deficiency of ·7; 15, ·1.

Now No. 4?—Division 10, a deficiency of ·1; 15, a deficiency of ·9.

The Assistant Judge: Where you do not point out any deficiency or any error we may take it you found it correct?—Yes, my lord.

In No. 3 you only point out with regard to the divisions 10 and 15?—No, my lord, I only tested the measure at those particular divisions.

Oh! we are not to assume, therefore, because you do not give other errors, there are not other inaccuracies?—No; I have only tested the measure at those divisions.

Mr. Poland: In No. 4 what are the deficiencies?—At 10 minims the deficiency is ·1; 15, ·9; at 20, ·8; at 25, 1·3; at 30, ·8; at 35, ·7.

Now these figures you have just read you believe to be as accurate as it is almost possible to ascertain?—I do, because I took every precaution. I was a quarter of an hour over each division. I examined it with a telescope of low magnifying power, which was carefully levelled. The bottom of the measure was on a support, properly levelled, and each division was carefully brought before the centre of the telescope. The water was dropped in and several determinations were made of almost every division. I believe it is as accurate as it can be done and it can only be done accurately in that way.

I suppose you have seen a large number of measures of a similar kind?—I have, and graduated instruments of all kinds.

In your knowledge all these things could be made much more accurately than they are?—Most decidedly. I could do so myself, although an amateur.

Given the manufactured piece of glass you could mark them more accurately than they are marked there?—They can be marked as accurately as they can be read.

Within how much?—Observers might differ by weight ·1 of a grain, with very great care; therefore you might have an error of one-tenth of a grain.

Or one-tenth of a minim?—I am speaking by weight.

The Assistant Judge: If you reduce it to measure perhaps there is one-tenth of a minim to which you might differ?—A minim is nine-tenths of a grain.

They may differ to rather less than one-tenth of a minim. Do you put it about that?—Yes, my lord.

You think we can fairly allow for differences of measurement to the extent of one-tenth of a minim?—Yes.

The Assistant Judge: We are now approximating to the question we may have to determine. It is only for Mr. Besley to show otherwise; but if this gentleman's opinion is correct, as an expert, we can fairly allow of differences of measurement by different persons to the extent of one-tenth of a minim.

Mr. Poland: In dispensing drugs is it material that the measure should be as nearly as possible accurate?—I consider so, certainly.

The Assistant Judge: In dispensing drugs you require accuracy in such measures.—Yes.

The Assistant Judge: The Act of Parliament does whether he does or not, and so does the Order in Council.

Mr. Poland: Take No. 1. You consider 2 minims deficiency in 15 as a very material defect?—I do, because there are many medicines in which 2 minims is a therapeutic dose. You would get a certain effect with a dose of 2 minims; therefore, I consider it a serious error.

Even 1 minim, is that a serious error?—I think so, certainly.

Cross-examined by Mr. Besley.

I think, Dr. Blyth, you were examined before the justices?—I was.

Are you of opinion that you can more accurately test by weight than by measure?—Most decidedly.

Did you speak when before the magistrates of the result of your testing by weight?—I did.

Have you got those figures now?—I have not them with me. They agreed very fairly with these.

You know the *Pharmaceutical Journal*, do you not?—Yes, I have heard of it.

Tell me this, on No. 1 measure did you not before the magistrates say that at 15 minims it was ·67 grains deficient?

The Assistant Judge: Which of these is that?

Mr. Besley: Before the magistrates this gentleman gave the result of testing by weight and not in minims, testing by weight, not testing by volume?—I have the weight here of my last determination, and it is 1·77. It is impossible for me to carry the figures in my head.

Surely you supplied the gentleman that called you as a witness with the evidence you gave before the magistrates?—I believe they had that, but I have not got it.

Where is the paper with the result of your weight tests?—I have not got it. They differed very little from these.

Do not say that, because if this be accurate it differs wonderfully. For instance, No. 1 measure at 15, did not you state upon your oath before the magistrates that the weight was ·67 grain deficient?—I do not think so, I cannot remember. I do not think so. I do not think I said anything of the kind.

Cannot you remember what you said?—That is my more recent examination, but I compared those weights with the weights taken in a more accurate manner.

Mr. Poland: You will give my friend the weights now from these, if he wishes it.

Mr. Besley: Please to look at this for a moment and tell me, although you have lost your own notes, is not that absolutely the evidence you gave on your testing by weight? (handing a copy of the *Pharmaceutical Journal* to the witness.) It is impossible for me to remember these abstract figures.

Why did not you bring the notes you used when before the magistrates?—I did not know that they would be wanted.

Why did you change the memoranda you made?—Because I wished to test it in the most accurate way that it was possible to test it, and took the greatest time possible, so as to bring before the Court the most accurate statement.

Did you tell the justices that which was inaccurate?—I certainly did not.

Do you mean to say now that the difference between the ·67 grain and what you are telling the magistrates here of 2 minims in that one testing is not a serious difference?

Mr. Poland: He does not admit that he said that.

The Witness: I believe that is a misprint—that there ought to have been a 1 before that ·67. There were a few minor differences.

Mr. Besley: Tell me what you call a few minor differences.—A tenth. There has not been a difference of more than a tenth between the testing before the magistrates and my present testing.

The Assistant Judge: I understand if there were differences between the evidence you first gave and the figures you give now, you adhere to those given now because you took extra care?—Most certainly, my lord.

You bestowed more time, care and attention upon it for the purpose of arriving at the measures which you have stated to-day?—That is exactly the case, my lord.

The Assistant Judge: Then it amounts to nothing, because we have to determine on the facts before us. The only observation is that such is the mode of calculating these measurements that it is quite possible for an experienced person to make a different measure one day to what he does on another, and when we find that gentlemen do differ in measuring, I think we may take that for granted. It is proved already to the satisfaction of the magistrates.

Mr. Besley: But to what extent? That is a very material matter in this inquiry—the extent to which there may be differences.

The Assistant Judge: That is very wide. The same person may differ in the measures he would arrive at, measuring on different days.

Mr. Besley: And the same person measuring by weight and by volume.

The Assistant Judge: What this witness has stated amounted to this, that so fine are these measurements that the same measurer measuring on Monday, when he comes to deal with these very small measurements may find a different measure one day to that at which he arrived on the previous day. But this gentleman says, "I measured these glass measures with the greatest accuracy, using the best means, and I have given you what I believe to be the most accurate measure to be arrived at by myself." That is what you say?—That is exactly what I say.

Mr. Besley: What I want to know from you is whether you mean that the difference between your own results—I am not asking about other people, I am asking about yourself—whether the difference of testing by weight, which is the evidence you gave before the magistrates, and now your evidence to-day by volume does not give a difference between ·735 of a minim at No. 15 on No. 1 measure, whereas now you say 2 minims; whether you have not changed your evidence from the difference between ·735 minim down to 2 minims?—Most decidedly not.

What did you say before the justices was the result of the testing by weight at No. 15 of measure No. 1?—That I cannot answer, because I cannot remember the exact figures I gave. You are asking me for abstract numbers; but I know there was a large deficiency, that is all I can say on No. 15.

My friend, Mr. Poland, has offered me a copy of your report. Would you mind looking at it.

Mr. Poland: If this is what he had before the magistrates.

Mr. Besley: If it be so, so long as he can have here what he had before the justices, I shall be satisfied.

Mr. Poland: If Dr. Blyth can remember it as being so. (Paper handed to the witness.)

The Witness: These are not my original notes, but here is what I suspected, a misprint. It is 1·67 instead of ·67.

Mr. Besley: You call the difference between 1·67 and 2 minims an inappreciable difference?—No, excuse me. This by weight—before the magistrates, it is No. 15, 1·67 grains deficient. I make it here 1·77, which is ·1 of a grain difference.

You have given it me in grains. Now will you give it me in minims? You say 2 minims; what you call 1·67 in grains, what is that in minims? Then I should have the contrast?—It is a calculation I could not make in my head. A minim is nearly nine-tenths of a grain. There is about ·1 of a minim difference between the two determinations.

One-tenth of a minim difference, and that one before the magistrates less than what you speak to now?—Quite so.

The one before the magistrates done by weight and what you speak of now done from volume?—Done also by weight.

I thought you had been doing this by volume since?—No; I have done them by weight.

You have always done them by weight?—Always done them by weight.

The Assistant Judge: You have given the measurements in volume, having taken the weight and the measure?—No, my lord; I have translated it by calculation. I have taken it in every case by weight, but in order to state it more clearly I have turned it into minims.

Mr. Besley: All your testings are by weight?—Yes.

You turned it into minims for the purpose of assisting us. Now with regard to No. 1 measure, at 5 minims Mr. Tibbey calls it 1 minim deficiency. You only call it ·2. Do you call that a great difference?—Of course there is a considerable difference—a discrepancy there.

Is there not an awful discrepancy between the inspector and yourself? You come and give us accurate evidence upon which, probably, the Court will rely; you talk of two-tenths, whereas the inspector who summoned the defendant talked of 1 minim on that one measure. That is a great difference?—It is eight-tenths difference. There is a difference.

Is it not a great difference?—That is the exact difference—eight-tenths.

The Assistant Judge: I think that difference is much larger than should be allowed for, because he said you can fairly allow for difference of measurement by different persons to the extent of one-tenth of a minim. You succeed by cross-examination, in fact there is evidence in chief, that there is in respect of these particular allowances a difference of eight-tenths, which is seven-tenths in excess of what ought to be, supposing there is proper accuracy of measurement by both. It amounts to that.—That is an argument in your mouth, Mr. Besley.

Mr. Besley: Oh, yes, my lord. The discrepancies are most material in this case. I think I had better select one or two from each measurement. That will be sufficient for the argument. Now, with regard to No. 2, you say that at the point supposed to be marked 10 minims, that is absolutely right, or, if anything, a small excess?—Yes; that is very correct indeed. I make it ·07 of a grain in excess, which may be an experimental error. Therefore, it may be said to be absolutely correct.

In that case is it not rather startling that Mr. Tibbey should swear to it being 1 minim deficient?—I do not know how he made it, I am sure. That, of course, is a discrepancy.

Is not that such a serious discrepancy as is inexplicable to you, a scientific professional gentleman?—That is done by measure. I always consider by measure it is not a good way of testing.

Do I understand that the whole matter might be corrected if there were powers to compel marking after testing by weight?—I do not go so far as that. I think by the pipette you can tell whether a measure is accurate or inaccurate; if you wish to obtain the exact amount of inaccuracy of measurement it ought to be by weight.

Just suppose for a moment that No. 2 measure was the inculpated measure, and that it was upon that particular point of 10 minims it was said to be false or unjust; you say it would be absolutely true and correct, do you not?—At that particular subdivision.

At that point?—Yes.

How can you say that it can be accounted for—by the testing by volume instead of by weight, when what you now demonstrate to be absolutely correct Mr. Tibbey calls a deficiency of 1 minim. That is what I want to get at. What you give here, and we believe you, and the Court will probably accept it, is that at that particular point of No. 2 measure at 10 minims it is absolutely correct, and Tibbey says it is 1 minim defective. I want to know how you explain it?—I do not think it is my business to reconcile discrepancies. I am ready to bear witness to facts.

The Assistant Judge: Which is that?

Mr. Besley: No. 2 at 10 minims, where Tibbey says it is 1 minim deficient the witness comes and says it is quite correct, or if anything a little in excess.

The Assistant Judge: According to Mr. Tibbey at figure 10 there is a deficiency of 1 minim, and according to this gentleman it was either accurate or he would rather say it was in excess, therefore the difference between these gentlemen is more than 1 minim.

Mr. Besley: Yes, my lord. Now take No. 2 measure at point 30. You tell me it is 1·3 deficient?—Yes.

That is your corrected and properly tested figure, is it not?—Yes.

What did you say that was before the magistrates?—I really could not say.

What is it on that paper?

The Assistant Judge: What have you got there?

Mr. Poland: It is a copy I have before me; if the witness, when he sees it before him, can remember it, well and good.

The Witness: They are not notes made by me at the time.

The Assistant Judge: Not made by you at all, it seems.

Mr. Besley: If it be necessary I will call the shorthand writer, who can prove what this gentleman said. The absence of his notes is a matter upon which I must comment.

Mr. Poland: By all means, in due time.

The Witness: In this paper it is ·91 deficiency.

Mr. Besley: When Mr. Tibbey puts that at 2 minims is not that a serious deficiency?—No.

The Assistant Judge: It is a deficiency of 1 minim according to the evidence. It is a most serious discrepancy compared with the evidence he has given to-day.

Mr. Besley: You said a minim and a decimal before. It is ·91?—I do not know whether it is correct or not.

To-day you say it is 1·3 minim?—Yes, which I am certain is right.

Is it not a serious difference, first of all, between less than a minim and 2 minims as spoken to by Tibbey, is not that a serious discrepancy?—If it exists, but I really cannot say.

You cannot explain this discrepancy; but with regard to yourself, how do you explain that by weight you bring it to ·91 before the magistrates and now you bring the difference 1·3?—I beg to say I do not say that I brought it out before the magistrates ·91.

I suggest you did?—I cannot admit the suggestion.

Do you mean to say you have had no curiosity to look at the figures you swore to before the magistrates and the new and more accurate figures you swear to to-day?—Most decidedly. I found the differences very little indeed.

Did that one vary as much as the difference between 1·3 and less than a minim?—I cannot say.

The Assistant Judge: Which are you referring to?—This is 30 minims and the No. 2 measure.

Mr. Besley: Take No. 3. I understand that at 15 you bring out ·1 deficiency only?—That is all; it may be considered fairly accurate.

And you did not give any evidence as to that before the magistrates, did you, at all?—I scarcely remember, I do not think I did.

You said nothing about No. 3?—I do not think I was examined on No. 3, nor do I think I examined it before.

You do not think you had tested that before?—No.

That is a contrast between ·1 by your evidence and 1 minim by Tibbey's evidence. Now I pass to No. 4. Did you give before the magistrates only evidence with regard to the 5 minims, 10 minims, and 15 minims points?—I do not remember.

Did you state that at 10 the difference was about ·3 before the justices, and now ·1 before the Court of Quarter Sessions?—I could not recollect.

Are you prepared to say you did not tell the justices it was the difference of ·3 of a minim?—I am not at all clear.

And now to-day you say it is ·1 of a minim?—But I must say that before the justices, I believe, if I remember rightly all my differences were in grains and not in minims. Therefore I could not have said it was three-tenths of a minim, I should have said its equivalent in grains.

The Assistant Judge: Is that observation applicable to all the answers you gave before the magistrates, because if so, the learned counsel has been acting on erroneous instructions. He has asked you what you said as to minims?—Yes, my lord; it is always in grains, the evidence before the magistrates.

Mr. Besley: I am not under any delusion, I think. He has turned them into minims himself since he has been in the box.

Is the difference between ·1 of a minim and 1 minim, which is Tibbey's figure, capable of any explanation except bad operating?—I do not know how he tested it. I am not in a position to afford explanations of discrepancies.

You say that 25 is only 1·3 deficient, what he calls 2 minims; is it so?—My measurement of 25 is 1·3.

As contrasted with his 2 minims?

The Assistant Judge: There is a difference again of ·7.

Mr. Besley: With regard to the interest of chemists in dispensing medicines, when you take potent poisons it would be an advantage to have the mark under rather than over the quantity, would it not?—No; I do not think so; because, under the Sale of Food and Drugs Act, if medicine were sent to me as an analyst, and that medicine had not its proper amount of drugs in it, I should certainly have to give a certificate that it was not of the nature the purchaser required and purchased.

Yes; but will you kindly dismiss from your mind the Adulteration Act. I am talking of dispensing medicine.

The Assistant Judge: If you were to suffer from a wrong dose, would you rather suffer from a weaker than a stronger one? It may depend on the disease you had to cure, probably?—Certainly.

Mr. Besley: Is it not safer to dispense medicine with less poison than more?

Mr. Poland: Poison is a medicine, and if you do not give enough medicine the patient suffers.

(Adjourned for a short time.)

Mr. Besley: I think I will only trouble you with the 20th division of No. 4. You say the deficiency is 1·3 of a minim?—Yes, 1·3.

When you were before the justices you said nothing with regard to that at all, did you?—I really cannot say. I cannot remember those sort of things.

Because you have not got your paper?—I have not.

Then the difference of seven-tenths of a minim—that is a large discrepancy, is it not?—It is 1·3 deficient.

As against 2 minims by Tibbey?—It is ·7 discrepancy.

That is a large discrepancy?—Well, it is ·7 discrepancy. I suppose he did it by volume and I did it by weight. By volume is not a very accurate way.

Is it a fact with regard to the imperial standards that it is quite impossible to have them entirely free from error?—I do not say so at all; I would not allow that for a moment.

Have you tried by weight against the imperial standards issued by the Board of Trade?—I have not, but I have articles of glass in my own laboratory which will deliver accurately by weight or by measure. I therefore do not see why the imperial standards should not be equally accurate with my own scientific instruments.

But you know nothing about the way in which the imperial standards are made?—I have only a general knowledge.

The Assistant Judge: The imperial standards in this case are the pipettes issued to the inspectors, that is the standard by which we have to consider in this case, whether the appellant's measures were accurate or inaccurate, whether it is the proper standard or not.

Mr. Besley: I think not, my lord, the question is whether the measures were unjust and false.

The Assistant Judge: Unjust and false.

Mr. Poland: The words of the section are "false or unjust."

The Assistant Judge: Those are very important words. A false weight—a false or an unjust weight. An unjust weight is false. False is distinguished from unjust. It is disjunctive.

Mr. Besley: Are there practical difficulties of construction and graduation of measures of the particular form of those four?—The conical ones are more difficult to read than cylindrical ones, therefore there is more difficulty in graduating conical ones than cylindrical ones.

You say conical glass instruments are more difficult to read for the purposes of marking?—Quite so.

Than the cylindrical ones?—Quite so.

Therefore there is the more probability of inaccuracy in the conical ones than in the cylindrical ones?—Yes.

So that a good chemist, where exactitude was required, would be more likely to use a cylindrical than a conical measure?—He ought to, I should think.

The Assistant Judge: This is a very recent Act of Parliament; has there been any decision by a superior Court on those words, "false or unjust?"

Mr. Besley: None, my lord.

The Assistant Judge: This is the first case that has arisen under this Act of Parliament?

Mr. Poland: The first I know of, my lord, on this point.

Mr. Besley: I believe, my lord, the fact is that the Act did not operate upon chemists until the Order in Council of 1879.

That is hardly an answer to my question. I want to know whether there are practical difficulties in the construction and graduation of measures of the particular forms of those four measures?—There are practical difficulties in graduating all measures, but there are more difficulties in graduating this conical form than the cylindrical form.

There is a difficulty in the graduation of all measures?—There is a practical difficulty.

That springs, does it not, from the imperfections sometimes of sight, and also when the marking has been done, in the turning of the wheel which makes the marking permanent?—I do not know, I am sure.

You do not know how it is done yourself?—I am not acquainted with the method that they use. I know the method that I should use, but I am not acquainted with the method that is used.

Do you know that these glass measures are made first of all without marking at all?—I am aware of that.

Then do you know that a film of varnish is put upon them, and they are then tested for the purpose of graduation with liquid from the pipette?—I know that too.

And that no mark can be made in the varnish without some breadth of the line, can there?—A line must have a certain amount of breadth.

It must have breadth. And after the glass is marked with the transparent varnish upon it, it has to be placed and held against a wheel rotating at an enormous speed, has it not?—Well, that would not be my method of marking it. I should etch it with hydrofluoric acid.

You might introduce a more expensive method, but as a matter of commerce, is it not the fact that they are marked in that way?—Very likely.

First of all you have the eye operating on the pipette to see that it is accurate; that is on the glass before it is marked; then after it is marked, actually making it permanent by a rotary wheel?—That is an imperfect method of manufacture which is not followed out in scientific instruments.

But those are common glasses ordinarily used by chemists?—Yes.

Do you agree with Mr. Chaney that the measures now in question, four of them, may be accepted as correct for the purposes of ordinary trade?—Most decidedly not.

You do not agree with the Board of Trade?—No; I have a most decided opinion on that point.

You say they may not be accepted as correct for the purpose of ordinary trade?—No.

A Magistrate: When you speak of the number of deficiencies, does that mean the deficiency as measured from the last figure of the glass, say the 5 degrees, or from the very bottom?—Always from the bottom. If it is deficient ·1 of a minim in 10, that means the whole of the measure is 9·9 minims.

The Assistant Judge: The glass is filled up to that point which you are testing the accuracy of.—Up to the point.

Necessarily from the bottom?—Yes.

A Magistrate: I do not quite understand; for at 15 minims of No. 1 you say there are 2 minims deficient, measured from the bottom, and at 20 minims you say the deficiency is only 1·6?—Because the glass must have been wider at that particular division, and it must have made up for the deficiency.

The Assistant Judge: You are referring, I think, to the conical glass; but the same observation would apply to the cylindrical one. The deficiency appearing at the lower measurement, might be corrected by an actual inaccuracy between that measurement and the one above it, and that tends to reduce it when you come to that point?—Yes.

A Magistrate: In that case there must be an excess in the second division as against the deficiency in the other. They are not equally divided?—No; they are not equally divided.

The Assistant Judge: In short, in taking the larger measurement as between this and the next measurement, there may be an excess, and that would tend to correct the deficiency in the measurement below or *vice versâ*?—Yes, my lord.

Re-examined by Mr. Poland.

Did you try them with the pipette as well?—I did. I tried them all just roughly with the pipette.

The Assistant Judge: That reminds me of what I want to ask you. Did you use the same pipette measure as Mr. Tibbey?—I cannot say, my lord. I asked Mr. Tibbey for a pipette measure, and he gave me the measure. Whether it was the same or not, I do not know.

Although you cannot say it was the same as he used, it was a measure which he gave you?—It was.

We will ask him whether the measure he gave you for the purpose of your measurement was the one which he had used for his measurements. We will get that out. Let Mr. Tibbey be asked that question at once.

Mr. Tibbey recalled.

Mr. Tibbey: Yes, my lord. It was one of the Board of Trade standards which Dr. Blyth used.

The Assistant Judge: Was it the one you had used for the purpose of this case?—I believe so. We have only two sets, and one, the first set, is rather awkward to use. I am almost certain that Dr. Blyth had the 60-minim tube in the second set of pipettes.

Did he have the same test measure or pipette for his measurements that you had—actually the same measure?—I am almost positive.

But not quite?—I should not like to swear to it, my lord.

If we find a difference in the measurement of these by different instruments, might there not be a difference between different pipettes issued by the Board of Trade?

Mr. Besley: I shall give you affirmative evidence that there is, my lord.

Mr. Poland: At all events, both sets were Board of Trade sets?—Yes.

Dr. Blyth recalled.

Mr. Poland: Did you apply the pipettes?—I did.

Did you find the measures inaccurate with the pipettes?—I did; but the exact amount of inaccuracy I did not take any note of, because I do not approve the testing by the pipette, not for myself.

Mr. Besley: Would the Court allow me to put one question on that? He says he tried with the pipette of the Board of Trade and found inaccuracies. What I want to know is this, whether his more accurate taking of the amount by weight instead of by volume does not show that the actual pipette of the Board of Trade was inaccurate?—I never tested the pipettes of the Board of Trade. I should have, to answer that question, to go through a very careful investigation and test each pipette. I have not done so, so that I could not answer the question.

The Assistant Judge: Surely the alleged inaccurate measures of this gentleman, the appellant, ought to be tested by one recognized standard, and he ought not to be called upon to meet a case in proof of which different tests are applied for the purpose of showing the inaccuracy of his measures. If Mr. Tibbey and if the last gentleman, Dr. Blyth, used the same test for the purpose of ascertaining whether the appellant had in his shop accurate measures or not, then we can understand it; but if we have first of all to consider whether these are unjust measures or false measures or accurate according to one test and then accurate or inaccurate according to another test, how many issues are we to try?

Mr. Poland: The one issue to try is whether they are false or unjust.

The Assistant Judge: In order to determine that question, you bring, as it were, not the same standard test, the same criterion, if I may use the word, but two.

Mr. Poland: One confirms the other; the inspector did test it with a pipette and it was inaccurate.

The Assistant Judge: And this gentleman by his scientific apparatus for weighing.

Mr. Poland: Then they say Mr. Tibbey made a mistake in the mode in which he tested, that it is inaccurate manipulation. Then we tried it by more scientific tests and show that in material parts they are inaccurate.

The Assistant Judge: It may be that there is no difference in the criterion; it may be there is no difference in the test and standards. It may be so, only it does seem to me that unless the defendant examined what is alleged to be unjust by what we must take to be the just positive standard for the purpose of our decision, this gentleman is certainly placed in a very great difficulty, which I should be slow to believe the law intended him to be placed in.

Mr. Besley: If I might be allowed to assist the Court in that view; you see by the statute that they appear to have contemplated this, that with regard to certain weights that every weight or measure that is stamped and verified, that is to be good; and it appears as if no one is entitled to go behind that except this. If from the composition of the measure or weight, such as lead or tin or anything of that kind, or iron, by use, what was stamped once and verified afterwards becomes unjust and false, there must be a re-stamping and a re-verification or a penalty. That shows it is inapplicable to this kind of instrument.

The Assistant Judge: That does not meet my observation.

Mr. Besley: In one sense it does, my lord. Every one of these four measures is stamped and verified by the proper person at York, who is said in this statute to give his authority over all England. Its coming away from York does not make a difference. It may be used in every part of England if once stamped and verified by the inspector at York. And I think it does come to that point. When once we have a measure, verified and stamped by an inspector, which cannot alter—because glass does not alter in its composition in any way——

The Assistant Judge: Then this question is a very important one. It is tantamount to your saying—it is perfectly immaterial to know whether you find Mr. Tibbey's measures do not coincide with this or whether they are inconsistent, but because I have the mark of the maker—the legal recognized mark——

Mr. Besley: Beyond the maker we have the inspector of York, who is a public official there.

The Assistant Judge: Does he put the "V.R." on?

Mr. Besley: He put the "YK." on.

Mr. Poland: We do not know that.

The Assistant Judge: I suppose it is so.

Mr. Besley: I will call him to prove this. In the manufacturing, a portion of the "YK.," which is a joint letter, which may be seen, is made, but until the inspector comes, and he himself, with the rotating wheel, makes the rest of the "K.," it is not his mark. I am told he puts his mark with a diamond. He comes there, and until he has put his mark with the diamond the whole figure of the "YK." united does not appear upon it. I will prove that to you when we come to that part of the case.

A Magistrate: The inspector has made a mark verifying these as true measures.

Mr. Besley: Yes.

Mr. Poland: In consequence of my friend's observation, I ought to read the 45th section. The 45th section is, "a weight or measure duly stamped by an inspector under this Act shall be a legal weight or measure throughout the United Kingdom unless found to be false or unjust." My friend did not read that. "And shall not be liable to be re-stamped because used in any place other than that in which it was originally stamped."

The Assistant Judge: Does not that throw upon the person who may use such a measure the obligation of seeing that the inspector has not deceived him in what he has alleged? It presupposes that false measures may be issued by inspectors, and that they may be false and that they may be unjust.

Mr. Poland: And that they may be issued at York and used in London, but they are still to be deemed to be legal measures.

Mr. Besley: The view may be this. It presupposes that what has been once marked by the inspector may, through the material changing, change, but it does not presuppose that an inspector ever sends out a glass instrument which cannot change.

The Assistant Judge: There is a great deal in this, because Mr. Besley, I can foresee, may possibly argue that although this gentleman, after this alleged inaccuracy, may be liable to a penalty for having made use of it, yet that on this section until it was found, that is to say, by proper authority, to be false, he would not be liable, it being issued by an inspector. I do not know whether that argument has ever suggested itself to you.

Mr. Besley: It had not occurred so potently to my mind, but it does occur to my mind; I had the substance of it with regard to the real meaning of the statute.

The Assistant Judge: It is to be a legal measure. Is this an instrument issued by the inspector at York? Assuming that it was for a moment, then this section says that it is not to be condemned. "It shall be a legal weight or measure throughout the kingdom unless found to be false or unjust." Now, of course, arises the question what is the meaning of the word "found." It may be that the reasonable interpretation of the statute would be a notice on the part of a competent person who is testing these measures that it is so. Was this gentleman guilty then of an offence under this Act until the inspector had given him notice that his measure, obtained from an inspector and legal throughout the United Kingdom, had been pronounced by him, and was found, in other words, to be false or unjust. If that be really the right construction of this section of the Act, although this gentleman might be in peril for continuing to use this measure, we should have to pause before we convicted him of having infringed the Act before it was found to be false.

Mr. Poland: This is a most important point with regard to the construction of this Act of Parliament. I should submit that it was not that one inspector is to find another inspector's measure incorrect.

The Assistant Judge: Then still better the position of this gentleman. I am putting an interpretation on the word "found" which would be less favourable to him. It may be Mr. Besley may say, "Oh, no; you must have it found by a competent Court." I am putting it in the most unfavourable way to the appellant, that is to say, I suppose that the word "found" in the statute would be satisfied, on an inspector or competent person saying it is so, and giving notice. But if that is not the right construction, then where is this conviction?

Mr. Poland: Pardon me, my lord, one inspector cannot find that another inspector's weight or measure is wrong.

The Assistant Judge: He can seize the weights.

Mr. Poland: What is the machinery for finding? Found by whom?

The Assistant Judge: Did the magistrates find it to be a false measure?

Mr. Poland: Certainly.

The Assistant Judge: Then it is not a false measure until they find it so. And there is no offence for using it until it had been so found.

Mr. Poland: They can only find it to be a false measure by convicting the man. There is no machinery under the Act to say they are to try an issue; just consider this. This is really a most important matter. *Primâ facie* it is a legal measure. This section says that a weight or measure duly stamped by an inspector under this Act shall be a legal weight or measure throughout the United Kingdom unless found to be false or unjust.

The Assistant Judge: Who do you say is to find it, a public tribunal such as a magistrate sitting in Petty Sessions? I want to know how you say that word ought to be construed, because I assume it ought to be construed for the purpose of argument in the most unfavourable way to the appellant. Put it in the other way, he is in a still better position. Do you say it ought to be found by the magistrates?

Mr. Poland: Not at all, my lord. *Primâ facie* it is a legal measure, but if the local tribunal finds it is a false measure it ceases to be a legal measure. That can only be found by convicting a man of using an illegal measure.

The Assistant Judge: Oh, no: By convicting him then and fining him they would really be fining him for using that which the statute says was to be a legal measure until they had found it to be otherwise.

Mr. Poland: How are they to find it? Then they say we dismiss this summons. What is the finding—what is the machinery?

The Assistant Judge: It may be a novel proceeding.

Mr. Poland: Of course, in working this Act of Parliament the inspectors go to the Petty Sessions and are now before this Court. It is most important, of course, that the true construction of the Act should be ascertained, and that there should be good sense given to the Act, and it may be shown to be, as it probably is, workable. Now, my lord, where is the machinery? It does not say that the weights and measures are to be seized and that then they are to be taken before the justices, who are to determine whether they are false or unjust, and that if they are false or unjust they are to cease to be be legal weights and measures. There is no machinery, as your lordship sees, by the Act for the Petty Sessions except on hearing a summons; there is no machinery for this Court except an appeal; there is no machinery for the Board of Trade. He finds them unjust and he seizes them. Then his duty is to proceed against the man. The section says:—"That a weight or measure duly stamped under this Act shall be a legal weight or measure throughout the United Kingdom." That means out of the district of the inspector who marked it, unless where it is found —where it is in fact found to be false or unjust.

A Magistrate: The inspector marks by his mark weights and measures, which at that time are false or unjust. You are assuming now they are false and unjust before they are found to be so.

Mr. Poland: He has marked a measure which is in fact, if I am right, false and unjust. Now, then, it is found to be false and unjust; and then it goes on: "And shall not be liable to be restamped because used in any place other than that in which it was originally stamped."

The Assistant Judge: You see it says, "unless found," which clearly means, unless afterwards found. It seems to me that what fell from me would possibly have more force if the word had been "until" and not "unless," but the word is "unless" found. But it is clear that the finding must be subsequent, because it refers to the finding as to the justice or falsehood of a weight previously issued. Therefore, the statute clearly contemplates a subsequent finding. But then it says that the weight issued by an inspector shall be a legal weight unless found to be false or unjust. That must mean unless afterwards found. Do you contend that although it was a legal weight until it was found to be unjust, and afterwards found, that such finding has a retrospective operation and that making use of it before, antecedently, is an offence under the section?

Mr. Poland: I am going to say that, my lord. Let me say this word in addition.

The Assistant Judge: I am only throwing out an opinion.

Mr. Poland: This Act is new to me, and I have no desire here except to try and get at the real legal merits of the case. Let me read the 48th section:—"Every inspector under this Act authorized in writing under the hand of a justice of the peace, and also every justice of the peace, may at all reasonable times inspect all weights and measures, scales, balances, steelyards, and weighing machines, within his jurisdiction, which are used or in the possession of any person or on any premises for use for trade, and may compare every such weight and measure with some local standard, and may seize and detain any weight, measure, scale, balance, or steelyard, which is liable to be forfeited in pursuance of this Act, and may for the purpose of such inspection enter any place, whether a building or in the open air, whether open or enclosed, where he has reasonable cause to believe that there is any weight, measure, etc., which he is authorized by this Act to inspect. And any person who neglects, or refuses to produce, for such inspector, all weights, measures, etc., in his possession or on his premises, or otherwise obstructs or hinders a justice or inspector acting under this section, shall be liable to a penalty not exceeding £5, or in the case of a second offence £10." Now then, therefore, the things are seized. They are found not to be legal measures in fact, and then, if they are found not to be legal measures in fact, under section 25, he is liable to a penalty.

The Assistant Judge: Who is to find them?

Mr. Poland: The magistrate, my lord.

The Assistant Judge: Then there is no offence "unless found to be false or unjust." It says, "shall be a legal weight unless found to be false or unjust."

Mr. Poland: They are found—of course, legally found —when the inspector has taken possession of them, and they are liable to be forfeited. That is to be the issue tried before the Petty Sessions. Then comes in section 25, which says that the person who has in his possession, that is, the inspector has found them in his possession and has taken possession of them because they appear to him under section 48 to be unjust, he has found them, for that purpose, by comparison with the standard measures to be false and unjust.

The Assistant Judge: Mr. Poland, we must put a reasonable construction on this clause in the Act of Parliament, which is for the protection of the trader. It is a clause clearly devised for the protection of the trader under circumstances where it may be somewhat difficult for him to comply with the requirements of this statute. Could the statute have said more if it had been dealing with a measure made by anybody until it was found to be unjust? A man might continue to use it, but at his peril; but surely this section shows that the intention was to deal with official weights and official measures. It says an official measure shall be deemed to be a legal measure unless found to be unjust. Surely that throws upon you the necessity of showing that before this gentleman incurred the penalties for using this measure, it had been found to be unjust.

Mr. Poland: I should say not, for this reason, that under section 48 the inspector by comparison says that they are liable to be forfeited:

(The learned Judge here consulted with the Magistrates).

Mr. Poland: Will you allow me to finish what I was saying?

The Assistant Judge: Certainly.

Mr. Poland: Just see how it works, because you see when the inspector has compared the measure with the legal standard he is to detain it because it is liable to be forfeited in pursuance with the Act. Now what has to be done? This chemist says, "My measure is perfectly just." The man says, "No." The inspector says, "I have condemned it; I say it is unjust." What is to be done then? That is not a finding as a finding to determine the question of fact. That is one man saying one thing and the inspector saying another. Then section 25 points out how that is to be done. Thus the forfeiture operates on the magistrate finding as a question of fact, when the man is summoned before him, that it is false or unjust, because that section says, following the exact words of section 48, if they are found at the trader's place or used by him they are in his possession for the purposes of use. Then, "every person who has in his possession; that which is found to be in his possession by the inspector, as"—— as what? That which is found to be false or unjust, which is in fact false and unjust, that which is a legal measure certified by a legal inspector at York or elsewhere? "Every person who uses or has in his possession for use for trade any weight, measure or scale, etc., which is false or unjust shall be liable to a fine not exceeding £5, or in the case of a second offence £10, and any contract bargain or sale or dealing made by the same shall be void." That is to be determined by the magistrate, and the weight, measure, balance, or steelyard shall be liable to be forfeited.

The Assistant Judge: You must observe this. According to what you say now, its meaning is, if the words had been instead of these which we find, "unless found to be false or unjust," simply, "if it be an accurate measure." Now just observe what you are bringing it to. This is what you say. It is not a legal measure because it was an inaccurate measure. Therefore the statute, to carry out its intention, according to your view of its intention, would have said if it be an accurate weight or measure duly stamped, and so on, it shall be a legal weight. Then it would be sufficient for you to show that it was not an accurate measure. But it is very differently phrased: "a weight or measure," whether correct or not—it does *not* say "a weight or measure duly stamped by an inspector under this Act shall be a legal weight or measure throughout the United Kingdom," but then it goes on, "unless found to be false or unjust." The words are not "unless they prove it to be inaccurate." The words are "unless found to be false or unjust." And do not the preceding words point to an inaccurate measure?

Mr. Poland: The reason is this, that all these weights and measures are bound to be marked, but that is only to make it a legal measure throughout the United Kingdom. It is not to make it absolutely a legal measure, to make it a conclusively legal measure by a person using it.

The Assistant Judge: If the measure was not to be stamped by the inspector for the purpose of the tradesman, if he were to be brought within the reach of the penalties for an alleged offence of this kind, what is the use of having a measure stamped at all by an inspector? It would be a mere trap for the tradesman.

A Magistrate: I can understand weights and measures becoming false or unjust by reason of use, weather, and so on. But in the case of measures that do not alter in their dimensions by use, as in the case of these glass measures, you are assuming in this case, it is false and unjust at the time the inspector marked it with his approval; therefore he did stamp a false or unjust measure.

Mr. Poland: And, my lord, if you really come to look at section 48, he is to inspect all weights and measures. They must be stamped. Then this section 45 is only for the purpose of making *primâ facie* a stamped measure when it is stamped out of the jurisdiction of the person using it, a stamped measure which is of good force in London, as if it had been stamped in London. To illustrate this case, this measure is stamped at York. They might say, "Oh, what have we to do with the York stamp in London?" But the section says if it is stamped at York it is nevertheless to be a legal measure throughout the United Kingdom unless found to be false or unjust.

The Assistant Judge: To put it thus, the inspector may have issued it and, nevertheless, the obligation is upon the purchaser; the user is to take care that what he has bought of the inspector is accurate.

Mr. Poland: Yes.

The Assistant Judge: It is still on him, if it be not accurate, then, he is liable to penalties.

Mr. Besley: Section 49 takes away the obligation. There is the remedy. An inspector who does happen accidentally to put his mark on what is wrong is liable to the penalty.

The Assistant Judge: I cannot but think it improbable that the Legislature, using those words, making a measure issued by an inspector, although a legal inspector, a valid measure throughout the United Kingdom, unless found to be otherwise, do not merely mean to say a valid measure if it be accurate. That is what you reduce the section to. If it be accurate *per se*, then it is valid. But the words are very different, "unless found to be otherwise." There is nothing in this case, if I followed your opening correctly, to show that when this gentleman was first charged it had been found to be unjust. It was not until the inspector, in discharge of his duty,—nobody reflects on him—brought it to his knowledge as inaccurate.

Mr. Poland: The measure might have a false mark put on to it after it was issued.

The Assistant Judge: I am presupposing the fact that it was properly marked.

Mr. Poland: We are dealing here with a question, which is a very important question. I really submit when you come to consider the Act of Parliament, I need not say, with great respect, that it is not open to the doubt that has been started on this point. You have given the fact that these weights and measures may be stamped in different parts of the country by local inspectors, and it may fairly be said that a measure stamped at York is not to be deemed to be a legal measure in London; but then the section says, and it is obvious that is the meaning of it, not only by the marginal note, but by the plain words:—A measure duly stamped by an inspector under this Act shall be a legal measure throughout the United Kingdom. What was that put in there for, but simply to say that a measure which is duly stamped shall be a legal measure throughout the United Kingdom for every purpose?

The Assistant Judge: The words are arguable.

Mr. Poland: It must be clear that that is the meaning of it, "shall not be liable to be restamped because used in any place other than that in which it was originally stamped." Is not that section perfectly clear that the stamped measure, stamped by a local inspector, is to be deemed to be not an illegal measure when used in London, because it has not got the London inspector's stamp on it, unless it is found to be a false or unjust measure? Is not that obviously the meaning of that section, that it is to be deemed to be a legal measure, notwithstanding that being used in London it has not the stamp of a London inspector?

The Assistant Judge: You cannot cut out these words, "unless found to be unjust or false."

Mr. Poland: That is a proviso that it is to be a legal measure, that a measure stamped at York is to be a legal measure in London, although not stamped by the London inspector, unless in fact it is a false measure.

The Assistant Judge: Then, as I say, your contention is, that the buyer and user of such a stamped official measure must himself take care that it is accurate. There still remains the obligation on him to take care that he is supplied by the official with an accurate measure. Early in the course of this argument I suggested that what I thought was the right construction would be clearer if the word "until" had been used, and not the word "unless." But here it is, "unless"—"unless found." You say this has been found, and having been found, the statute means that the measure was always—this appellant was always using an illegal measure, and therefore he is punishable for the antecedent use of it, the use of it before it was found.

Mr. Poland: In this particular case?

The Assistant Judge: That may be the strict interpretation of the words.

Mr. Poland: May I add this? The question does not arise in this case, which would be a very different one, I submit. If this gentleman was using one of his own inspector's marked measures, he would say, "That was delivered out to me by one of your own inspectors," and practically that might prevent his being convicted. But he is using here in London a measure of an inspector, marked at York.

The Assistant Judge: What do you say with regard to the particular locality of York? Would it have been a legal measure, having the official stamp, in York? Do you say this section is merely applicable to the use of a locally stamped measure beyond the locality?

Mr. Poland: I should think so. But still it is a more difficult question than this, because this one, it seems to me, when you come to consider it, was put in for the purpose of saying that you need not have the measure stamped in one place stamped again when used in another. It shall be deemed to be a legal measure unless it is in fact not a legal measure.

The Assistant Judge: That is to say, it amounts to this. If it had been "until" there would have been far more in what I think is the right construction of the statute, but it is "unless found." You say that has no more meaning than this, that this was a legal measure, and was to be deemed such unless it were found not so;

then it has been found. We understand your argument.

Mr. Poland: Then I think, my lord, it all works satisfactorily. The inspector says, I find in your shop a measure which is stamped by the York inspector, I compare it with my local standard, which I have to work by, and I am sorry to say that I find this measure is liable, in my judgment, to be forfeited. I must seize it and detain it in order that the local authority may determine whether or not it is liable to be forfeited in pursuance of this Act. Then that being so, the inspector has got it, and it is liable to be forfeited under the Act, or not liable to be forfeited under the Act. . How is it to be forfeited under the Act? The inspector says, I look at section 25, and I find in your possession for use for trade a measure which is false or unjust. I therefore charge you with that before the magistrates, and I ask the magistrates to determine whether this measure is false or unjust, and whether it is not right and proper; that my seizure was legal, and that it is liable to be forfeited. Then, my lord, it seems to me you make good sense of the Act in that way, and that it may well be that the justices said in a case of this kind, if this gentleman was using a stamped measure in good faith, they would fine him 6*d.*, or 1*d.*,—a nominal fine, but he must not go on. Because if the magistrates acquitted him on this charge these measures are returned to him, and are not forfeited, and he goes on using these same weights and measures.

The Assistant Judge: Very different questions would arise if the magistrates in the course of the litigation expressed their finding to the effect that it was a false or unjust measure; his subsequent use of it would place him in a very different position to that in which he stood where he first went before them, because then there would be a finding by a competent tribunal that it is an erroneous measure.

Mr. Besley: There is no forfeiture until the second offence.

The Assistant Judge: Is there not a forfeiture until the second conviction?

Mr. Poland: I do not know that.

Mr. Besley: Read the 25th section.

Mr. Poland: My friend has started a fresh hare now. The words are, "Or in case of a second offence £10," that applies to that—"and any contract, bargain, sale or dealing made by the same." By the same what?

Mr. Besley: By the same person.

Mr. Poland: Made by the same false weight or measure. So that if it is a contract made by a false weight it should be void, by the first conviction.

Mr. Besley: It is made by the same person. A measure does not make a contract.

Mr. Poland: A person may make a contract by a false measure. My friend does not appreciate the argument. It shall be void. Why void? Because you have made a bargain by weights and measures which are false. That is void. "And the weight, measure, scale, etc.," that is, by which the same was done, "shall be liable to be forfeited." So that it is quite obvious there is a forfeiture, and the contract is void when made by false weights and measures, that is, weights and measures which are false or unjust, the penalty being £5 in one case, and £10 in the other. It is not a novel mode of legislating.

The Assistant Judge: This is so doubtful a matter that I think we must proceed with it. Certainly the section is deserving of our very careful attention.

Mr. Poland: It is not any new mode of legislating. Persons are liable to be indicted for receiving persons who are lunatics, when they did not know they were lunatics. There is a reported case, which says that it is the duty of a person who carries on a business for profit, it may be they are acting in perfect good faith, but if they do an illegal act, for the protection of the public they are punishable for committing a legal offence, although the case may be met by a fine of 6*d.* or 1*d.* or £10. I think your lordship will see on really considering these sections, that I have put the true view before the Court. If it were not so, it would be so difficult to know what was to be done. I must really apologize for so pertinaciously arguing it; but it is so important a case to have settled by this Court after full consideration, so that all the London inspectors, and country inspectors as well, may know what to do.

Mr. Besley: Will the Bench allow me to say a word? My friend has omitted to call attention to the machinery of the Act of Parliament. The machinery is this. That first there shall be local standards made, and you will find that the inspector who marks is protected by the 40th and 41st sections with regard to the provision and verification of the standards from which he starts. There is a provision that the local authorities shall provide local standards for purposes of comparison by way of verification and inspection. The 41st provides that "a local standard of weight should not be deemed legal nor used for the purposes of this Act unless it has been verified or rectified within five years before the time at which it is used." So that we begin with the person who marks—the inspector is protected by a machinery that he may take it for granted that what he uses as a standard, if it has been verified within five years, is the measure by which his conduct is to be viewed. Then comes the inspector, and the inspector is bound by comparison with that standard to mark only those vessels which are in accordance with the standard. And if the inspector is guilty of any negligence in respect of the comparison of the vessel he marked with the standard, he himself is liable to a penalty. Then we come to the person using, and then we have this condition of things, that whereas the statute says distinctly, now you may rely upon it that whilst a measure which has the mark of an inspector upon it, as the inspector himself has been protected by reference to the local standard, which is to be looked to every five years, the user is protected in this Act by the mark being put upon it, and he is protected by that mark on it, unless it is found out to be false or unjust. There is another penalty on any person who manufactures a measure and puts on a false mark of an inspector, he makes a false measure, and there is a penalty for that. But when you have this state of things, that the vessel has got the mark of the inspector on it, and he has acted *bonâ fide*, he is protected if he has gone by a local standard, however erroneous it may be, so long as it has been verified within five years. Now you are asked to say that a man has been rightly convicted of an offence, who is admitted to be acting *bonâ fide*, with a *bonâ fide* measure with a mark upon it. Why, if an inspector had put a mark which he ought not to have put on, he might be fined £5 or £10, or if this is not a *bonâ fide* mark then the glass people might have been fined £5 or £10. So that you are really taking the person who is most innocent in the matter, who is using the measure, and saying that this gentleman is to suspect of not putting on the mark properly; that he is to suspect him of not having compared the measure properly with the standard, which he is bound to do. I submit, therefore, that the limited meaning which my friend put on the wording cannot be the true meaning.

The Assistant Judge: It comes to this, taking into consideration these various sections of the Act of Parliament, which regulate the conduct of the local inspector, here is the inspector subject in the event of his neglecting the obligation thrown upon him by the statute, subject to penalties; but if he acts *bonâ fide*, and if according to the standards by which he has to construct these measures, or he takes other measures and compares them before he stamps them with the standard, and the results of the comparison are such as to warrant his issuing these measures, he is to be free from blame, and not amenable to punishment. And if it is also to be said that they being really inaccurate measures, five thousand persons to whom he may send them, or who may rely on the stamp, are nevertheless to be subject to penalties. What a position is the trader put in! Now is the man who should be the more responsible party actually free from punishment, and those who may have received measures bearing his mark upon them, believing them to be accurate measures, and using them as such, liable to penalties, and any number of persons. Surely we must look at the whole machinery of this Act of Parliament and see what the duty of the inspector was, and see how far the Legislature intended that persons who obtain their measures bearing the official mark of an inspector should be deemed to have acted in such a way as to bring themselves within the penalties of the Act, although such measures may be in fact inaccurate.

Mr. Poland: As traders they get the benefit of the false or unjust measures, whatever it may be.

Mr. Besley: Not in this case.

The Assistant Judge: The more responsible person, who is the inspector who may have issued the measure, is to escape, and the purchaser from him of the measure with the official mark upon it, who uses it, believing it to be accurate, is to be subject to penalties.

Mr. Besley: Would it not be much better to take the view which the Court is, I think, inclined to take, that unless found, as my friend says, in a court of justice, to be wrong, or it may be found by the inspector, the user is not liable.

The Assistant Judge: I foresee that we shall have to state a case on one or more points for the consideration of the Court above. It may be we had better proceed to hear such further evidence as we may have on the facts.

Mr. Poland: Section 49 says that an inspector is liable who stamps a measure in contravention of the Act, or without duly verifying the same by comparison with the local standard.

The Assistant Judge: Then was the inspector liable who issued this? Assuming this to be a duly issued measure by the operations of the inspector, do you go so far as to say that the issuing of this inaccurate measure by the inspector subjected him to penalties under the Act?

Mr. Poland: Section 42 appears to deal with this:—"If an inspector under this Act stamps a weight or measure in contravention of any provision of this Act, or without duly verifying the same by comparison with a local standard, or is guilty of a breach of duty imposed on him by this Act, or otherwise misconducts himself in the execution of his office, he shall be liable to a fine not exceeding £10 for each offence."

The Assistant Judge: Do you say that in this case he has been guilty of one or other of the offences specified by that 49th section.

Mr. Poland: I think so, my lord.

The Assistant Judge: You think he has?

Mr. Poland: I think he has.

The Assistant Judge: Then this gentleman has been so unfortunate as to fall into the hands of an inspector who has neglected his duty, and in contravention thereof issued a false measure.

Mr. Poland: There might be great difficulty in proving whether the measure was in the same state as when it came from the hands of the inspector. The Act deals with the case as it exists. It is found in a trader's shop, and the duty is thrown upon him of seeing that it is correct. The penalty may be, as I have said, 1*d.* or £10.

The Assistant Judge: Behind all this there remains the question whether you can find a man guilty of an infringement of an Act of Parliament, and subjecting himself to a penalty, unless you show he has the *mens rea* at the time.

Mr. Poland: I should submit it is clear in this Act that it is a breach of duty; it is not *mens rea*.

The Assistant Judge: I cannot see where his breach of duty was if he purchased a measure bearing the stamp of the inspector, which the statute says is to be a valid measure throughout the whole kingdom. I want to know what duty he has broken. I have not heard one word in this case to show that the appellant, Mr. Whittle, has failed in any duty whatever.

Mr. Poland: I do not want to argue it over again. The section is clear, it is found in his possession.

Mr. Besley: That does not prove the *mens rea*.

Mr. Poland: There is nothing in the Act about *mens rea*.

Mr. Besley: The Courts say you are not to make a man a criminal without it.

The Assistant Judge: Then there are the words, "false or unjust." They are words we may have a great difference of opinion upon. You may say "false" means merely inaccurate, not correct. Mr. Besley may contend that the word "false" is something more than inaccurate, otherwise the statute would have said inaccurate; that it means false with the sense of fraudulent.

Mr. Poland: I should have said, my lord, that false means untrue. It does not say knowingly false.

The Assistant Judge: "False or unjust" are the words in this statute. It is true Mr. Poland may say that the word "false" is to be construed as if it were "inaccurate," "not correct."

Mr. Poland: Yes.

The Assistant Judge: Mr. Besley, by the word "unjust" being used, would contend that "false" means false in the sense of fraudulent, not merely inaccurate. And how can it be deemed false in that sense? How can this gentleman be supposed to have regarded it as false, when he bought it with the official stamp of the inspector upon it?

Mr. Poland, That would be practically repealing the section altogether. It is the same for everybody.

The Assistant Judge: Well, we must proceed.

Mr. Peter Harland McIntyre sworn. Examined by Mr. Mead.

You are a manufacturer of graduated glass measures?—Yes.

You live at 30, Kirby Street, Hatton Garden; you are a medical glass engraver?—Yes.

You work for numerous firms of druggists' sundrymen in the metropolis?—London and the Provinces.

Including Hanbury and Son, Sanger and Son, and less firms?—Some of the best firms.

Do you have to mark similar measures to these?—Yes; precisely the same class of measures as these.

Conical and cylindrical?—Yes, precisely.

How do you mark these, by what process do you measure them?—The measure is put on a level board; we have a little pipette when measuring these glass things, which shows 5 minims fluid is put in the measure, and a solution of gum and vermilion.

The Assistant Judge: What is the object of this evidence? You are calling one manufacturer to show how he manufactures.

Mr. Poland: My friend cross-examined Dr. Blyth as to whether it was possible to make these accurate. I am going to show that with ordinary common care in the trade this is not a defect that cannot be remedied.

The Assistant Judge: What is the use of the official mark if it is to have no effect whatever? Why should the Act have prescribed official marks if traders cannot rely on them?

Mr. Poland: If a local authority appoints an incompetent inspector, the public are not to suffer by that.

The Assistant Judge: Then let there be inspection of all these things, and if they are used after that time, let the user be subject to penalties.

Mr. Poland: My lord, this evidence is for the purpose of showing that there is no practical difficulty in marking conical and cylindrical glasses of that description.

The Assistant Judge: Accurately to the standard?

Mr. Poland: By the pipette, within of course, as you will hear, a very slight deviation from real accuracy.

Examination continued.

Mr. Mead: Within what do you say it is possible to mark them?—A one-drachm and all measures like that, with proper care, you ought to mark it practically correct. Occasionally an error might creep in, say half a minim, but as a rule I should say it was practicable to mark correctly.

To half a minim?—In a drachm.

You would mark a conical one in the same way?—Of course a little more care would have to be used in the conical, because the lines come closer to together, the sight line would be a little more difficult to distinguish. You adjust that, however, in every case. They could be much better graduated than these, because with the naked eye you can see these are inaccurate, being a taper measure the 15 ought to stand closer to the 20, instead of that it stands nearer the 10, showing an interval of about 3; then the top of the line shows an interval of about 7.

As you progress towards the top the intervals ought to be less, because it is wider at the top, and allows more volume between each?—Yes, exactly so.

Have you made any difference since the Act has been passed in your mode of marking?—The only difference we make is this. Before the Act passed, the few next the bottom we used to measure, up to the second line, and then to guess the intermediate lines all the way up. If we were marking a 1-drachm tall measure we should put in 5 drops, then 5 more would make 10, then drop in 10 more and guess the 15 line; but since the Act came in, for tested measures each one has to be measured.

Mr. Poland: Do you charge more?—A little.

Cross-examined by Mr. Besley.

Where is the glass factory where the glass measures are made for you?—Some in Yorkshire; some in Birmingham; some in Stourbridge.

You are not the maker of the glass?—We do all the work that there is on it; there is no firm that is the actual maker of the glass.

You buy your glass vessels?—Yes.

Some from the York Glass Company?—No; we do not do with the York Glass Company.

You mark them after they come to you?—Yes.

Are you provided with a pipette?—Here?

Are you when you mark them?—Everything is measured with a pipette.

Not by weight at all, by volume only?—Yes.

Have you ever compared your pipette with the standard?—We have only compared it thus far, that we know the measures we send out pass the standard.

The inspector passes them?—Different inspectors, not one inspector only; I am speaking of various inspectors in London and the provinces as well.

That is the sole knowledge you have about the accuracy of your marking?—Decidedly.

Mr. Poland: The value of this evidence, my lord, is in not merely selecting one witness. We have three or four, but it will only be a word or two from each.

Mr. Thomas Tucker, sworn, examined by Mr. Mead.

You are a glass engraver?—I am.

And you supply different firms of druggists' sundrymen with glass apparatus and measures?—They send me the glass and I graduate it.

Is there any difficulty in accurately marking measures of that sort?—None whatever, that I see.

You measure each graduation, I suppose, with a pipette?—I do.

The Assistant Judge: There is no difficulty in accurately marking apothecaries' measures of this kind?—No.

Mr. Mead: Within what proportion of a minim?—I may endorse the previous witness's opinion.

The Assistant Judge: According to the pipettes of the Board of Trade.

Mr. Besley: He does not use them, I suppose.

Mr. Mead: You use pipettes?—Yes.

Mr. Besley: But not issued by the Board of Trade.

Mr. Mead: Within what proportion of a minim can you mark?—I should say they could be done, as the previous witness has stated within about ½ a minim on the 60.

Cross-examined by Mr. Besley.

Half a minim on the 60?—I should think so.

You do not pretend to say that they are absolutely accurate?—Well, they pass the standard of inspectors.

The inspector after you have graduated them—he marks them?—Yes.

That is your test of accuracy, that the inspector, coming after you, marks what you have graduated?—Just so; we presume they are correct after they pass through his hands.

You presume they are correct; that is why you say it is so easy?—Yes.

How do you mark them, with a rotatory wheel?—We graduate them with a pipette, and mark them with a pen, with whitening and gum water, the consistency of ink.

Do you put a transparent covering to the glass?—No; I do not use that. I do not understand that at all.

Have you ever had an inspector at your place when you have been marking your graduations?—No.

Re-examined by Mr. Poland.

Do those appear to have been carefully done?—No; I should say this one, No. 1, is very carelessly done.

A Magistrate: Does the Government inspector make any charge for marking?—Yes.

The Assistant Judge: We must take the facts.

Mr. Besley: I shall object to his opinion about the marking, after we have had evidence of the actual facts.

Mr. Frederick France, sworn, examined by Mr. Poland.

You live at 13, Red Lion Street, Clerkenwell; are you a glass engraver?—Yes.

And have been so for more than forty years?—Yes.

Have you been accustomed to mark measures for druggists?—Yes; and all experimental purposes.

Just look at those conical and cylindrical glasses. Can you mark glasses of that description accurately or not?—Positively accurately.

In what way do you mark them?—By pipette or by weight, according as might be requisite.

The Assistant Judge: This is a novel kind of evidence. It is evidence for the purpose of satisfying the Court that the defendant is fined for not doing that which is possible. Assuming that the argument on the other side will be that the party is fined for not doing that which is impossible to be done, you are calling witnesses for the purpose of showing that this gentleman is punished for not having done that which is possible.

Mr. Poland: That it is within the Act.

The Assistant Judge: I never heard such evidence in a court of justice.

Mr. Poland: That it is not a matter extremely difficult to be done, but in the ordinary exigencies of trade it can be done with reasonable care.

The Assistant Judge: It presupposes that the Court will hesitate to convict this man lest it should be convicting him for not doing that which is physically impossible. That is what is amounts to. You are calling witnesses into the box to show that accurate measures can be made, and that this gentleman ought not to have escaped punishment because it is impossible to make accurate measures; because they say, we can make accurate measures. I never heard evidence of that kind.

Mr. Poland: No objection was raised to it. It was made evidence by my friend's cross-examination.

Mr. Besley: I do not object, my lord.

Mr. Poland: I understood from my friend's cross-examination of Dr. Blyth that he contended it was next to an impossibility.

The Assistant Judge: You anticipate the defence.

Mr. Poland: It was raised by the cross-examination of Dr. Blyth. This is the last witness, I am happy to say.

You say these glasses can be marked either by the pipette, or by weight, according as they are required?—

Yes; and I may say almost positively correct; in fact by weight, positively.

By weight they could be made positively correct?—I make standards of all classes for medical men.

By the pipette, accurate within what?—Within the fraction of a grain or a drop.

Do you make the standards for the Board of Trade?—Not direct for the Board of Trade; but I believe most of the standards of the inspectors which are used, both in town and country, were my making.

Cross-examined by Mr. Besley.

You mark pipettes?—I mean the standards they have to pass.

You mark pipettes?—Yes.

You do not make the glass?—No.

You disagree with the evidence of the two previous gentlemen who said that you could not do it within ½ minim of 60?—No; I do not disagree.

You have sworn you could do it positively correct?—Within a fraction.

Within what; what do you call a fraction?—A tenth of a grain, or something as minute as that.

Within a minim on 60 do you mean?—Oh, yes; less than a minim in 60.

Less than ½ a minim; did you hear the last two gentlemen say it was not possible within ½ a minim?

Mr. Poland: No, they said it could be done.

Mr. Besley: Do you say so?—I say I could do it.

What do you weigh with?—With distilled water at the proper temperature.

Do you really mean to say you marked these things by weighing?—Many of them.

What do you charge when you mark by weight?—Various prices.

Do you charge more for marking by weight than by volume?—Certainly.

How much more?—That all depends upon what the article is; whether it is for a standard or for a simple article.

What do you charge when you mark by weight?—I do not think it is a fair question, that I should state my charges.

Mr. Poland: That is the case, my lord.

The Assistant Judge: It is open to you to make admissions, and I take it, knowing your usual practice, you will at once readily admit what is really uncontested. May we take it as admitted by you, that in this case these measures alleged to be inaccurate were issued by the Government inspector and bore his mark?

Mr. Poland: No, my lord; not a Government inspector, a local inspector, appointed, I suppose, by the Corporation of York. At least, I believe my friend will prove that.

The Assistant Judge: A local inspector appointed under the Act?

Mr. Poland: I have no legal knowledge, but I believe my friend has witnesses to prove it. It is very likely it is so.

Mr. Besley: That is your case at present?

Mr. Poland: Yes.

The Assistant Judge: Before you address us, we should like you to give us evidence of that, Mr. Besley.

Mr. Besley: I will call the man himself.

The Assistant Judge: Confine your evidence simply to that point.

Mr. Besley: Yes, my lord.

Mr Thomas Calvert sworn. Examined by Mr. Besley.

You live at York?—I do.

Have you for many years been inspector of weights and measures for the city of York?—Yes.

How many years?—Forty.

The Assistant Judge: Are you reappointed every year. Have you been appointed under the Act of 1878?—Yes.

You are appointed annually?—No, my lord.

You have been appointed under this Act, however?—Yes.

Mr. Besley: Are those four measures before you, measures which you have first tested and then marked?

(The witness examined them).

The Assistant Judge: Do they bear your marks to begin with?—They do.

It is called a stamp?—Yes, my lord.

Those four measures bear your stamp, each of them?—Each of them.

Mr. Besley: Before you put on your mark, did you test them in the ordinary way?—I did.

By the pipette, the Board of Trade Standard?—By the pipette, the Board of Trade standard.

Was that according to each graduation?—It was.

When you find any of the glasses manufactured by the York Glass Company, Limited, in any way inaccurate, do you reject them?—I do.

How do you reject them?—I put a little scratch on the line that I find fault with, and put the measure away.

When you find that the measures will not pass, you put your diamond through a portion of the mark, and throw it aside?—Certainly.

And do not mark it?—Certainly not.

You take every care you can, and as you think properly?—I do.

Cross-examined by Mr. Poland.

How long did you say you have been inspector of weights and measures?—I was first appointed in January, 1841.

You have been inspector to the corporation of York of weights and measures since January, 1841?—Yes.

When this Act passed you remained on, did you?—No; there have been two or three Acts of Parliament since that time. There were reappointments.

You have been reappointed?—Yes.

You were reappointed under this Act?—Yes.

When did you first test a measure of that kind? Just hold up a conical one.—After I received the copy of the Board of Trade standard measures, I believe in June.

June in the year before last?—June, 1880.

The first time you ever tested a glass of that kind was in June last, is that so?—Yes.

You first began to test these delicate glass measures in June last year, is that so?—Yes.

Who instructed you how to test them?—I do not believe there was any instruction to any inspector. I got none.

Did you get a spirit level to take care they were standing perfectly level?—I did.

What else did you do?—I got a block and levelled it, and put these on it.

Then what did you do?—Then I took a pipette.

And tried it with the eye?—Yes.

What water?—With—not distilled water; it stood at 62° F.

You find it rather difficult, do you not, with your previous experience to mark those conical measures?—I have not to mark them.

You only check them?—I compare the measure, and if I find it correct, I put the mark on that is on the top. I have nothing to do with graduating the marks.

The Glass Company do that themselves?—They do.

You check them?—Yes.

Have you marked them "York:" that is put on by the Company is it not?—Partly so.

Now tell me what is your fee for marking for the York Glass Company; how much each?—The fee I receive on the part of the corporation.

What do the Glass Company pay?

Mr. Besley: Is that in issue?—I was stopped when I was asking a previous witness.

The Assistant Judge: Go on, Mr. Poland.

Mr. Poland: What fee does the company pay?—They pay 1s. a dozen.

You have to test them, and you get 1s. a dozen, and you account for it to the corporation. That is so, is it?—Yes.

The Assistant Judge: Here is a measurement required to be performed with the most scrupulous accuracy, with the assistance of the finest instruments, and here is the public officer, the inspector, charging a 1*d.* each. If the public is to be protected against the possibility of error in instruments of this kind, do let the machinery under which they are issued to the public be known; the nature of the machinery and how the testing proceeds, and who it is tests them.

Mr. Poland: Do you know that there have been a good many complaints from the Board of Trade about the York standards?—No.

Have you not heard any complaints?—No.

About the York testing; that the things tested at York have been found from time to time to be incorrect?—No.

Have you any assistant?—No; I do all this myself.

The Assistant Judge: This does not touch the question in our minds, for which we required to hear evidence before calling on Mr. Besley.

Mr. Poland: I think it is very useful evidence to to show that it was never intended that glasses tested in this way at York should be considered absolutely correct.

The Assistant Judge: I do not think it was ever intended to consider it should be absolutely correct, because an ambulatory inspector is appointed to go about inspecting things. If after condemnation they are used, then that is a very different state of things.

Mr. Poland: Tell me, on that conical one, what part of the mark you have put on?—I cannot show you from here. (The witness walked across the Court and pointed it out to Mr. Poland.)

I cannot see it by this light. Just describe it, Mr. Calvert. Is it to make the R. perfect, the V.R.?—It is so.

How do you know that is your mark. Has it any distinguishing mark?—There are other marks on the measure that I know.

How can you tell, anybody could do that?

The Assistant Judge: Are you sure those are your marks or not?—I am sure they are my marks.

Mr. Poland: Just attend, Mr. Calvert. The YK., you know, is on it, and everything except a little piece.

Mr. Besley: And two little strokes.

Mr. Poland: Anybody could do that?—Anybody could put a scratched mark on glass, undoubtedly.

It is the completion of the V.R., these two little marks, and a little bit of the R. Now look at the conical one?—This is a conical one.

Now look at the cylindrical one, what is the mark there?—That is the same as the one you have in your hand.

That little bit is like that?—Yes.

Two little touches?—Yes, two scratches.

That is the way you do it?—Yes.

How many of these do you test a week for the glass company?—Three hundred to four hundred.

Sometimes more, do you?—Yes.

Do you ever reject any?—Yes.

Very few, I suppose?—A good many.

Re-examined by Mr. Besley.

Have you any doubt at all that they are glasses you marked yourself?—No, not at all.

Mr. Poland: He says when he rejects a measure he puts a dash against it.

Mr. Besley: He says he marks it out with a diamond.

Mr. Poland: Will you allow me one other question. When you reject a measure, what do you do with it to prevent it being used or sold?—I put a mark across it with a little scratcher I have, across the line that I find fault with.

The Assistant Judge: When it is condemned you do not issue it?—Certainly not, my lord.

Mr. Poland: You do not break it?—Many times it is broken. I do not break it, but they are taken away and broken.

You give it back to the company?—I put them in a basket.

Are you sure those are not rejected; is there no mark there?—Certainly not.

The Assistant Judge: Do you put your stamp on a rejected glass?—Certainly not.

Did you explain that you examined it for the purpose of seeing whether it had been rejected or not before you put your stamp upon it?—I do, my lord. I compare it with water at every graduation.

Mr. Poland: Pardon me, he has not put any stamp upon it.

Mr. Besley: Stamping is engraving by the Act.

Mr. Poland: The whole thing is made complete by the York Glass Company?—The V.R. is substantially completed, and he says there is some little mark he puts on.

Mr. Besley: He finishes the R. in the V.R.

Mr. Poland: Who can tell it is his finishing?

The Assistant Judge: That is a question of evidence. It is for the Bench to consider whether they are satisfied that he did put his mark. It is easy for you to argue that it is impossible for him to say whether he did or not, but we have his evidence that he did.

Mr. Besley: I will give further evidence on that point.

Mr. Poland: It seems to me a most extraordinary way of a public inspector stamping.

Mr. Besley: Why do you not proceed against him?

The Witness: You see the V.R. YK.; it is the mark between.

The Assistant Judge: Here is the V, the thin stroke of the V, and then the thin stroke with the R?—The right hand stroke of the V is the first stroke; the R is completed, and he says it is the lower stroke of the R? No, my lord, it is the mark across the centre of the R. that I put on.

Mr. Besley: The words of the Act are, "In such manner as to be so far as practicable indelible."

The Assistant Judge: That is clear on this one; now hand the others.

Mr. Poland: It is not a distinctive mark.

Mr. Besley: It does not say so.

The Assistant Judge: There is no particular mark described. This gentleman has used this way of marking a standard, which may be a very imperfect way; but for this purpose it is his mark.

Mr. Poland: It is a mark like his.

The Assistant Judge: He says it is his. If it is his it is of course like it: it is the thing itself. Of course you can argue on it.

Mr. Besley: I have another witness on this point.

Mr. Hutchinson sworn. Examined by Mr. Besley.

Are you the managing director of the York Glass Company, Limited?—I was the managing director at the time this action was commenced, and although retiring from the business I have been requested to represent the company in that capacity.

The Assistant Judge: What company?—The York Glass Company, Limited.

Mr. Besley: Are the measures made for the use of druggists made in a part of the works called the blowing house?—They are.

They are then taken to the cutting and engraving shop?—They are.

And they are there graduated by comparison with the Government standards with pipettes that are verified with the Government standards?—The pipettes are verified with the Government standards.

You use those pipettes in the graduation?—In the graduation.

How long has this process been done at the York Company's works?

The Assistant Judge: I asked you to satisfy the Court by proof, that these measures had been stamped, and bear, therefore, the stamp of the inspector at York, from whom they were said to come.

Mr. Besley: Yes, my lord. Are there any of them manufactured and stamped, by any other inspector?—There are a few have gone to be inspected and to be stamped elsewhere. There are none issued in any way as coming from us, except what have passed through an inspector's hand.

With regard to the York stamp, is it a V.R. combined letter?—V.R. YK.

Is that V.R. the adopted stamp of the corporation?—The York city corporation refused entirely any crown stamp, because they said it was very easily imitated. They sent the inspector and myself both back.

The Assistant Judge: What stamp did they send back?—One of the suggestions was that it should be a crown and number scratched upon it.

Mr. Besley: Did the York corporation adopt the V.R. letters combined as their mark?—Yes; they adopted it for this reason, that it is their mark on everything.

Are you able to say that these four glasses are manufactured by the York Company?—I have not had an opportunity of looking at them (inspecting them). I have no doubt of it.

The Assistant Judge: Perhaps you can also tell whether they bear the stamp, and this is the more substantial point on this occasion, of the inspector of York?—They all bear the York city corporation stamp, and they are all the manufacture of the York Glass Company.

Mr. Besley: The person who graduates previous to the testing by the inspector, is he a person of experience?—Yes, he is; he has been at it all his life.

How long has he been at it?—Twelve years, I believe.

Long before the Board of Trade pipettes were sent out?—Yes.

Is this one of your manufacture showing the V.R. before the inspector has tested it and marked it?—Yes; that is the part the engraver puts on it at the works, the finishing stroke is put by the inspector before passing it for sale.

Under any circumstances do you ever fabricate glass vessels with the mark of the inspector?—Never.

Such a thing never occurs?—Never, once.

Have you ever used those that are discarded by the inspector?—If it is only a slight error, and the line can be polished out until you cannot see that it has been taken out and a new line can be put in at the correct point, it might be presented again for inspection.

Would it be sent to the inspector again to be passed?—Certainly.

Those that could not be so corrected by the line being rubbed out, would they be broken?—Destroyed at once.

Whatever was marked as incorrect and was corrected would still come before the inspector again?—Oh, yes; he never places the finishing touch until he has passed it.

Is there a great difficulty—a practical difficulty in the graduation of measures to be absolutely correct?—I believe it is utterly impossible to have them absolutely and scientifically correct by that method of marking.

You employ the best talent you can for the graduation and obey the law by letting the inspector mark?—We employ the best talent we believe existing in this country.

Cross-examined by Mr. Poland.

You are not in the service of the York Glass Company now?—I am not.

You only come to represent them?—I represent them.

Does this Mr. Calvert, the inspector, reject many of your glasses?—Comparatively few; of course, a considerable number, considering the thousands he has to examine.

How many persons have you to test them?—He tests them all.

On your own premises?—One man.

Mr. Besley: To graduate.

Mr. Poland: Have you only one man who graduates?—We have one on the premises graduating, and another man was trained on the premises, who works in the city, and has done some during the last six months.

You make a large number of them?—A large number.

Do I understand you to say that there is no difficulty in properly marking these cylinders and the conical ones so as to be within ·5 of a minim correct?—I think if a man was set to graduate one which was to come for scientific testing he possibly might do it with that nicety; but I think it is almost more than ought to be expected of him.

That might be; but a competent graduator, a competent man, is there any real difficulty in his graduating these so as to be correct within ·5 of a minim?—Yes there is.

What difficulty?—There is a difficulty.

What difficulty?—When the water is placed in it he has two upright pieces of iron, about the thickness of a penholder; he also has a pen which he dips into some white substance. He holds that by these two pieces of upright iron, to steady him, and by the eye he has to gauge the bottom portion of the meniscus; he has to place the pen upon that; he has then to move his measure round on the wood to draw that line; he has then to go over that line, in whiting, which must be the thickness which the pen point makes it; he has then to go and by dexterity of manipulation to place that line directly on to a wheel which is charged with oil and emery; the point of the wheel must be charged with oil and emery or it would crack the measure; therefore, I do not think it is possible that he can do it with positive accuracy; he has to go as nearly in the line as he possibly can.

Within ·5 or ·6 of a minim. Is there any real difficulty, if a man takes proper time over it and gives proper attention, in making both those measures correct within ·5 of a minim? Will you pledge yourself to that, Mr. Hutchinson? Do you mean to say a competent marker cannot mark these, taking proper care and attention, within ·5 of a minim?—I do not exactly understand what you allow as proper time to do it.

Why, reasonable time. There is no practical difficulty. It is a mere question of time and skill, is it not?—I should not like to bind a skilful man to do it.

But a skilful man would do it?—I will not say that he would.

What is the price of these things?—I do not remember the list price; something like 1*s.* each.

If they were made 1*s.* 6*d.* each, he could afford to give more care and attention?—It does not matter what the attention is, you cannot guarantee accuracy in those.

Have you been in correspondence with the Board of Trade about your marking?—No; it was the city, I think, had a little correspondence with the Board, not ourselves.

About complaints made that the York marking was incorrect?—Not that I am aware of.

What was the correspondence?—It has never been questioned anywhere but here.

Never questioned anywhere?—Not to my knowledge.

Not that the York marking has been found on various occasions incorrect, have you never heard that?—No.

Listen to this: "I have to add that complaints have already been made concerning the York standard, and the Board of Trade have for some time been in communication with the Corporation of York on the subject."

Mr. Besley: The "standard."

The Assistant Judge: The standard referred to in that letter would be the deposited standard.

Mr. Besley: The local standard deposited it may be with the Corporation.

Mr. Poland: The pipette by which the things were tested is supplied to the inspector, the standard by which the York inspector acted.

The Assistant Judge: That is, of course, if he had incorrect standards, those standards were incorrect and he would mark incorrectly.

Mr. Poland: And their price is 1*s.* each?—I should not like to say exactly.

The Assistant Judge: Mr. Poland, we do not think it necessary in this case to call on Mr. Besley to open his defence on the question of these measures, comparing them with the real Government standard, because we were of opinion that if he could satisfy us that they were issued by the inspector, and bore the inspector's stamp, then that we should be in his favour.

Mr. Poland: Then, my lord, as my friend has called witnesses, I am entitled to say a word on this evidence.

The Assistant Judge: Yes, I know you are, but you understand what the question is before us.

Mr. Poland: Yes, my lord, I quite appreciate it.

The Assistant Judge: We will hear you, Mr. Poland.

Mr. Poland: As I understand, the Court is satisfied that these measures which were seized in the shop of the appellant are, in fact, false and unjust; but, as they bear the mark of the local inspector at York, in point of law the appellant has committed no offence. Now, my lord, I understand that that is the object for which this evidence has been called, that these, in fact, although used in a shop in London, bore the mark of the York inspector, and although they are false—because for the purpose of the argument it must be conceded that they are false and unjust—yet no offence was committed.

The Assistant Judge: You, of course, proceed on the assumption that these are inaccurate measures when they come to be closely tested by the actual Government standard, if there be any such thing as an immutable Government standard.

Mr. Poland: My lord, I contend that although that is so, the offence under this Act of Parliament has been committed. Now, my lord, of course that is a very important question, because they have been seized, and if the conviction is quashed they are not forfeited, they are to be returned; they must be returned to the appellant, and, in point of fact, then the decision will go to this, that however false and unjust the measures are which a man is using in his trade, if they have the mark of a local inspector, competent or incompetent, upon them, no offence has been committed.

The Assistant Judge: Our judgment will not go to that; on the contrary, we should express our opinion—we should hold otherwise. Therefore, do not assume that that would be the effect of our judgment. It would be directly contrary to it. I have expressly drawn attention to the wide difference between the alleged offence in this case of a tradesman *bonâ fide* using an instrument that has been officially used without notice that it was inaccurate, and the use of such instrument after he has received notice from the Government inspector that it is inaccurate.

Mr. Poland: I was dealing with that very case which your lordship put.

The Assistant Judge: No, you said our judgment would be to the effect that it was sufficient if it bore a Government stamp.

Mr. Poland: Sufficient until the man is found using it, that is involved in the proposition that in this case no offence has been committed. Then a person could go on using these measures which are stamped by a local inspector, competent or incompetent, and may go on safely using these without taking any means to test their accuracy; but because they bear the mark of a local inspector there is no other obligation on them, but to see there is that mark upon it, and that they may go on selling coals, potatoes, or any other commodity that there may be—when it is found that a man has been dealing for weeks, months, or years, with these measures so marked.

The Assistant Judge: Suppose it is found that the weight has been chipped, suppose it is found to be otherwise than as it must originally have issued from the inspector who stamped it; that would be a very different state of affairs altogether. I am assuming the particular case before us. We are not saying what our decision would be under a state of facts different from these now before us; we are dealing with glass measures used by apothecaries.

Mr. Poland: You are dealing with all measures, my lord. This case involves the decision as to whether a man can use all measures, whether for coals or potatoes or any other article of merchandise, for the Act of Parliament is the same for apothecaries' measures as for coals and potatoes; and you are asked to construe this Act of Parliament and to say that a man who uses in his business a measure which is false and unjust commits no offence if the measure bears the mark of a local inspector. That is the position; that is the legal decision which you have to pronounce. Given a measure false and unjust, given that it has the mark of a Government inspector, given the fact that it has never been pointed out to him that it is inaccurate, he commits no offence. In law, to say that would be in point of fact almost involving the repeal of this Act of Parliament, because it would be utterly useless if, when the inspector went round to tradespeople, and said, "Your measure is ½ lb. wrong, or your measure is ½ oz. wrong, or your measure is so many drachms wrong," the man turned round and said, "What of that, I have had this measure from York, or from some other county; it has got the mark upon it; what have I to do with the matter?" Now, my lord, the Act of Parliament does not say that a man who uses a measure for trade, who has in his possession for use for trade a measure which bears a local stamp upon it is legal, but it says it is illegal if he uses a measure which is false and unjust, whether it has a local stamp or not upon it. There is not one word in the Act of Parliament upon it to say, "provided and be it enacted that if such measure which is so false and unjust has the stamp of the local inspector upon it he shall commit no offence." The Act does not say that. Why are those words to be imported into this Act of Parliament? This case, assuming that it is to turn on this legal construction, really becomes a very serious matter indeed.

The Assistant Judge: It is.

Mr. Poland: Because the inspector is to go round to the different parts of the parish and seize the measures. But what is the use of his seizing them?

The Assistant Judge: Yet it may be that the Act of Parliament did intend that persons who have purchased their measures from an inspector ——

Mr. Poland: They do not get them from an inspector.

The Assistant Judge: They get them verified and stamped by the inspector. It may be that the Act of Parliament intended that those persons should be entitled in this case to use such measures and to use them legally, and that they were to be legal measures unless found to be inaccurate. We have to look at the 25th section, that is the one on which you ask us to convict the appellant, in conjunction with every other clause in the statute, and we cannot overlook the 45th section. I quite agree that the expression "false or unjust" is one upon which different minds may place different conclusions. Whether it means inaccurate or whether it means false in the sense of fraudulent, may be a very nice question; but we cannot but observe that the Act of Parliament uses that word not in a sense if it should be found inaccurate, or until it may be found inaccurate, but unless it be false it shall be a valid measure—it shall be a legal measure, unless found to be false.

Mr. Poland: Of course, that is the point to be decided. If it is to be a legal measure for all purposes, an inspector has no right to seize it, and all contracts made upon it are not to be void.

The Assistant Judge: Have the goodness to tell me where the chemist is to go and test the measures which he buys with the mark of an authorized inspector. What is he to do? Is there an obligation upon him to buy scientific apparatus to test a measure before he uses it? Is he to have machinery by which he can ascertain whether the Board of Trade will pronounce such a measure to be a just and accurate one?

A Magistrate: Why should the Board insist on having them stamped at all if it is to be no protection to the public?

Mr. Poland: It is to some extent a protection to the public; but that does not get rid of the obligation on a man that when he uses a measure with a stamp upon it of a local inspector he must take his risk. He does not have it tested by the Board of Trade, he does not get it from an inspector of the place where he is carrying on his business, where he is carrying on a trade for his own profit, and I submit the Legislature has thrown upon him the duty of ascertaining that he is dealing with a measure in his trade which is not false or unjust, and the Act of Parliament, as I submit,—I will read it presently—goes beyond that, and it says it may be that you did not know it was false or unjust, but all contracts made upon it are void, and the measure is liable to be forfeited. The case involves this, that contracts made upon these measures are not to be void, that they are not be forfeited. What is the inspector to do? The inspector goes there and finds a man had been for weeks or months using false measures. What is he do? Take possession of them. What then? What is the use of his taking possession of them. They have the stamp of the York inspector upon them. What is he to do with them? Is he to return them, and when they are returned, is the trader to go on using them because one inspector is not evidence against another? There is the York inspector, who says these are accurate, and the metropolitan inspector says they are not. Who is to determine it? According to that, there is one inspector's statement against another, and then in point of fact these unjust inaccurate measures may be used again by this man because they are not found to be illegal. I say the very object of this statute is in terms clear and expressive, and the Legislature has chosen in this case to do as in many others, to make it an offence for a man to have in his possession measures which are false and unjust even although he did not know they were false and unjust, and even although he believed they were not false and unjust.

The Assistant Judge: And even although they may bear the stamp of the inspector.

Mr. Poland: That is conceded; even although they bear the stamp of a gentleman at York, the tester at York. If it is to be all determined on this section I would ask the Court whether, it being conceded that the measures are false or unjust, they say that if stamped by a local inspector he commits no offence. Let me read the words:—"Every person who uses or has in his possession for use for trade," etc., etc. (The learned counsel again read the section.)

A Magistrate: They may become false or unjust by use.

Mr. Besley: Exactly.

Mr. Poland: It is true they may, and notwithstanding the stamp is on them. That clearly would be within the section. How are you to tell? The Act of Parliament does not say "which he shall know to be false or unjust." The Legislature may make this an offence, and I submit it has made this an offence, the penalty, of course, being left to the magistrates, who may say these measures being in fact false or unjust they must be forfeited; but, of course, as you relied on the stamp of a local inspector, we only fine you a nominal fine, one penny or sixpence as the case may be, and as there is no moral turpitude involved in the case, but for the protection of the public the duty is thrown upon you of not using in your trade measures which are false or unjust. I do venture to submit, in this case, that as put by one of the learned magistrates, a measure might have been altered since. It might then bear the stamp of the York inspector, and yet be false or unjust. It would be impossible to ascertain who had altered it; whether it was altered by the wholesale or retail dealer after it had been marked by the inspector or whether it had been altered by the trader himself, and yet you are to say he commits no offence under this Act, although it is a measure altered after it had been used, bearing the stamp, although in fact it was false or unjust. It is like bye laws that are made very often. There is the case I submitted some time ago about the lunatic, where the Legislature says that you commit an offence by receiving lunatics, even although you do not know they are lunatics. And the matter is entirely a question as to the true construction of this Act of Parliament, and I submit the Legislature has carefully taken care not to use any words which render it necessary for the person complaining to prove that the man knew that these things were false or unjust, because otherwise it would have said, "fraudulently use." It does not say fraudulently use, it does not say fraudulently have in his possession, it does not say use a measure which is false or unjust to the knowledge of the trade. It leaves out all those words.

The Assistant Judge: There are all those difficulties which have been pointed out again and again. It is a false weight, and it may be that the use of that word is contra-distinguishable from unjust—it may be false or unjust—it may be that the use of that word thus coupled was intended to signify inaccurate, not false in the sense of fraudulent. It may be so. That is fairly open to argument, that the Legislature intended by the use of the word "false" to mean an inaccurate weight.

Mr. Poland: Does it not mean the same thing?

The Assistant Judge: Incorrect, inaccurate.

Mr. Poland: Clearly.

The Assistant Judge: False or unjust; but if so, then what becomes of the use of the word "unjust?" Unjust would be perfectly useless in that case, because if it were inaccurate it would be sufficient to constitute an offence that the measure was inaccurate. The use of the word "unjust" would be perfectly unnecessary. Still the words used are not "false and unjust" but "false or unjust."

Mr. Poland: But then you have this Act of Parliament passed for the purpose of having certain weights and measures. All commodities are to be sold by these standard weights and by these standard measures, and if you use a weight or a measure which is not accurate accordingly to the standards created by this Act, then that is a false weight or measure. It in an inaccurate weight or measure. If it is less than the proper quantity it is an unjust weight or measure; but in any event, even if you give more than the proper quantity, it is liable then to be abused, and you must have all your weights and measures true and accurate according to scale and according to weight.

The Assistant Judge: You know it is not unusual for learned judges sitting in Westminster Hall to refer to dictionaries. I have known learned judges to refer to dictionaries again and again for the meaning of very common words, and a dictionary has been put into my hands which gives the meaning of the word "false," and it gives it the meaning which, without having such a dictionary, I thought to be the proper meaning to attach to the word, although I do not hesitate to say that it is arguable—"False: untrue, not faithful, hypocritical."

Mr. Poland: Not true, not faithful.

The Assistant Judge: A measure issued by a Government inspector.

Mr. Poland: If you are speaking of a false coin, you speak of false as meaning counterfeit coin, and false in this sense means not true.

The Assistant Judge: You say it is inaccurate. You have repeated your argument, pardon me for saying so, twenty times. You say it means inaccurate.

Mr. Poland: I say it means inaccurate.

The Assistant Judge: But, I think, although you may say so, it is arguable, whether that does not mean something more, especially coupled with the words, "or unjust," because, if it was the intention of the Legislature to merely condemn a person for having an inaccurate weight, it need not have gone on and have said an unjust one. But, however, it is the contrary construction which we are disposed to hold, having regard to the clause in the Act of Parliament, and that it imposes a penalty on the subject, and we ought certainly not to give it a wider interpretation than the Act actually compels us to give.

Mr. Poland: With great respect, "false or unjust" must be construed according to the subject-matter, and where you have an Act establishing weights and measures, "false" must be used in contradistinction to true. Therefore you have a weight which is accurate according to certain standards, and you have weights which are false or unjust.

The Assistant Judge: What is the converse of the word "false" used in the standard? Is there any word where they have to express accuracy or correctness?

Mr. Poland: Yes, "true weights and measures."

The Assistant Judge: True according to what? Then you have the two words "true" and "false."

Mr. Poland: Yes, true weights and measures according to the standards established.

Mr. Besley: I do not find the word "true" in the standard.

Mr. Poland: False in the case of a coin, is counterfeit; in this case they established weights and measures of a particular standard, and then any weight or measure which is not of that standard is false; and in addition to being false it may be unjust. I do submit that this is a matter which should be left to be decided by the Court.

The Assistant Judge: If it is false it must be unjust.

Mr. Poland: It does not necessarily follow.

The Assistant Judge: Can a true measure be unjust?

Mr. Poland: No, it may be using a measure that is larger than the true measure; that would be liable to abuse. You may not sell things by other than by the true measure. You must not say, Oh, well, I did not sell you that as a bushel; that is not intended as a bushel measure; but then the inspector says, Oh, I beg your pardon, under this Act of Parliament you must have all the divisions of bushels, sacks and half bushels. You must not try and get rid of the Act of Parliament by saying that that is not an imperial bushel, because it is not a bushel, or any aliquot part of a bushel; therefore it is false even if the man were to prove that he was in the habit of using that as a bushel when it was in fact more than a bushel. That is why "false" is put in, because it is to be for all purposes accurate in every sense. I submit this case ought not to be stopped on that point, but that assuming here for the purpose of argument that these weights and measures were false and unjust (because that is assumed for the purpose of this argument), that it is a case which ought to be reserved for the opinion of the Supreme Court if the Court should be against me on that contention which I have addressed to it as to the true meaning of this Act of Parliament.

The Assistant Judge: There is a question which I should wish to ask Mr. Tibbey, so that there may be no mistake about it. I think he has answered it.

Mr. Poland: According to section 44 measures are to be marked with a stamp of verification, in such a manner as best to prevent fraud.

The Assistant Judge: There is no particular method prescribed, it seems.

Mr. Tibbey recalled.

The Assistant Judge: I understood you to say that you tested these in the shop?—Yes.

And you took them away?—Yes.

They did not remain there after in the possession of the defendant, and were not used afterwards by him in his trade?—No.

The Assistant Judge: That is what I wanted to be quite clear about.

The Assistant Judge (after consulting with the magistrates): No doubt an important and somewhat difficult question is raised in this case; but after having heard all the arguments of the learned counsel, on due consideration we are of opinion that this conviction should be quashed, there being, in our opinion, no proof that the appellant had in his possession for use in his trade a false or unjust measure within the meaning of the 25th clause in the Act of Parliament. The measures in question, whether they be accurate according to the imperial standard or not, bear the stamp of the Government inspector by whom they were issued as accurate, and there is no proof that they were known by the appellant to be inaccurate, or that they were known to be so at any time while he was in possession of them. For these reasons we think the conviction must be quashed.

Mr. Poland: Will the Court grant a case on that point?

The Assistant Judge: Yes; I will give you the precise words of our decision, because you see we put it somewhat on different grounds to those which you surmised we should base it upon.

Mr. Poland: Only one point of law arises that has been suggested.

The Assistant Judge: We have carefully guarded ourselves from any expression of what our opinion might be after hearing the evidence in contradiction as to the accuracy; in case it be accurate according to the imperial standard or not. Even if we did grant a case and the Court above thought we should inquire into that, and even supposing that the appellant did not know that it was inaccurate, that he would be liable to a penalty, it would be for the Court then to send the case back for further inquiry. At present I do not think the time of the Court ought to be occupied with it. That will be distinctly understood.

Mr. Poland: Quite so; my lord. Then the Court refuses a case.

The Assistant Judge: No, I am quite willing to grant a case; but I point out that, as our judgment is based on the construction of that section, should the Court above think that, even although the defendant may not have known that this was an inaccurate measure, still he is liable; then they would send the case back to us to find whether the measure was accurate or not. But according to our view of the statute we think we ought not to be troubled with that question.

Mr. Poland: Then it will have to come back to the Court.

The Assistant Judge: Then, as I said before, let it come back; but if the Court should agree with us, it will not come back.

Mr. Poland: But will the High Court deal with the question until the whole appeal is disposed of?

The Assistant Judge: Certainly, on that finding.

Mr. Poland: I am quite content.

Mr. Besley: Will it be convenient, my lord, at the same time to put in the case that one point about the power of amendment?

The Assistant Judge: I should not grant you a case on whether there is a power of amendment. I have no doubt whatever of the power. I shall not grant you any case on that.

Mr. Besley: I did not know whether when you were stating the one you would state the other.

The Assistant Judge: No, the conviction is before us, as amended on the application of Mr. Poland, and we grant the case. Our judgment will sufficiently express that it proceeds on the two questions which you can clearly see. On the meaning of the word "false," and on the further fact that this was a measure issued by an inspector and that it was not found to be false or known to the appellant to be false or ever used by him after he had knowledge that it was false.

Mr. Besley: I do not know whether it is necessary for me to ask the Court to make any order for costs.

Mr. Poland: It is not usual to give costs against justices.

Mr. Besley: Against Mr. Tibbey.

The Assistant Judge: No.

Mr. Besley: There is power under the Act.

The Assistant Judge: I am quite sure the magistrates would not give it.

Mr. Besley: Would you reserve the question?

The Assistant Judge: No; as far as this inquiry to-day is concerned, we do not not give costs, but we quash the conviction. If Mr. Poland desires a case for the consideration of the Court, he shall have the case, and the case will sufficiently express the grounds of our judgment.

Mr. Poland: Then, my lord, about the measures. What is to be done with them?

The Assistant Judge: If you would allow me to suggest, gentlemen, I think that the four measures should remain here locked up until the case is disposed of.

Mr. Poland: Very well, my lord.

PROSECUTION UNDER THE PHARMACY ACT.

At the Liverpool County Court, on Tuesday, Feb. 1, before Mr. J. F. Collier, judge, a suit was brought by the Council of the Pharmaceutical Society against Mr. Alfred James Wright, for the recovery of a penalty of £5, under the Pharmacy Act, for having used the title of druggist, not being registered.

Mr. Hull (Messrs. Stone, Fletcher and Hull) appeared in support of the claim, and Mr. Wills Harper for the defence.

A witness, named Dominic James Lynch, was called and said that on the 14th of last month he purchased a packet of Epsom salts, which he produced, at a shop in South Castle Street, over which was a sign with the names "Knowles and Wright, Shipping and Export Druggists." It was also proved that the defendant was not registered under the Act.

For the defence, Mr. Wills Harper explained that the defendant had no interest as a partner in the business, which was acquired from him by Mr. Knowles at the end of 1879. He had since that time been merely an assistant at the shop, receiving a salary and commission, but the sign remained unaltered.

The defendant having himself proved these facts, his honour said he did not see how, under the circumstances, the defendant could escape the penalty, because he clearly used his name as a druggist. He therefore gave judgment for the amount claimed with costs.—*Liverpool Daily Courier.*

POISONING BY MORPHIA LOZENGES.

An inquest has been held by the Manchester city coroner, Mr. E. Herford, on the body of Thomas Kirwin, aged three years and ten months, the son of a labourer.

The evidence showed that on Sunday afternoon the deceased was sent on an errand, and on returning said he felt very sick, and shortly afterwards he become unconscious. As he remained in that condition, medical aid was called in, and an emetic having been administered without effect, the stomach-pump was applied, and a quantity of fluid drawn from the stomach. The child, however, died about 10 o'clock on Sunday night. The parents of the child afterwards heard that he, with other children, had taken some lozenges which were supposed to be poisonous, and in the house was found a portion of a bottle, out of which the children admitted that they had taken something.

Mr. Robert Gibson, a "manufacturer of vermin killer, medicated lozenges, and also of wholesome sweetmeats," whose place of business is in Erskine Street, Hulme, was called before the coroner, and stated that between the closing of the premises on Saturday and opening on Monday a window was broken in the establishment, and a bottle abstracted, which contained lozenges, an ingredient of which was morphia. These lozenges had been prepared in accordance with the order of a medical man in China, through a London house, and witness imagined they were to be used for the same purpose as opium, but they had not the disagreeable taste of that drug.

In answer to the coroner he said that the medicated lozenges and vermin killer were manufactured in a separate portion of the premises from that in which the wholesome sweetmeats were prepared. He also stated that the window from which the lozenges were abstracted was previously cracked, and there was now a hole in it, but the window was at such a height from the ground that a child could not reach it.

Dr. Henry Worswick, of Chorlton Road, said he, in conjunction with Dr. Fairclough, had made a *post-mortem* examination of the body, and had no doubt, from the appearance and the evidence, that death was caused by morphia. An eighth part of one of the lozenges produced would cause an adult to sleep six or eight hours, and a child of the age of deceased ought not to have taken more than a twelfth of that quantity.

A verdict of accidental death was returned, and the jury, considering that a window containing poisonous sweetmeats ought to have been properly protected, made a recommendation that in future it should be protected.

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE DRAFT PHARMACY ACT AMENDMENT BILL.

Sir,—In your editorial remarks on Mr. Proctor's letter of the 29th, you say that he (Mr. Proctor) "well-expresses the feeling of disheartenment which must be felt by many on hearing the demand for a monopoly in the sale of all kinds of drugs and pharmaceutical preparations," and a little further on "that legislation in favour of the druggist is not to be looked for or wished for."

To the first quotation I would say, I should be much surprised if this be the case with the "many," and to the second I would ask, what else do we want but this? If I am not greatly mistaken this is the burden of the cry of the chemist.

I can hardly understand such a letter as Mr. Proctor's being written. Such abnegation is altogether too wonderful, and deserves being put "on record" as desired.

As to "national laws being made for individual or class interest," I say it has been done, and will be again and again, and especially should it be in our case, as, having been legislated at, in the shape of compulsory examinations, etc., it is quite time we should be legislated for.

This leads to what ought to be the leading feature in any Pharmacy Amendment Act, viz., that of giving us the total privilege of selling all articles used as medicines, so as to effectually prevent all stores and unqualified persons from dealing with them, and without being a failure—or comparatively so—that the present Act is, and the proposed one would be. Anything short of this will fail to benefit the bulk of the trade much.

Why cannot we have somewhat similar laws and privileges to those they have, not only in France, but in other countries, which bring not only privileges and substantial emoluments, but also such a standing and position, that anyone who knows any of the countries of the continent could not say we enjoy at present?

One word as to the widow question. Aside from any sentimental view of the case, we ought to look on it as a right that a widow should keep on a business with a qualified assistant. Without many exceptional privileges, why should we be subject to very exceptional hardships such as this would be?

It is a fact that we are a trade, not a profession, and why should we be different in this respect from other trades, if the necessary precaution (a qualified assistant) be taken? In many instances it would be preferable to the way many businesses are conducted, where the proprietor, if seen occasionally, has next to nothing to do with the real working of the business, in many cases left to unqualified assistants, whereas in the widow case there would be the guarantee of a qualified person.

The argument that if a widow could keep on a business, then a company could, does not apply, as there is, I might say, a sacred right on the one side, which common sense and English justice would not interfere with, but which would not apply to the other.

These are by far the two chief matters in connection with the proposed Pharmacy Amendment Act. The other matters in comparison with these are of little practical value to the majority of the trade, as I think would be found on inquiry.

Stonehouse, Plymouth. PELHAM C. MAITLAND.

Sir,—One of the most extraordinary clauses in the proposed new Pharmacy Act appears to me that it should be left to about a dozen men to say whether or not it would be advisable to allow a widow to carry on the business of her late husband beyond three years. Why should they wish to assume any such right? Surely the law ought to be the same for all, without the interposition of anyone. The clause altogether is most inhuman, and, I think, based upon a misconception of the laws of political economy. I ask, is it the duty of the State to sanction any Bill which provides for the increase of pauperism? Can anyone doubt but that this will be the case to a more or less extent if the Bill passes?

I am very much afraid intense selfishness is at the bottom of it all, for had the late law appeal been sustained we should have heard nothing at all about it.

One of your correspondents suggests "it is necessary for the safety of the public." Surely he cannot be in earnest. Has he ever known a mistake made in a widow's business that has proved fatal, and carried on by a qualified person? The public good, no doubt, is what is to be looked at, but I fail to see how it can be enhanced any more by a qualified assistant managing a branch business, or one managing a large one where several assistants are kept and where the principal or principals do nothing else but attend to the books, and have their pharmaceutical preparations made by unqualified porters, than by one managing the business of a widow. Another correspondent says "a pharmacist should insure his life so as to provide for his widow by means of her carrying on some other business." He forgets to say what business. Does he mean a coffee shop, or baby linen warehouse? If not, what? And pray why should a man or men dictate to a woman as to what she is best fitted for in obtaining a livelihood? It is the same old, old story, the sacrifice of woman on the altar of Jephtha's God. Does it not occur to your correspondent, a chemist's widow would not have the same social status she has now, if compelled to enter on any such business? If she likes to do so of her own free will, well and good, but do not compel her to do so at the dictation of others, for their own benefit.

If the Council would take other matters into consideration to improve the trade, I think they would be better employed. For instance here is one:—What do all these advertisements mean we see in evening papers so frequently, most of them coming from so called first class houses? Specifics for everything pretty nearly, and some of them backed up by a medical man not a hundred miles from Harley Street? Why should these things be pushed on to the public at exorbitant prices, the advertisers themselves, in most cases, well knowing they are of none, or very little use whatever? I asked one of them a short time since, how his preparation cured a certain complaint, and was answered, "I do not know but it does." I suggested, "You do not know but it pays," which provoked a smile which I think I well understood.

Now if the Council would find some means to put a stop to this polite lying (I call it), I think it would be much better, and do not try to reduce the few simple occupations that are tolerated to women by the overpowering exigencies of modern life. Surely a woman can keep books and take a note of her incomings and outgoings every week, and if she does so she is simply copying a good many of the proprietors of large businesses and branch ones; and to try to get rid of her because co-operative stores take money out of men's pockets (and it is presumed they cannot be put down unless she is) is nothing more or less than a moral and physical sacrifice of her. It will be hardship enough if her assistant makes a fatal mistake, when she will be called upon, most likely, to sell her business to pay for damages. The Council, I hope, will see their way to remove this clause and try some other of getting rid of co-operative stores trading in drugs.

C. M.

Sir,—Having read the Amendment Bill, I do not think it sufficiently stringent. Why not confine the sale and manufacture of chemicals and drugs for human and animal ailments, external and internal, to qualified chemists under the Pharmacy Act, as it will then place grocers and directors of stores under a very simple law: pass their examinations and sell what they like. But chemists must not forget that they dabble frequently very much in other businesses besides their own, so that I propose we pay a tax and place ourselves as an educated body under Government supervision. By doing so, we should not only increase the confidence of the public, but, in my opinion, gain over the medical men to give up dispensing.

As a rule we are, owing, perhaps, to the nature of our business, a jealous and narrow-minded class of men, and it behoves us to give up crying about the injury done us and work together for the common good, and there is not the slightest doubt but what we should succeed in improving our positions wonderfully if we go to Parliament with a clear and concise tale, offering to give as well as take.

I propose that a tax of £20 and £5 yearly be paid respectively by wholesale and retail chemists.

86, *Northgate Street, Gloucester.* E. G. HUGHES.

Sir,—How will the proposed Pharmacy Bill affect the patent medicines which may be in the hands of retailers?

Probably £100,000 worth of "patents" containing poison will be in stock when the Bill becomes law, none of which will be labelled "poison." The makers will not be liable for any sent out before January 1, 1882. What is to be done with the quantity held by retailers?

Surely this point needs consideration.

Another matter that needs reconsideration is the proposal to label the bottle, pot, or box, as well as the outside wrapper.

This is very serious for the retailer, as he cannot possibly know if the bottle is labelled or not. The outside wrapper is all that needs labelling, because the article is sold unbroken, and if the outside of the package is properly labelled, the object of the clause is secured.

I think the proceedings for penalties should be taken only by order of the Pharmaceutical Council, for there are such great difficulties in the matter that most awkward circumstances may occur. For instance, a retailer is convicted of selling an unlabelled article; he pays the penalty and costs, and then proceeds against the manufacturer, who may perhaps produce evidence that the article left his hands long before the Act came into force. The poor retailer has all the costs to pay and gets no redress.

Let the Council prosecute in all cases of non-labelling and let them be compelled to go against the maker. By this means the object in view will be attained without vexatious injustice to the retailers.

17, *High Street, Canterbury.* J. R. COOPER.

Sir,—I am glad Mr. Proctor has raised the tone of discussion going on at present in the Journal, by characterizing certain objections to the amended Pharmacy Act as "unstatesmanlike."

It is not presumptuous for a pharmacist to take a statesmanlike view of pharmaceutical legislation, and it is his interest to do so if he expects his representative in Parliament to support a special Act for his benefit. Taking this view I would advise all to bear in mind two leading principles, which must guide those who frame a Pharmacy Act and those who criticize it.

First.—The greater good or safety of the public, and

Second.—The personal qualification and responsibility of those instrumental in securing that good or safety.

Now, it is obvious Mr. Sandford's view of the "widows' clause" would be destructive to the second principle.

A legal qualification cannot be transmitted with a business, it is a personal matter secured and guaranteed by law; the vicarious management, therefore, of a business, for the benefit of an unqualified owner is clearly against the objects of pharmaceutical legislation and of the real interests of the trade. The solicitude shown by Mr. Sandford for the widow and fatherless is most creditable to his heart; but when feelings of that kind are imported into legislation questions, which are based on hard unbending facts, the issue must be unfavourable. The result of my observations, and perhaps my experience extends farther back than Mr. Sandford's, is, that widows without a son or near relation to manage do not benefit by delegated authority.

There may be exceptional cases, and special power can be given to deal with such.

Montrose. GEO. BURRELL.

Sir,—I agree in the main with Mr. B. Proctor's letter in your last issue. Many, I fear, are hoping for the impossible, viz: that no one but a pharmacist should be allowed to supply drugs or chemicals. This, if attempted, must surely fail, and it is quite right that it should do so.

What we want to achieve is this, that none but competent persons shall be allowed to dispense prescriptions or supply poisons, in whatever form they may be offered.

Some of the suggestions by Mr. E. Smith, of Torquay, I think demand attention, and no doubt the Council of the Pharmaceutical Society will do all that is needful in the matter.

To attempt to introduce a "widows'" clause would be a great mistake. I doubt if a business carried on by an assistant will, as a rule, be found remunerative; and an exception, here and there to be met with, is no real proof in such a matter.

If a pharmacist's business is to be carried on by an assistant, you surely could not prevent a co-operative store from doing the same.

The long and short of the matter is this: if we wish to obtain an amendment of the Pharmacy Act that shall not only be of benefit to the public, but shall also remunerate us as a body for the responsibilities and anxieties naturally attendant on our calling, we must throw all "crotchets" to the winds and approach the House of Commons as a united body, asking for what we feel our just claims; and in such united action lies our only chance for success.

High Street, Barnstaple. EDWARD PRATT.

Sir,—The number of patent medicines containing poisons are so few in number, that the proposed restriction against the selling of them by others than chemists would be of no advantage to the trade and no relief against the present system of "cutting" prices, when it is considered that the chemists themselves would be hampered with restrictions and regulations; or, as Mr. Wilkinson, in his letter to you, puts it, "Although the Bill is professedly aimed at persons outside the trade, it will also, and quite as vexatiously, affect many who are properly and legally in the trade; for every druggist who puts up a cough mixture, or cough pills or lozenges, in which opium in any shape is contained, will be obliged to put on a poison label, and be subject to the same penalties and annoyances as outsiders, without benefit either to himself or to the public whose welfare is so tenderly looked after." Another thing, the word "poison," will be so commonly seen upon cough medicines, pills, and lozenges, that it will cease to have that deadly signification it ought to have upon more potent medicines.

And then again, there is the country village trade, where no chemist could possibly obtain a livelihood. Can it be said that it is in the interest of the public that they should not be able to purchase a bottle of chlorodyne from a retail grocer or patent medicine vendor?

It is in the interest of the public that chlorodyne should be compounded by a pharmaceutist, and the law should not allow it to be compounded by anyone else; but when the duly qualified pharmaceutist has compounded, labelled and put upon it his name and address, then it is absurd to try to get Parliament to put pains and penalties upon anyone who simply hands it over at the request of a purchaser.

The proper course it to permit no one to have a patent medicine licence unless he is upon the Register; get Parliament to do that, and it will benefit the trade. A special register, for country villages, could be kept and certificates issued by the Registrar. The licences should only be granted by the Excise, on production of the certificate, precisely as a magistrate's certificate has to be obtained before a licence is granted to a retailer of wines and spirits. CHEMICUS.

Sir,—A great deal has been said and written about the widow of a chemist and the assistant carrying on the business (of course qualified). But, for the sake of argument, suppose that an assistant (and there are many) who is the right hand of his master, should happen to be left to manage the business, through the death of the proprietor, and the said assistant be not qualified, is it not hard for him to lose his situation and also harder for the widow to lose a valuable "servant," of many years' tried and proved experience, and have to place over his head a (perhaps) younger man, who happens to be qualified "according to law," simply because the aforesaid assistant was rather nervous at the "examinations" (which I dare say a good many readers will understand), and although wanting in some minor points could hold his own behind the dispensing counter with any of the best "passed men" in the world? Such a man, I say, would be debarred from carrying on business for a widow, whose husband he may have served faithfully for years, and at the husband's death lose a good situation, the widow a good "servant," and the business a good master in every sense of the word.

Hampshire. D. H. F.

THE RELATIONS OF MEDICINE AND PHARMACY.

Sir,—I expected on opening the Journal this morning to find considerable correspondence in reply to Dr. Williamson's letter, but was disappointed to find little more than a casual remark in a letter from Mr. F. Taylor. Can it be that chemists are so enamoured of the patent medicine trade that they cannot turn their attention to something better in every respect? Especially when the proposal to discuss the matter comes from the quarter they thought most opposed to the change. It casts a great reflection on us, as a body, that a helping hand should be held out to those who show no anxiety to help themselves.

Let us apply ourselves to find some plan which will meet with the approval of the medical profession, so as to secure that part of our business which the law compels us to be capable of discharging efficiently, and which so few of us get, viz., the dispensing of medical prescriptions.

What is it that the doctors require at the hands of the chemists, with a view to bring about this change?

First, that their instructions should be faithfully carried out, and this is very important, both to the prescriber and his patient. On this point the doctors need have no misgivings. At the present time the higher branch of the medical profession entrusts to the chemists the dispensing of their prescriptions, and I believe this arrangement is carried out to the entire satisfaction of all the parties concerned. I am sure that if doctors only know the care and exactitude exercised by chemists in this respect, they would see that this work can best be done by a class who make it their especial study, and who can complete it without the probability of being called away, perhaps until hours after the patient should have had the medicine.

But they also want the medicine to be supplied at as moderate a cost as possible. I take it they consider the price usually charged now is too high if the plan is to be generally adopted. If this is so, it is our duty to see whether it is not possible, with a great accession of business, to reduce the charge for dispensing. In carrying out this, I think we would have to retain the prescription, and so do away with the work of copying, and to further lessen the time occupied in dispensing, I suggest that labels, with ready printed directions, be more generally adopted; it is almost universal with doctors themselves. Then, again, the general practitioner keeps a stock of pills ready made, so that as soon as he has decided whether they are to be from No. 3 or No. 33 formula, he puts the requisite quantity into a box in the time that we should take to get a mortar to make them in. We all know that it takes as long to make one pill as it does to make a dozen, and nearly as long to make a dozen as it does a gross, and if the medical men would co-operate with the chemists to carry out a plan in this respect similar to what they adopt themselves, chemists might take into consideration whether by this saving of time, and being more fully occupied, they could not afford to supply medicines from local practitioners' prescriptions at lower rates.

Anyhow, I think the subject is worth discussion, and some effort being made to meet the requirements of the medical profession. Perhaps it is premature to enter into the question yet whether any reduction can be made in the charge for dispensing physicians' prescriptions as we have them now, and the usual routine to go through. We must be prepared to meet with some opposition to the change, even from chemists, for we must remember that there are some who make it a special feature of their business to supply surgeons with drugs, and to these the change may not appear so desirable as it does to others. I am convinced that if chemists generally show sufficient interest in the matter, the Council of the Pharmaceutical Society will do what it can to carry out the intentions of the founders of the Society.

Rochdale. R. ROBINSON.

LOW PRICED "PATENTS."

Sir,—I am a druggist in a locality inhabited chiefly by a "working class" population. Lately a grocer has opened next door to my shop, who sells all "patents" at wholesale prices. He deals also in cod liver oil and Parrish's syrup. Regarding the latter he has a bill in capitals conspicuously displayed informing the lieges that what his neighbour the druggist charges 2*s*. for he is able to supply for 1*s*. The result has been my customers have been reduced in number, and the last straw was placed on the camel's back by the information conveyed to me by candid friends that the grocer's "chemical food" was far superior to mine, being taken with great relish by children, while my production was sourer and had somewhat of an inky after-taste. On procuring a bottle of this superior grocery syrup, I find that it absolutely does not contain a trace of phosphates of lime or iron, being merely a rather watery syrup, nicely coloured with cochineal, and flavoured with a dash of HCl. What action would you recommend in the circumstances? We have no public analyst, and the Act has never been enforced in this district.

HIAWATHA.

SPIRITUS AMMONIÆ AROMATICUS.

Sir,—I have read with interest the correspondence on the preparation of the above spirit.

As my name has been mentioned in connection with the subject I may say that for more than a dozen years I have made sp. ammon. arom. by solution, using volcanic ammonia and the finest oil of lemon. This way of working admits of precision, and the product, though slightly coloured, is, in my judgment, all that could be desired as a medicine. I use it in dispensing and for making the ammoniated tinctures.

But the public requires that its sal volatile shall be colourless, and though this is a matter of no moment, yet so long as it is the custom, we cannot afford to disregard it.

By using rectified spirit of good quality, and oils of lemon and nutmeg which have been distilled from an alkaline liquor, spirit of sal volatile nearly as colourless as the B.P. preparation may be made by solution, and quite as colourless if the spirit of wine employed be sufficiently pure to bear the addition of ammonia without being discoloured. The rectified spirit of commerce does not usually stand this test, but no doubt a purer spirit would be supplied if there were a demand for it.

By the way, Mr. Tanner says that "by dissolving the ammoniæ carb. in the water and liq. ammon. fort., and then adding the solution so obtained to the spirit, a crystalline deposit of acid ammonium carbonate forms, which never completely redissolves, and the water added for this purpose is generally in excess of what is contained in the B.P. product." This difficulty may, however, be easily avoided. If, instead of adding the solution to the spirit, we add the spirit gradually to the solution with brisk agitation, the precipitate which forms is very finely divided, and soon dissolves if the bottle is put in a warm place and occasionally shaken.

The specific gravity of sp. ammon. arom., taken alone, is not a character of much value.

It seems very desirable that a remedy so extensively employed both by the medical profession and the public should have its composition more rigorously defined. Why not state the amount of NH_3 and of CO_2 it ought to contain—say 10 grains of the former and 6 grains to the latter in the fluid ounce?

Lastly, I think the advocates of distillation will find it hard to discover any good reason why that circuitous mode of preparing sp. ammon. arom. should not be superseded by the more direct and reliable process of solution.

Sheffield. JOHN T. MILLER.

HYDROCARBONS AS SUBSTITUTES FOR LARD.

Sir,—In a recent number of the Journal was a letter in which the writer drew attention to vaseline as representing materials of this class and suggesting that in the new Pharmacopœia they should form the basis of all ointments.

Now, I am unable to speak of the action of these hydrocarbons from personal observation, but the following fact may prove very useful in determining the above question.

A friend of mine was a short time since severely afflicted with eczema. He used many kinds of local applications, with varying results. At length, however, he was urged to use one of the numerous forms of solid hydrocarbons. Being in a state of misery, he lost no time in procuring some, and trying it; but instead of the promised relief, it drove him almost frantic.

This may or may not have been an extremely exceptional case: but under any circumstances it points to the importance of the effects of these hydrocarbons being more thoroughly investigated, and more clearly understood, ere they be ordered to be used in the new Pharmacopœia as a basis for "all ointments."

86, *Curtain Road, E.C.* J. R. SUMMERS.

EFFECTS OF THE FROST.

Sir,—In reply to Mr. Bisset's letter in last week's Journal, I think the reason why he found zoedone tasteless and lime juice neutral after they had been frozen and remelted was owing to the fact that when water freezes it excludes all foreign matter from its substance. Ice formed from salt water contains no salt. We may consider zoedone as water holding in solution sugar, CO_2 and other compounds. In the act of freezing these would all be thrown out. The lime juice may be considered in the same way.

Belfast. WM. STEWART.

Sir,—Mr. Bisset's letter under above heading, in your last issue, has prompted me to give you the following as our experience:—

The lower part of one of our windows was filled with "vin-santé," the majority of the bottles lying down. The front row only were composed alternately of pint bottles of "vin-santé" and "zoedone."

After the frost set in every bottle of zoedone was found to contain a block of ice, the "vin-santé" remaining unchanged for a week later, and then only two out of six in the row freezing.

One quart bottle of "vin-santé," standing further back, was the only other one in the window frozen. Two bottles of zoedone had burst; in the others the corks were hardly disturbed.

On opening, though no effervescence, there was no appreciable lack of distinctive flavour, the zoedone being the more palatable of the two.

Ely. WILLIAM LINCOLNE.

ASSOCIATIONS.

Sir,—Having been a constant reader of this valuable Journal, and taken particular notice of the progress and advantages attained by the different associations of assistants and apprentices, I am, as a Welsh promoter of pharmacy, inclined to feel jealous of those neighbouring associations, and would feel proud if I could arouse my fellow assistants in South Wales to be up and forming something of the same nature. I consider it a shame to think that we as a nation are so backward in that respect. I hope that these few lines will lead to a further investigation, and that something to the improvement of the rising pharmaceutical students of South Wales will result.

ONWARD.

COMMUNICATIONS, LETTERS, , etc. have been received from Messrs. Schacht, Conroy, Nesbit, Mackay, Wynter, Stewart, Church, Green, Warriner, Humphrey, Wilkinson, Proctor, Gostling, Local Secretary, Dalex, Pro et Con, Glycerine, Ignorans, Nemo, Associate, Improver, Solent, Sanitas, A. P. S., J. G. P. S., M. P. S.

THE WEIGHTS, BALANCES AND MEASURES EMPLOYED IN PHARMACY, THEIR DEFECTS, AND THE REMEDY.*

BY PROFESSOR REDWOOD.

The Weights and Measures Act of 1878, and the Order in Council of August 14, 1879, have imposed new duties and responsibilities on chemists and druggists by rendering it necessary that the weights and measures used in dispensing medicines, as well as those more commonly employed in buying and selling, should be officially verified and stamped. For although it may be considered doubtful (yet I cannot admit even the doubt) whether the law was intended to apply, and strictly does apply as regards its requirements, to all the weights and measures used in pharmacy, or only to those with which sales by weight or measure are effected, there seems to be no security against the application of the law to all weights and measures by inspectors, and much consequent trouble to dispensing chemists, except by their submitting their weights and measures of every description to the process of verification and stamping.

The following extracts will show what the requirements of the law are with reference to weights and measures used *for trade*; what the meaning of the term *trade* is as used in the Act; and what the liability of chemists and druggists is in regard to weights and measures which may be found in their possession, although not used *for trade* in the sense in which that term is employed in the Act.

The 24th, 25th, 28th and 29th sections of the Act state that "every person who uses or has in his possession for use *for trade* a weight or measure which is not of the denomination of some Board of Trade standard shall be liable to a fine," etc.; and "every person who uses or has in his possession for use for trade any weight, measure, scale, balance, steelyard, or weighing machine, which is false or unjust, shall be liable to a fine," etc.; and "every weight, except where the small size of the weight renders it impracticable, shall have the denomination of such weight stamped on the top or side thereof in legible figures and letters;" and "every measure of capacity shall have the denomination thereof stamped on the outside of such measure in legible figures and letters;" and "every measure and weight whatsoever used for trade shall be verified and stamped by an inspector with a stamp of verification under this Act;" and "every person who uses or has in his possession for use for trade any measure or weight not stamped as required by this section shall be liable to a fine," etc.

The 19th section defines the meaning of the term *trade*, as used in this Act, as follows:—"Every contract, bargain, sale or dealing, made or had in the United Kingdom for any work, goods, wares, or merchandise or other thing which has been or is to be done, sold, delivered, carried, or agreed for by weight or measure, shall be deemed to be made and had according to one of the imperial weights or measures ascertained by this Act, or to some multiple or part thereof, and if not so made shall be void; and all tolls and duties charged or collected according to weight or measure shall be charged and collected according to one of the imperial weights or measures ascertained by this Act, or to some multiple or part thereof. Such contract, bargain, sale, dealing and collection of tolls and duties as is in this section mentioned is in this Act referred to under the term *trade*."

Now, this appears clearly to restrict the Act, with regard to the requirements already specified, to such weights, balances and measures, as are used *for trade*, that is, as the Act defines it, for selling any article or doing anything in such way that the contract or bargain is to do it for payment by weight or measure. If a weight, balance, or measure is used exclusively for the purpose of preparing, compounding, or dispensing medicines, and not for selling by weight or measure, it cannot be said to be used *for trade*, and would not, therefore, be necessarily subject to the requirements of the law to which I have already alluded, as specified in sections 24, 25, 28 and 29. Any such weight, balance, or measure would be as much excluded from the contemplated requirements of the law as are those used exclusively for analytical or other scientific purposes.

Then, if this be so, it may be asked why need chemists and druggists trouble themselves about having all dispensing weights and measures verified and stamped? The answer to this question will be found in section 59 of the Act, which says,—"Where any weight, measure, scale, balance, steelyard, or weighing machine is found in the possession of any person carrying on trade within the meaning of this Act, or on the premises of any person which, whether a building or in the open air, whether open or enclosed, are used for trade within the meaning of this Act, such person shall be deemed for the purposes of this Act, *until the contrary is proved*, to have such weight, measure, scale, balance, steelyard, or weighing machine in his possession for use for trade."

An inspector is therefore authorized to assume that any weight or balance found on premises which are employed for trade is itself used for such purpose, and he may seize the weight or measure, if found defective, and summon the tradesman, on whom the duty will fall of proving, if he can, that the weight or measure is either within the requirement of the law, or is excluded by reason of its not being used for trade.

It may not be always easy to satisfy a magistrate that dispensing weights and measures are not sometimes used for selling by weight or measure. The inspector may himself or through a friend or agent have purchased 5 or 10 grains of quinine, 20 grains of rhubarb, or a drachm of laudanum, and evidence of this would go far to prove that dispensing weights and measures are liable to be used for trade. But even if the defence should be successful, the fact that a dispensing chemist, in the performance of whose duties great accuracy is required, had been summoned for using an illegal weight or measure, and had escaped conviction only by showing that the law did not apply to his case, would, in addition to the trouble and annoyance of having to defend himself in a public court, leave a certain stigma upon his character.

It will be found to be the best and soundest policy, therefore, for chemists and druggists to have all the weights and measures of the denominations legally available for use in trade, which they may employ for any purpose or have on their premises, officially stamped. That this will entail an additional burden on chemists and druggists is obvious, and some expressions of complaint on this account may be anticipated. But a thorough consideration of the subject in all its bearings will tend, I believe, to show that the interests of pharmacy may be greatly advanced by those engaged in its practice promoting the objects of this law, and as completely as possible carrying out the regulations which the law contemplates.

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* Read at the Evening Meeting of the Pharmaceutical Society, February 2, 1881.

If I were asked to point out a direction in which British pharmacy, with all its modern improvements, had manifested little or no progress, and was much behind the existing state of pharmacy abroad and the advanced state of science and art in this country, I should refer to the imperfect arrangements adopted for ensuring accuracy of weight and measure in dispensing medicines.

The same old system of using a pair of hand scales, which are taken out of a box and roughly thrown back again each time they are used, which prevailed a century or two ago, in the days when Mithridate and Venice treacle were looked upon as potent medicines, still prevails and is apparently considered equal to the requirements of modern pharmacy, which has to deal with strychnia, aconitine, and a host of active medicinal agents, the doses of which should be adjusted not by grains but by hundredths of a grain. Until recently the weights and measures employed in dispensing medicines have not been subjected to any official test of their accuracy, and there is reason to believe that a great part of those still commonly used are very defective. It can hardly be said that the regulations hitherto adopted for giving effect to the new applications of the law to apothecaries' weights and measures are capable of fulfilling what is required in a satisfactory manner. The testing of these weights and measures ought to be conducted on a different principle from that which has generally been applied in the verification of the weights and measures used in ordinary commercial transactions. In the latter case the object is the protection of the purchaser from fraud, and the principal aim in testing is to ascertain that the weight or measure fully represents the quantity indicated. If it be somewhat in excess of the quantity, this, being in favour of the purchaser, would not be considered an offence in the way that a deficiency would be. It is the usual practice in making weights to keep them a little in excess of the true weights they are intended to represent, allowance being thus made for wear in using. So also in testing weights, although no deficiency is allowed, a slight excess is not objected to, but is rather looked for, if not required, being commonly designated the turn of the scales. This, however, is a variable quantity, depending partly on the sensitiveness of the scales and partly on the judgment of the operator. If a weight turns the scales in the right direction when tried against the standard, it is so far right that it cannot be said to be unjust for the purposes of commerce, and this is what the law seems to have contemplated.

Now I venture to submit that this is not the right system to apply in the making or the testing of weights or measures used for dispensing medicines. If some doses of strychnia were about to be weighed, it would hardly be said that the use of a grain weight that was half a grain in excess of its true weight, and of a balance that took another half grain to give the turn of the scales, would benefit the purchaser or be a favour for which he would have reason to be thankful. In dispensing the greatest practicable accuracy is demanded, and for the attainment of this object it is necessary to have instruments of exactness, and especially accurate weights and a true and sensitive balance. Nothing here that is a deviation from strict accuracy tends to favour the purchaser, and with reference to weights, the only ground on which any deviation can be justified is that of the difficulty of preserving accurate weights in an unaltered state from the effects of use. Some deviations must be allowed, to admit of wear in using, but they need not exceed narrow limits. In making and also in testing apothecaries' weights with a view to their being verified and stamped, I would suggest the following limits of deviation from the legal standards, these deviations being in the direction of excess:—

On ½ grain	. . . .	0·02 grain.
„ 1 grain to ℈ss.	. . . . .	0·05 „
„ ℈i to ʒiv	. . . . . .	0·10 „
„ ℥i to ℥x	. . . .	0·25 „

These are the limits I have adopted in the verification of apothecaries' weights, and which I have submitted to the Board of Trade. I consider the deviations indicated sufficient to allow for the effects of wear, with careful use, during a reasonable time, which is all that can be required. They are the greatest deviations proposed to be allowed, but much less than are now usually allowed, in weights of this description when they are stamped, and are then supposed to be in a fit state for the commencement of their use. In time they will lose by abrasion and may soon lose to a sensible extent if subjected to rough usage. The careful and conscientious pharmacist will of course from time to time have his weights and scales tested and readjusted or renewed if necessary. He will do well to keep a set of weights for the exclusive purpose of testing those in daily use. But this is work that cannot be done without the use of a suitable balance,—one sensible to the hundredth or at least to the fiftieth of a grain,—and this together with a set of accurate weights, such as are used for analytical purposes, should be looked upon as essential appendages to every pharmaceutical establishment where medicines are dispensed. The habit of using such instruments of precision when required, as they often are in dispensing powerful medicines, cannot fail to produce a beneficial influence, and their use, as well as the dexterity required for their successful use, will not only serve to distinguish the operations of pharmacy from those of ordinary trade, but will impress the public with the importance of the scientific training to which the pharmacist is subjected. The Pharmaceutical Society, which has done so much towards promoting the advancement of scientific pharmacy, is naturally looked to for its aid in bringing about an extension of the use of accurate weights and dispensing balances. This object would be promoted by encouraging the appointment of special inspectors for the testing and stamping of weights and measures in which great accuracy is required, and by inducing the adoption by such inspectors of a uniform practice of stamping only weights that come within fixed limits of deviation from the legal standards. As I have already said, in the case of weights, only narrow limits of deviation need be, and should be, allowed.

With regard to apothecaries' graduated glass measures, although the same object of attaining to the greatest practicable accuracy in their construction and use should actuate those by whom they are made and used, the result will necessarily fall short of what can be accomplished in the case of weights. It may be broadly stated that we have no such thing as accurately graduated measures of capacity. The best results obtained in that direction are but approximations to strict accuracy. An operator may possibly find that a quantity of a liquid which he has measured with a graduated glass measure, when tested by weight will prove to be the true measure indicated by volume, but this is a result so rarely occurring that it may be looked upon as completely accidental, and quite incapable of attainment with certainty by the most skilled operator. There are several difficulties that stand in the way of correctly estimating the volume of a liquid by means of a graduated glass measure. These apply partly to the construction of the measure, and partly to its use either in testing or in practically applying it as a measuring instrument. In graduating the measure, that is, marking its capacity, the proper quantity of liquid must be put into the glass, and another measure is used for this purpose, therefore whatever difficulties beset the attainment of accuracy in the instrument about to be produced will have applied also, in some degree, to that which is used in its production. The inaccuracies in one are thus extended to, and may be increased in, the other. When the measured liquid has been introduced, the position of its surface is to be marked on the outside of the glass, and to enable the operator to do this, the glass, before commensing the operation, is partly covered on the outside with a sort of varnish which can be easily removed at the end of the process, and the height at which the liquid stands in the glass is temporarily indicated by a mark made in the varnish; or sometimes a small spot is marked on the glass with a coloured liquid from the point of a fine brush without any varnish having been previously applied. In doing this the glass must be placed on a level surface, and the eye of the operator must be horizontal with the surface of the liquid and coincide with it. But the surface of the liquid in a glass measure will not be level but curved, this being caused by the adhesion of the liquid (water) to the surface of the glass, producing a concavity or meniscus the depth of which will vary with the diameter of the vessel, the nature of the liquid, and the condition of the surface of the glass.

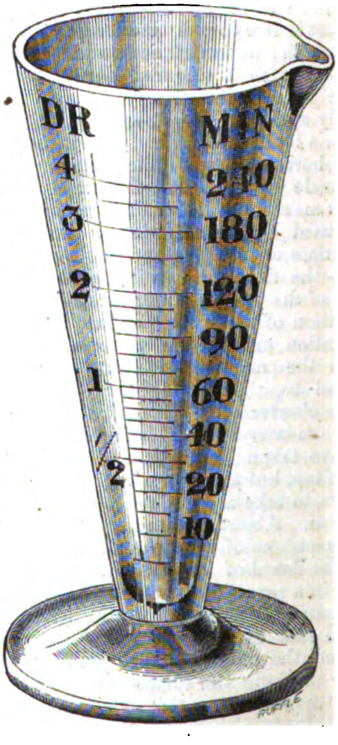
A question arises here as to what part of the meniscus the marked line on the glass should correspond to. There appears to have been no fixed rule observed by the makers or by the testers of these measures with reference to this point. Some have taken the bottom of the meniscus, and some the top, but the prevailing practice appears to have been to take a point midway between the top and bottom. About two months ago a circular was sent to inspectors of weights and measures, by direction of the Board of Trade, calling attention to the fact that in a report of the Commissioners of Weights and Measures, in 1870, Professor Miller, of Cambridge, suggested that the bottom of the meniscus was the best if not the only definable point that could be taken in marking the surface of a liquid in a glass tube. It appeared from this communication that the Board of Trade, although they offered no authoritative instructions on the subject, favoured the opinion that the bottom of the meniscus should be used by inspectors in reading the indications obtained with graduated glass measures; and the opinion thus conveyed or implied has no doubt largely influenced the practice of manufacturers as well as inspectors. The adoption of one uniform rule in this respect would tend to remove a very influential source of errors in the use of these measures, for no near approach to accuracy can be attained with reference to them until makers, testers and users are agreed as to the proper method of reading their indications. If one reads from the top, another from the bottom, and others, again, from some intermediate part of the meniscus, there may be differences in the results arrived at of important amounts, but differing, of course, according to the diameter of the measure used. The object of the communication of the Board of Trade appears to have been to induce uniformity of practice in this respect, and although I have heard of inspectors who claim the right to exercise their own judgment in the matter and refuse to deviate from their accustomed practice, yet I have no doubt there will be a general disposition manifested to follow what may be looked upon as a recommendation or at least a suggestion from so high an authority as the head of the Standards Office. I have reason to believe that the Board of Trade look with some confidence to the Pharmaceutical Society for the aid they are so capable of giving in bringing about a more general agreement in the practice of those engaged in making and testing, as well as of those more largely engaged in using these measures. I was myself at first disposed to consider the middle of the meniscus the part that ought to correspond with the marked line on the glass, but since my attention has been more specifically called to the subject by the communication from the Standards Office I have not only adopted the method therein suggested, but have come to the conclusion that it is the best and safest method to adopt. The bottom of the meniscus is a tolerably well defined line; the middle of course is not; and the top is less clearly defined than the bottom.

Taking the bottom of the meniscus, therefore, as the part of the surface of the liquid with which the marked line on the glass should correspond, I may now return to the operation of marking the graduations on a glass measure. This, as I have already said, is first done by scratching a line in the varnish or marking a spot on the glass. The line thus made will, of course, not be a mathematical line having length without breadth or thickness. It will necessarily have some thickness, which must extend either above or below or both above and below the lowest part of the line forming the bottom of the meniscus. I would suggest that it should extend above the boundary of the meniscus rather than below it; so also the spot must cover a certain area and should occupy a position similar to that of the line. The mark I am now alluding to, however, is but a temporary mark for guiding the operator in subsequently making a permanent engraved line by the application of the engraving wheel. Some dexterity is required in performing both these operations, especially the former, which requires that the eye of the operator should be exactly level with the surface of the liquid. If it be either above or below this position, the mark made on the outside of the glass, apparently corresponding with the surface of the liquid inside, will not be in its right position. All the intended graduations of a glass measure are first marked superficially while the liquid is present, and the liquid being then removed the engraving wheel is applied over the marks for the purpose of producing permanent engraved lines.

Now all this, which is the work of those engaged in graduating glass measures, involves several difficulties which are so many sources of deviation from strict accuracy. There is first the introduction of the right quantity of liquid into the glass. If this is done by volume there are several obstacles to the attainment of accuracy there. But of course it might be done by weight, which would greatly lessen the liability to error, but would also greatly increase the time occupied in the operation, and therefore it is not practically adopted with measures of this description. Then with reference to the part of the meniscus opposite which the line is to be drawn, uniformity of practice on this point has not yet been established, and even if it were now established, there are thousands of glass measures in use that were graduated and officially verified and marked before this rule came into operation. Then again there is the difficulty of making the first superficial marks in the right places, and the further difficulty of making the engraved lines accurately to coincide with the centres of the superficial marks. These latter difficulties would still remain if the first difficulty as to the quantity of liquid introduced were removed.

The result is that the graduated glass measures used in pharmacy, even those that have been duly tested and stamped by legally appointed inspectors, cannot be relied upon with any confidence, unless it is known what rule, if any, has been adopted in testing them; that is to say, whether the top or the bottom or the middle of the meniscus has been considered the part of the surface of the liquid with which the engraved line is intended to coincide. Even under the most favourable circumstances, where the maker and verifier of the measure have adopted the recent suggestion of the Board of Trade, all that can be reasonably looked for is an approximation to strict accuracy, and this only, as far as its use is concerned, when the user of the measure, knowing on what principle it has been tested and verified, adopts the same principle in using it. Under these circumstances there may be a near approximation to accuracy, but still the indications afforded by the engraved marks on the measure will be almost always, and almost necessarily, either above or below the right quantity. The general tendency of inspectors, who have only been accustomed to the verification of measures used exclusively for commercial purposes, has been to pass those that were in excess of the true measure, even when the excess is considerable, but to reject any that were at all short of measure, thus acting on the same principle as that adopted in regard to weights. This however, is not the right principle to adopt in testing apothecaries' glass measures, which are almost exclusively used for dispensing medicines. In a certain sense, excess of measure may be here looked upon as a more serious error than deficiency. The point to be aimed at is to have neither excess nor deficiency. By very careful and skilful manipulation the deviations from strict accuracy may be reduced to a small amount, the extent of which will greatly depend upon the area of the surface of liquid in the measure. Thus, with measures of a conical form, a deviation of two or three minims is scarcely appreciable when the diameter of the surface of the liquid is half an inch or more in extent. A drop or two spread over the surface in such a case forms a thin film which has breadth enough but very little thickness. Measure-glasses of this form are not well suited for measuring small quantities of powerful medicines, and yet I find most of the minim measures of the present day are of the conical form, which it appears are preferred to the narrow cylindrical measures because they are more easily cleaned. Their introduction, however, is a modern innovation, and one which I think ought not to be encouraged. Looking back to the days of my practical experience in pharmacy I have no recollection of these conical minim measures which are now found in every pharmaceutical establishment. Minim measures used to be always of the narrow cylindrical form, but even they are not free from some defects. In addition to their not being easily cleaned, it is sometimes found that they are not easily emptied, this latter effect occurring more especially when there is strong adhesion between the glass and the liquid, or when under other circumstances some of the liquid remains attached to the glass in distinct drops. As measures, however, these cylindrical glasses, when in a fit state for use, admit of greater exactness of adjustment than do those of the conical form.

One of the serious defects in the glass measures now commonly used is that of having too many graduations on the same measure. This applies especially to small conical measures, which are sometimes graduated up to 120 or 240 minims, with marks for every 5 minims carried up to parts of the



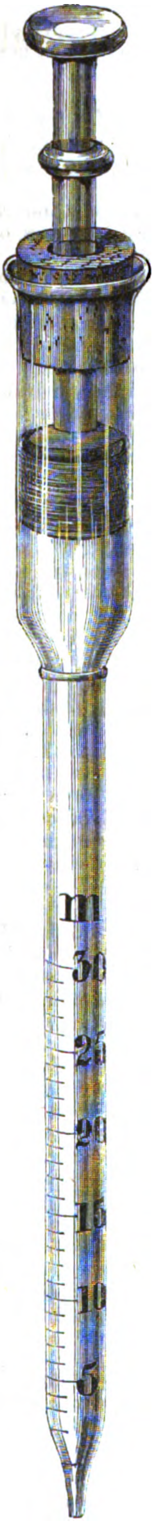
Real size of measure.

glass where the surface of the contained liquid being over half an inch in diameter, it is impossible to measure with accuracy. This crowding in of a large number of graduations, and thus making the same measure serve both for minims and drachms, is a great mistake, and the practice ought to be discouraged. Here is a half-ounce conical measure, with minim graduations from 5 minims upwards. Now, who would think of using a measure of this sort for measuring 5, 10, or even 15 minims, unless it were in the case of an inert medicine, which, however, would hardly be ordered in such quantities? But the objection in this case is much greater when we come to the graduations for successive quantities of 5 minims each higher up on the glass, where the diameter of the conical vessel having increased, the lines are so near to each other that they cannot all have numbers attached to them, and it is not easy to identify the values (if they have any) of the closely crowded lines. On the introduction of a liquid into such a measure, the meniscus will occupy the space between three of the marked lines, so that the reading might be either 10 minims more or 10 minims less, according to the part of the meniscus that the lines are supposed to correspond to. In measures of this description I would have no graduation below 10 minims, and then progress by tens up to 30 minims, passing from 30 to 60, and thence to 90 and 120, without any intermediate marks. This is high enough to go with a measure on which minims are marked. A measure having a range of half an ounce should have no subdivisions of less than half a drachm, and these should be confined to the lower and narrower end of the glass. The same may be said of an ounce measure, if well made, so as to be narrow at the bottom and the glass not too thick. With larger measures the graduation should commence from higher points, the tendency throughout being to diminish the number of graduations and to avoid having any for small quantities in large measures. What good purpose can be answered by having a graduation for half an ounce on a half-pint measure, especially if it be of the beaker form; or even for so little as an ounce on a twenty or forty ounce measure. Yet these graduations are constantly found on large measures of the beaker form. There are, no doubt, those who consider that a multitude of graduations on a measure-glass make the instrument more valuable, but a little reflection and a knowledge of the circumstances attending the production of the instrument, with its numerous engraved markings upon it, would probably lead to a different conclusion. Now, let us take a two-drachm, half-ounce, or ounce measure glass, and consider what has to be done to it before it is ready for use. The manufacturer has first to provide the plain glass, which must be of good clear glass that will not unduly distort the rays of light that are to pass through it when used. Then each glass has to be submitted to the processes to which I have already alluded for effecting all the graduations and markings required for it. This constitutes a distinct class of business, and, I believe, graduators undertake the work at about 2*d.*, or less, for each measure. For this small sum is it reasonable to expect that all the measurements and markings should be made with the accuracy required in an instrument such as would be used for purely scientific purposes? The only wonder is that the work is as well done as it generally proves to be; but to look for perfection under the circumstances would be as unreasonable as it is, while expecting accuracy, to insist on having a large number of graduations, and some of them useless, on each glass, which must necessitate a more hasty and less careful and accurate performance of the work than might otherwise be afforded. I would strongly urge upon pharmacists that they should encourage the use of graduated measures in which there should be a smaller number of graduations than are now usually marked on them, and thus induce more pains to be taken in producing measures of greater accuracy.

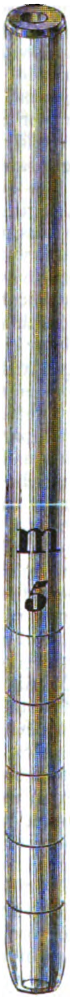
This subject occupied much more attention in the early days of the Pharmaceutical Society than it has done latterly. The late Mr. Alsop, of Sloane Square, in 1843, pointed out the great disparity there is in the sizes of drops, depending partly on the nature of the liquid, and partly on the surface from which the drops fall. He suggested a more general adoption of the practice of ordering minims instead of drops in prescribing medicines, and with the view of rendering the measurement of minims more exact, he introduced what he called his minim meter, the form of which was improved some years afterwards, in 1851, by Mr. Ashton, a medical man, residing in Cavendish Square. Mr. Alsop's minim meter consisted of a straight tube of small, but uniform diameter, drawn out to a small opening at the lower end, and having a piston working in the upper open end, by which a liquid could be drawn up into the tube to any required height, and discharged again by depressing the piston. The object of Mr. Ashton's improvement was, by enlarging the upper end of the tube where the piston works, to prevent the liquid from coming into contact with the packing of the piston. The same object was effected in a very simple manner by Mr. Abraham, of Liverpool, by discarding the piston altogether and substituting for it a small elastic indiarubber bottle which is attached to the upper end of the graduated tube. With either of these instruments the measurement of small quantities of liquids may be effected with considerable exactness. The graduated part of the tube may be reduced in diameter, as it was by Mr. Ashton, so that each minim should occupy the tenth part of an inch or even more if desired, and the complete discharge of the liquid from so narrow a tube is ensured by the pressure of the air upon it when the piston is depressed. This instrument may be termed *the syringe pipette*. Small open pipettes to be worked with the finger, and graduated only up to 5 or 10 minims, each minim occupying half of an inch, are among the instruments of greatest precision used by dispensers for measuring liquids. Minim tubes of the ordinary cylindrical form, but of small diameter and thin glass, as shown in the drawing, are also supplied by dealers in chemists' sundries, and when carefully graduated may be sometimes used with advantage. It is important, however, in using these small tubes and, indeed, in using open tubes or small conical measures generally, to ascertain that the inner surface of the tube is in a condition in which the liquid will freely and uniformly adhere to the glass and flow over it. To ensure this the surface of the glass should be clean and not too dry. If the surface should have any oily or resinous matter on it, or if it be too dry, the liquid (water), instead of adhering, may be repelled, and the surface become convex instead of concave. Under these circumstances the liquid, under the sole influence of cohesion among its particles, will gather into distinct drops which will remain attached to the surface of the glass. The best method of perfectly cleansing the glass and preventing such results is to put oil of vitriol into it and afterwards to well rinse it with water.

There is a slight source of variance in the results obtained by measuring with a graduated glass measure, even when all the precautions referred to have been observed, which is that the curvature, and consequently the depth of the meniscus, will vary with different liquids. Thus, for instance, a resinous tincture will sometimes present an almost perfectly flat surface, the resinous matter present having partly destroyed the adhesion of the liquid for the glass. This is a result for which allowance must be made by the operator in determining the position the surface of the liquid should bear with reference to the marked line on the glass.

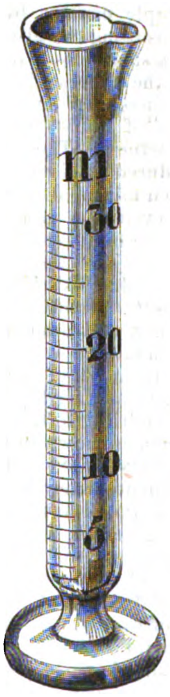
Having alluded to two classes of measuring instruments which are used for the purposes referred to,—one consisting of a vessel closed at the bottom and open at the top, into which a liquid is introduced to the required height, and from which it is afterwards poured by inverting the vessel, and the other consisting of a tube open at the bottom (where the liquid is introduced and discharged) and either open at the top (until closed with the finger) or closed there with a piston or elastic bag,—it is necessary to observe with reference to these measures that while the former are measures of *capacity*, the latter are measures of *delivery*. The syringe or elastic bag pipette is undoubtedly the form of apparatus, if properly graduated, with which the most accurate measurements may be made. This form of instrument is made to *deliver* the quantities indicated by its graduated markings. On the other hand, the ordinary conical or cylindrical open-mouthed measure glass is only a measure of *capacity*. It contains the quantity of liquid indicated by any one of its markings when filled up to that mark, but the whole of this liquid cannot be poured out of it, some being retained by adhesion to the surface of the glass.



Syringe pipette (full size).



Minim pipette (full size).



Minim tube (full size).

It will thus be seen that the volumetric measurement of liquids, as it is usually effected for pharmaceutical purposes, is attended with many and serious difficulties, and my object in this communication has partly been to point out what the difficulties are, not by any means with the view of inducing an easy acquiescence in defective operations because it is difficult to attain to greater perfection, but rather to stimulate the members of our fraternity to push forward in the acquirement of the highest practicable precision required in the exercise of their art, by which and by the necessity for scientific culture, the art of pharmacy is distinguished from many other pursuits.

The Board of Trade, who have already suggested what they consider the right principle to adopt in graduating and testing apothecaries' measures, are now, I believe, preparing a scale of errors which may be allowed in these instruments. This, of course, is founded on the admitted fact that slight errors cannot be avoided. Such error, will be greatest in measures of large diameters and may in a glass, the surface of the liquid in which is about 4 inches in diameter, amount to 50 or 60 minims, and in a small glass where the surface of the liquid is from half an inch to a quarter of an inch in diameter it may be from 1 minim to less than ½ a minim. The question of allowable errors, however, is one principally affecting inspectors who have to verify, and makers or engravers whose duty it is to graduate, these measures. What the chemist who uses them has to do is, to purchase only measures that are guaranteed to be graduated from the bottom of the meniscus, with only slight deviations for errors and these extending upwards towards the middle of the curve. He will then be enabled to use them with the best security he can be reasonably expected to provide for their accuracy within the prescribed limits. It may be some satisfaction to those chemists who have already supplied themselves with measures that have been verified and stamped when the practice was more lax than it has since become, to know, that although they may not be strictly accurate, yet, thanks to the Trade Protection Association, the Court of Appeal has decided that the use of such measures if legally stamped does not constitute an offence in law until formal proof has been supplied to the chemist that they are false and unjust. If, with that knowledge, he continues to use them he will be subject to well deserved punishment.

It will, I am sure, be admitted that it is our duty to further as far as we can the objects contemplated by the Legislature and the Board of Trade in establishing a uniform and correct system of weights and measures for use in trade, and also to extend this system to all departments of pharmacy, by using only such weights, scales, balances and graduated measures for dispensing medicines as will justify the announcement of "prescriptions accurately prepared."

[*The discussion on this paper is printed at p.* 683.]

ESTIMATION OF NICOTIA IN TOBACCO.*

Some work has been done by Mr. E. T. Pease, in the estimation of alkaloid in leaf and manufactured tobacco, by the volumetric method with potassium mercuric iodide, as directed in detail by Dragendorff ('Werthbestimmung einiger starkwirkenden Droguen,' 1874, 52).

The tobacco was first dried, the portion weighed, then macerated for at least twenty-four hours with water acidulated with sulphuric acid, and the expressed liquid concentrated and filtered. The solution from 2 to 3 grams of tobacco, was brought to 50 c.c., and of this 10 c.c. were taken for titration. The end of the reaction was found by filtering a few drops through a very small filter, trying the filtrate on a watch glass with a drop of the volumetric reagent, and rinsing the filter into the whole solution. The potassium mercuric iodide was twentieth normal, or old decinormal, Mayer's standard ($HgCl_2 + 6KI$).

The precipitate first obtained appears milky when formed, but soon turns black and waxy, and settles to the bottom in a coherent mass. Several of the operations were duplicated, with but very slight differences in results. The end of the precipitation is sharply defined.

No. 1. Cigars, 2·00 per cent. nicotia.

No. 2. Kentucky leaf tobacco, 4·05 per cent. nicotia.

No. 3. Sweet peach chewing, manufactured, with much steaming, from same grade as No. 2, 3·24 per cent. nicotia.

No. 4. Filler from real Havana tobacco cigar, 4·21 per cent. nicotia.

No. 5. "Havana-seed" leaf tobacco (grown in this country from imported seed), 3·94 per cent. nicotia.

No. 6. Gem cigarette tobacco, Richmond, Va., 3·93 per cent. nicotia.

A short clay pipe, some time in use and partly coloured, though not darker than pipes seen on the street daily, was pulverized, macerated in acidulated water, and the solution treated as from tobacco. The result of titration, if due to nicotia, indicated 0·4779 gram of that alkaloid. The pipe weighed 23·619 grams; therefore 2·02 per cent. of alkaloid was indicated.

Mr. Pease also made an experiment in determination of tobacco smoke. The presence of nicotia in the smoke has been made the subject of discrepant reports. He reports the following result, also the one with the old pipe, above stated, with some reservation. At present he is not assured but that some of the empyreumatic products of nicotia (or of tobacco) may react with Mayer's solution. Until research or experiment settles the question, he could not interpret the results as positive evidences of unchanged nicotia. A quantity of the dried Havana-seed leaf tobacco (No. 5), weighing 3·6685 grams, was burned in a brier-wood pipe (one long in use). The pipe bowl was tightly connected to glass tubing reaching to the bottom of a four ounce flask, containing acidulated water, and this flask was suitably connected with another holding acidulated water. All the smoke was drawn through the flasks. The filtered solutions were concentrated, and titrated. A total of 0·081 gram of nicotia was indicated, this being 2·48 per cent. of the dried tobacco burned.

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 12, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REGISTRAR'S REPORT.

ALTHOUGH accidental, there was a certain "fitness of things" in the coincidence that on the day on which the Council of the Pharmaceutical Society put the finishing touches to the Bill for the amendment of the existing laws relating to pharmacy, which it intends to lay before Parliament in the name of the chemists and druggists of Great Britain, the Registrar presented his annual statistical report disclosing the number of pharmaceutical chemists and chemists and druggists on the Registers and the proportion of them who are there by virtue of having passed a qualifying examination, as well as the proportion of them who are connected with the Society which is assuming to act in the name of the whole. Should the Bill reach a discussion on the second reading in the present unpromising session, no doubt these statistics will be taken into consideration, and it is consequently so far satisfactory to find that the numerical strength of the Pharmaceutical Society, both absolutely and relatively, was greater at the end of the past year than at any previous period. Nevertheless, it must be confessed that the subscribers to its funds are not yet numerically proportionate to the unanimity with which the whole trade looks to the Council of the Society at times like the present to use its influence and money in obtaining remedial legislation. The statistics, however, are not without indications that the Society contains within its ranks the *élite* of pharmacy.

Commencing with the Register of Chemists and Druggists it appears that it now includes 13,462 names. This shows an apparent decrease during the year of 89. But to arrive at a correct conclusion it is necessary to take cognizance of the fact that at the close of the year the Registrar exercised the power vested in him by the 10th section of the Pharmacy Act of erasing from the Register the names of persons who could no longer be communicated with at their registered addresses. In this way 160 names were erased, and as this represented the accumulation of entries which had ceased to be correct during two years, it may fairly be assumed that the number of persons who in the course of the year 1880 entered the calling of a chemist and druggist through the portal of the

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* From the *Journal of the Am. Chem. Soc.*, July, 1880.

Minor examination was about equal to the number of names that became removable from the Register during the same time through death and other causes.

The above-mentioned absence of increase, as applying to the number of persons entering an already overcrowded calling, may be regarded with equanimity. But when we turn to the Register of Pharmaceutical Chemists we find that this also is nearly stationary, the number of persons who have passed the higher examination during the year 1880 having been only 9 in excess of the number whose names have become removable from this relatively small Register, being 2308 against 2299. Here the prospect becomes less satisfactory, as it shows what a large proportion of men rest content with the bare legal qualification and refrain from pressing forward to that higher one which every-day experience proves to be of more value to the pharmacist than any protection that the Legislature is likely to grant would be. Still it is interesting to note that there has now been a slight increase in two successive years, which appears to indicate that the point has been reached at which the additions of examined men to the Register of Pharmaceutical Chemists is equal to the combined losses of examined and non-examined men, which latter still constitute a considerable proportion of the whole class.

This leads us to the next topic, which is the relative proportions of examined and non-examined men on the Registers. The number of persons who passed the different examinations and the relative proportion of those who failed has been dealt with recently in our yearly summary and need not be repeated here. Of course, as the Registers are now practically only recruited by examination, the proportion of examined men is an increasing one; the extent of the increase is ascertainable from the new Register, a copy of which was laid before the Council at its last meeting.

From this it appears that of the 2308 Pharmaceutical Chemists now on the Register 1450 or 62·82 per cent. have passed the Major examination. The number last year was 1410 or 61·33, so that the increase of examined men on this Register has been 40, or 1·49 per cent. of the whole. The relative proportion of Pharmaceutical Chemists who have passed the Major examination to the entire number of Chemists and Druggists is now 10·77 per cent., against 10·40 per cent. a year ago.

After deducting the Pharmaceutical Chemists there remain on the Register 11,154 Chemists and Druggists. Of these 2853 or 25·57 per cent. have passed the Minor examination, being a net increase of 208; whilst the percentage relation to the entire Register has simultaneously been raised from 19·52 per cent. to 21·19 per cent. It will be observed that this class still includes a much larger proportion of unexamined men than the other; in fact it will probably be a matter of surprise to some to learn that one out of every three examined men has passed the Major, though the proportion of Minor men is becoming larger every year. The two classes taken together number 4303 examined men, or 31·96 per cent. of the entire Register.

The following table will show these details more clearly:—

	January 1, 1880.				January 1, 1881.			
	Number.		Per cent.		Number.		Per cent.	
Pharmaceutical Chemists:—								
Examined . .	1410	2299	10·40	16·96	1450	2308	10·77	17·14
Non-examined	889		6·56		858		6·37	
Chemists and Druggists who have passed the Minor only . .		2645		19·52		2853		21·19
Remainder, including those who have passed the Modified . .		8607		63·52		8301		61·67
Total		13551		100·00		13462		100·00

Turning now to the numerical strength of the Pharmaceutical Society, we find, as before intimated, that it is now absolutely greater than in any previous year, and as this is coincident with a decrease in the Register, it follows, *à fortiori*, that it is so also relatively to the whole body of chemists and druggists. According to the return the number of persons connected with the Society at the end of last year as Members and Associates (excluding Apprentices) was 4636, or 34·44 per cent. of the 13,462 on the Register. A year previously the numbers were 4589, or 33·86 per cent. There has thus been a net increase of 47, which has been mainly due to the increase in the important class of Associates in Business, as both the Pharmaceutical Chemist and Chemist and Druggist Members show a small decrease.

The decrease of 17 (or 2 less than in the previous year) in the Pharmaceutical Chemist Members shows that the point has not yet been reached when the fresh elections of examined men are equal to the losses of examined men as well as of those who hold the title in consequence of having joined the Society before the year 1853. But it is satisfactory to notice that the additions to this class during 1880 were 11 in excess of the total number who passed the Major that year, again proving that there is a disposition among some who had previously held aloof to come forward and join the Society. Of the 2308 registered Pharmaceutical Chemists, 1966, or 85·18 per cent. are now Members of the Pharmaceutical Society.

The decrease in the Chemist and Druggist Members, amounting in this return to 9, is one that must necessarily become more marked as years pass on.

The Associates in Business show an increase of 60, and now number 1025, and the Associates not in Business show an increase of 13, and number 840.

Besides the foregoing there are 1074 Apprentices or Students of the Society, which is 3 in excess of the previous year.

These figures also we throw into a tabular form:—

	January 1, 1880.		January 1, 1881.	
	No.	Per cent of whole.	No.	Per cent of whole.
Pharmaceutical Chemists, Members of the Society .	1983	86·25	1966	85·18
Other Registered Chemists and Druggists connected with the Pharmaceutical Society	2606	—	2670	—
Total number of Registered Chemists and Druggists connected with the Pharmaceutical Society. . .	4589	33·86	4636	34·44
Registered Apprentices subscribing to the Society .	1071	—	1074	—

EXHIBITION OF CHEMICAL AND PHARMACEUTICAL APPARATUS, ETC.

It will be remembered that the Council, at its meeting last week, on the motion of Dr. Symes, passed a resolution that an Exhibition of chemical and pharmaceutical apparatus, and other objects of special interest to pharmacists, should be held in the Society's rooms during the present year, but referred the question as to the best time to the consideration of the Library, Museum and Laboratory Committee. On Wednesday last that Committee met and decided that the Exhibition shall be held in connection with the Annual Meeting of the Pharmaceutical Society in May, and an official announcement to that effect appears in another part of this Journal. Applications for space by intending exhibitors will have to be made to the Secretary before the 1st of May; but as this constitutes a considerably longer notice than it was possible to give respecting the Exhibition of last year, it may be hoped that the number of exhibitors on that occasion, though large, will be exceeded on the coming one.

SCHOOL OF PHARMACY.

The courses of lectures on "Chemistry and Pharmacy" and "Materia Medica and Botany" in connection with the Pharmaceutical Society's School of Pharmacy, 17, Bloomsbury Square, will recommence on Tuesday, March 1, when Professor Redwood will deliver his first lecture on "Chemistry." Professor Bentley will commence his course on "Materia Medica and Botany" on Friday, March 4. Students will find the ensuing five months a favourable period for studying at the School, for between March 1, and the end of July they will have an opportunity of attending not only the laboratory and the usual courses on Chemistry and Pharmacy, and Materia Medica and Botany, but also the summer course on Systematic and Practical Botany, which is conducted at the Royal Society's Gardens, in the Regent's Park, where every opportunity will be afforded to them of obtaining a practical acquaintance with plants.

In addition to the foregoing there is now, also, a class for the acquirement of practical instruction in Dispensing, which will recommence on Tuesday, March 1, at 5 p.m. and be continued every Tuesday and Thursday, at the same hour, until the end of July. The demonstrator, Mr. A. F. Dimmock, who conducts this class, will be glad to receive any autograph prescriptions with which members may be good enough to favour him.

THE WEIGHTS AND MEASURES QUESTION IN PARLIAMENT.

It is consolatory to find, from the proceedings in the House of Commons, that the unsatisfactory state of the law in relation to the verification of weights and measures is attracting the attention of our legislators. On Thursday, the 3rd inst., Mr. Chamberlain, the President of the Board of Trade, in replying to a question put by Mr. Barran as to permission to use defective glass measures for veterinary purposes, referred to the recent quashing of a conviction and said that the Board of Trade had no power to interfere with the verification by local authorities of glass measures, but that it was, with the assistance of the Pharmaceutical Society and the principal local authorities, preparing suggestions as to the scale of errors that should be permitted.

Notice of another question, still more to the point, has, however, been given by Mr. Ross, who proposes on Friday night to ask the President of the Board of Trade "whether under the uncertainty "existing as to the interpretation of the 45th section "of the Weights and Measures Act he proposes any "legislation on the subject, by which an inspector "should be bound to accept as correct any measure or "vessel duly stamped by an inspector outside his "district, without himself verifying the accuracy." It is obvious that such legislation would be improper, as it would prevent the testing of a weight or measure after it has once received a mark of verification, although it might have since become grossly incorrect through wear and tear. But the question may possibly draw from the Government an expression of opinion which would have an important bearing upon the threatened appeal of the Marylebone magistrates against the quashing of their conviction of Mr. Whittle.

THE ARSENIC ACT.

On Thursday evening, in the House of Commons, Mr. Chaplin called attention to a recent trial for horse poisoning in Lincolnshire, in which it was stated that a large quantity of arsenic had been sold by a chemist, who had entered the sale in his book as "to be used for horses," and asked whether the Government would take steps to prevent the indiscriminate sale of arsenic by chemists for such purposes. In reply, the Home Secretary expressed an opinion that some amendment of the Arsenic Act is necessary.

DEATHS OF ANNUITANTS.

We regret to have to announce this week the deaths of two Annuitants on the Benevolent Fund. Mr. Edwin Markland, who was elected an Annuitant in 1875, died on the 30th of January, aged eighty years. Mr. George David Bensley, of Wells, Norfolk, elected in 1877, died on the 6th inst., aged fifty-five years.

Transactions of the Pharmaceutical Society.

PHARMACEUTICAL MEETING.

Wednesday, February 2, 1881.

MR. T. GREENISH, PRESIDENT, IN THE CHAIR.

The fourth Evening Meeting of the Session was held on Wednesday, the 2nd inst., the chair being taken at half-past eight.

DONATIONS TO THE MUSEUM.

After the minutes of the previous meeting had been read and confirmed,

Mr. HOLMES called attention to various specimens which were exhibited on the table. The first was a specimen of guaco, presented by Dr. Symes. The name of "guaco" had been applied to a number of drugs in South America which had been used as remedies for snake bites. The drug had been recently imported into this country, chiefly, he believed, for use in homœopathic medicine. The present specimen differed from the majority of those he had seen. Whether the *Mikania Guaco* had any real therapeutical value he did not know. There was a specimen of Para tonquin beans which were very much finer than the ordinary kind, though he did not know that they were at all superior in quality to the Chinese sort. Then there was a specimen of Japanese star-anise. Those who had read the *Pharmaceutical Journal* might have noticed the statement that Dr. Geert had found the fruit to contain a poisonous oil, and as it was imported into this country and sold at about half the price of the Chinese star-anise, it appeared probable that some of it might be mixed with the Chinese star-anise, and so escape detection. It might be recognized by its smaller size, want of taste, and the paler and thicker seeds. The Japanese star-anise had not as yet appeared in this country mixed with the Chinese kind in commerce, but he was afraid that it would be so in course of time. He had been informed by Mr. Passmore that such was already the case in Amsterdam. There was also on the table a specimen of a new alkaloid, aspidospermine, and its sulphate and citrate, obtained from the white quebracho bark. There were also specimens of the oils of turpentine obtained from *Pinus sylvestris*, *P. Laricio* and *P. Pumilio*, which had been presented by Dr. A. Vogl, of Vienna. There were also on the table specimens collected by the same gentleman of the different varieties of the gentian root of commerce, together with herbarium specimens of the plants. He noticed last year that a specimen of gentian which came into commerce was remarkably ringed or annulated, and that this feature was mentioned in 'Pharmacographia' as a distinguishing character of the root of *Gentiana lutea*. On close examination it seemed to him that the rings were the scars left by the leaves upon falling off, which left the vascular bundles of the ribs, and these formed projecting points. He found upon examination that this characteristic was not confined to *G. lutea*, but occurred also in the other species, and appeared to be limited to what formed an upright rootstock, and was well marked only in the larger specimens of older plants of the larger species. One of the gentians, *G. asclepiadea*, which he found to be used in medicine in Austria, had not an upright rootstock, but a prostrate rhizome, quite different from any of the other gentians which he had seen. Another specimen on the table was one of *Aconitum variegatum*. This was one of the species said to be mixed with the ordinary aconite of commerce. It would be observed the *Aconitum Napellus* had a much longer and more gradually tapering root than *Aconitum variegatum*. The latter plant was said to be weaker in its action than *Aconitum Napellus*.

Mr. BLAND said that the question had occurred to him whether the oil which was obtained from the star-anise was identical in chemical properties and therapeutical effects with the oil of the *Pimpinella Anisum*. From some specimens that had come under his notice lately, it seemed that it was not so.

Mr. HOLMES said that, as far as he knew, they were identical in chemical properties. There was a difference in their physical properties. One crystallized much more easily than the other. The oil of *Pimpinella Anisum* crystallized at 50°, while the oil of the *Illicium anisatum* crystallized below 35°. He believed that 'Pharmacographia' said that there was no other difference known. He knew nothing of any therapeutical difference in the properties of the two oils.

The PRESIDENT asked Dr. Symes whether guaco had been chemically examined, and whether any alkaloid had been obtained from it.

Dr. SYMES said that he did not think that it had. As Mr. Holmes had said, guaco was a term which had been largely applied to numbers of plants, and samples of guaco which had come to this country had consisted of two or three species mixed together. This, however, was a reliable sample of *Mikania Guaco*. In Brazil guaco had a reputation for curing snake-bites; but in the province of Rio Grande it was used as a remedy for coughs. It was somewhat of an expectorant, but had not the depressing effect of ipecacuanha. It would be remembered that Mr. Holmes had brought chekan before the Society; that substance had been used for winter cough, and guaco seemed to fulfil the same purpose. It was pretty largely used in France, and was recommended for several purposes, having certain therapeutical effects. He observed in a French medical journal, the other day, that they were comparing guaco with curare, and remarking that, while there were some properties possessed in common by these two substances, there were certain properties which guaco did not possess. He (Dr. Symes) did not think that *Mikania Guaco* had any properties in common with curare. It was an innocent drug which was taken by the natives as an infusion and drunk freely. Whether its reputation in Rio Grande, as a remedy for coughs, was due to its sudorific effects, he did not know. It had been tried with some success in this country, but not to a sufficient extent. He could not say positively whether it had been chemically examined.

Mr. HOLMES, replying to the President, said that he did not mean to say that there were two or three different kinds of guaco imported regularly into this country as articles of commerce; but different kinds were occasionally sent over to this country by speculators, and, not meeting with any demand, they were disposed of at the rummage sales, or otherwise disappeared. The other guacos which he had seen chiefly belonged to the *Aristolochiaceæ*. The guacos derived from the genus *Aristolochia* had a very distinct camphoraceous odour, and a characteristic stem structure different from that of *Mikania guaco*. He was not aware whether guaco had ever been histologically or chemically examined. It well deserved investigation.

Mr. MARTINDALE asked Mr. Holmes whether he knew that the two specimens of oil of turpentine that were put on the table were really obtained from the oleo-resin turpentine or from the pine leaf. He thought that it would be a misnomer to term the samples oil of turpentine if they were distilled from the leaf, as he thought these had been, and were known in commerce as fir wool oil.

The PRESIDENT said that Mr. Holmes seemed to account for the rings on the gentian in a manner which did not agree with his (the President's) idea. He had observed that the ringed appearance would be found in one part of a root and not in another, as for instance in the older part and not in the younger. His idea was that the ringed appearance was largely due to age.

A paper was then read on—

The Weights, Balances and Measures employed in Pharmacy, their Defects, and the Remedy.

BY PROFESSOR REDWOOD.

This paper is printed at page 673, and gave rise to the following discussion:—

Mr. BLAND said that that meeting was greatly obliged to Professor Redwood for the very interesting and important paper which he had read. It came with what might be called a manifold authority, for Professor Redwood had had practical experience as a pharmaceutist; he was also a Professor in the Society, and he was one of the officers who acted under the statute by which this matter was regulated. His (Mr. Bland's) own impression was that they were not very greatly indebted to the Legislature for this additional act of paternal government, of which they had had so many examples in recent years. He wished that when the Act was passing there had been some Parnells or Dillons to obstruct its passage. It appeared that the tendency of legislation, as far as chemists were concerned, was to put them down altogether as noxious animals. He could not but regard the provisions of the Act as calculated to worry and harass them. They were left in doubt as to the powers of the Board of Trade and of the various inspectors. Professor Redwood had told them that some inspectors acted upon their own judgment in estimating the proper capacity of the measures, and consequently one inspector might condemn a measure which another inspector had passed. It was most unjust that a pharmacist should be subject to any proceedings for using a measure that had been officially verified. If an incorrect measure was marked, the inspector who marked it ought to stand in the gap. With regard to "the turn of the scale," Professor Redwood had used that term in a sense somewhat different from that in which it was understood by retailers. They understood it to mean a small quantity of a substance put into the scale in order to overbalance it on the side of the substance which was being weighed. He could not understand why in weights which were used for the accurate weighing of powerful medicines there should be allowed to be any excess at all. Professor Redwood had said that a pharmacist ought to have in his possession a balance which was sensitive to the $\frac{1}{100}$th part of a grain, but he had not stated how much such a balance was intended to carry. He (Mr. Bland) should consider it a very improper use of such a balance to place it upon a counter for the ordinary rough work of dispensing. He agreed with what Professor Redwood said with regard to graduated measures, but the paper appeared to have made a new use of the word meniscus. The term did not belong to a single surface. In elementary books on optics it was stated that a meniscus was a lens of which one side was convex, and one side concave. It was true that Ganot, in his book on physics, used the term in connection with the graduation of barometers, but he applied it to a solid body—erroneously as he (Mr. Bland) believed. The question about the level at which the measures were to be graduated, was one of very great importance. He disagreed with Professor Redwood in his opinion on this subject. He believed that a line somewhere above the middle line would be the true level at which to graduate a measure. Chloroform, for instance, formed a surface which was almost a plane without any concavity at all. Supposing that they had to measure six fluid drachms of chloroform in a measure which had been marked in the bottom of the concavity, they would have a quantity minus the true quantity represented by the six drachms, because the measure being graduated by the filling of it with water, there was not only the measure up to the level of the graduation, but there was that which superabounded in the shape of a ring of fluid adhering to the glass itself. Therefore, the volume of the chloroform and the volume of the water would not be the same. It struck him that measures had one defect which had not been mentioned, but which was very important, and that was that many of the measures were graduated on one side only. This was a source of very frequent error, because if the measure was not held in a perpendicular position, there would be a very material difference in the quantity of liquid that would be required to reach any particular graduation. It appeared now that there was still another rod in pickle for them. In this matter he was not only a pharmaceutical chemist, but he was a dealer in measures, and he felt very much in the position of a toad under a harrow. Any day some local inspector might pounce down upon him, for he did not know whether he was justified in having in his possession measures which were not officially verified, although they were for sale and not for use by himself for the purpose of measuring. As to the Board of Trade being about to issue a scale of allowable errors, whence the Board derived their authority in that respect, he did not know. It seemed that the Houses of Parliament directed the Board of Trade, and the Board of Trade sometimes directed Professor Redwood, and sometimes Professor Redwood directed the inspectors. Who was the prime authority, he did not know, but it appeared to him very much like the horses having to be consulted before the coachman could decide in which way he was to travel.

Mr. POSTANS said that, in the able paper to which they had listened, Professor Redwood had shown that he knew a good deal about the intricacies of the law, and he had shown very nicely indeed how he himself could drive the traditional coach and four through the Weights and Measures Act; but, with Professor Redwood's usual caution, he had also pointed out to pharmacists how unwise it would be on their part to follow his example, unless they happened to be as clever as himself. Professor Redwood had clearly shown that the Act did not apply to the weights and scales associated with scientific chemistry, but that, undoubtedly, all persons connected with the trade and practice of pharmacy were liable under it to have their scales and weights adjusted and standardized and verified. The syringe pipette, which had been recommended, would answer for such things as prussic acid, but for general purposes there would have to be many of such instruments in use. As to the minim pipettes, Professor Redwood had also shown that they had great drawbacks. He (Mr. Postans) remembered that years ago, when he was an apprentice, they always had the upright pipettes; but great difficulty was found in getting them washed out cleanly. They were certainly found to be good fly catchers in the summer months. He was very much inclined to stick up for the old conical measures. But there was another side of the question. It was very desirable to induce medical men to order spoonfuls by measure. Indeed it seemed to him that spoons might be done away with altogether if mixtures were taken by parts, and by such means greater accuracy would be insured. Quite lately some very strong medicines were ordered, and he had reason to believe that the teaspoons used were not quite what they should have been. It was well known that household teaspoons varied from one to two drachms.

Mr. FRAZER said that in the west of Scotland they had an inspector who accepted the verification of any other inspector in the kingdom, but that was not the case everywhere. A local inspector in one place might reject the inspection of another. Perhaps this Society might have sufficient influence on those in power, to say that a measure verified by one inspector in one part of the kingdom should pass everywhere. The mark was literally the Queen's stamp, and a Queen's servant in one place disowned the signature of the Queen's servant in another place.

Professor ATTFIELD said that he would submit that the Act in question should have one little addition made to its title to render the title accurately descriptive. He maintained that, instead of its being a Weights and Measures Act, it was only, from a scientific point of view, a Weights and Measures of Water Act. As Mr. Bland had pointed out, when chemists and druggists measured liquids other than water, that was ninety-nine times out of one hundred, a measure that would *deliver* a drachm of water accurately might *deliver* slightly more than a drachm of some liquids, and far less than a drachm of others. In the case of a measure holding a drachm of some thick liquid, perhaps some half dozen drops of the liquid would be left in the measure. It was to be remembered that, as Professor Redwood had mentioned, they had to deal with liquids in which they had to consider not only the force of gravity, but the forces of adhesion and cohesion. In using measures for liquids other than water, they were allowed by the Act of Parliament to swallow a camel, but they were compelled by the Act to strain at a gnat. They were to strain to get the tenth of a drop of water, while they might disregard the tenth of a drachm of an important medicine. Another point of view which one might take of this subject was, of course, the point of view of policy. He did not wish to say a single word against accuracy, but he thought that there were better ways of being accurate than depending upon these mechanical contrivances, and one was to depend upon the knowledge, the skill, and the common sense which every pharmacist ought to possess. The mischief was that dependence on mechanism always tended to weaken one's sense of personal responsibility. He feared it was as hopeless to attempt to enforce pharmaceutical accuracy by Act of Parliament as by the same means to enforce goodness in the people generally.

Mr. Martindale said that Professor Redwood was very severe upon the measurement of liquids, and probably justly so. He would like to ask him whether he would be inclined to favour the continental mode of dispensing—that of weighing the liquids. He (Mr. Martindale) had looked forward for some years to the metrical system being introduced into this country, and in that case there might be no measurement for liquids. That was a great objection. They could certainly measure small quantities into a large bottle much more easily than they could weigh them. If 15 or 30 minims of prussic acid had to be put into an 8 ounce mixture, it could be done more expeditiously and accurately even with the conical minim measure than it could be done by weighing.

Mr. Long said that he hoped that the suggestions which Professor Redwood had made would produce a beneficial influence on pharmacy, by showing that it ought to be entirely removed out of the category of trade and into the category of a higher occupation requiring science, qualification and remuneration. With Mr. Bland and Mr. Postans he questioned the propriety of such finessing with medicine as required a sixth of a grain of this and a quarter of a grain of that and the other, to be made into one pill and also to all infinitesimal single doses requiring to be weighed. With all due respect to the medical profession, he held that it would be very much better if they would order less of a potent medicine in a bottle, and give a larger dose. The danger would be infinitely less than at the present time. Dr. Paul, in an article about weights and measures, had said that he thought that scales and weights, or the scales especially, deserved better treatment. It was a great trouble to get the scales kept as they ought to be. With regard to the minim tubes he had used them for eighteen years, but his assistant used sometimes to drive the tube down to the bottom of the bottle, and it would come out with the bottom off. It was all very well for prussic acid and such things as that. The Government ought not to stamp anything which was not correct. What was the use of a Government ordering them to do certain things and then giving them inaccurate data to start with? They ought to use minim measures for measuring minims, and ounce glasses for measuring ounces. As to dispensing scales they should be supported on the balance principle, and not on knife edges, and they ought to be kept under a glass shade.

Mr. Holmes wished to make one remark with regard to the conical measure. When he was an apprentice his first difficulty was to tell exactly when the liquid in the glass measure was level with the mark. He could not see the mark opposite, and he found that unless the measure was held perfectly even the slight tilting on one side would cause a superfluous quantity to be unwittingly measured. If the line were carried round to the side it would be more easy to see by the liquid crossing the line at the side when the measure was not level. With regard to glass measures, Professor Redwood showed that the inaccuracy did not make much difference after all. In a 2 drachm measure there might be 10 minims too much, according to the variation of the line. But Professor Redwood further said that, when the liquid was poured out, there was always a small quantity left, so that the ten minims would be divided, and the difference would probably be only half a drop in a dose.

Mr. Atkins said that he thought that since they had the Act they were bound as pharmacists to make the best of it. He could not, however, but regret the fact that the operation of the Act had been extended to chemists. It was intended originally for the purposes to which Professor Redwood called attention in the earlier part of his paper, and related to what might be called matters of trade—the giving of just weights and measures, so that the purchasers should really get their money's worth. The Act seemed to exempt entirely and exclusively that body of gentlemen who would be specially interested in it, namely, scientific men. They were left, and he thought that chemists might have been left also, as a humbler limb of the body of scientists. In the country, chemists really would be considerably imperilled by the action of incompetent inspectors. It was a matter of prime importance that if inspectors were to descend upon pharmacies and test the weights and measures, they should themselves be tested first as to their accuracy. He was glad, however, that the Act was to some extent permissive in its action, and municipal bodies in the country were using a wise caution with regard to the adoption of the Act.

Mr. Salomon said that he had listened with a great deal of pleasure to the excellent paper. Professor Redwood called attention to the fact that though he was previously in favour of the centre line of the meniscus being taken as the true line of water, he now preferred to take the top, and the gentleman who was at the head of the Standards Office had adopted that view. He (Mr. Salomon) thought that it would be much more easy, in the ordinary way of dispensing, to get the true line by taking the line in the centre as something to guide each way. He might say, as a manufacturer, that he thought that the older measures in existence, with very few exceptions, were taken from the middle line of the meniscus, and that comparatively few were taken on the lower line. If an alteration was made it would be good for trade, because the old measures would have to be broken down and a fresh stock produced. With regard to the method in which the graduators made the lines, he had never seen varnish used for the purpose. As a rule, a pigment of chalk or something of the sort was taken, and the mark was made with a steel pen. The copper wheel got a better grip of such a substance than it would get upon varnish. The establishment which he represented were anxious to carry out the views of the Board of Trade, and to meet the convenience of chemists, but they had had considerable difficulty since the Order in Council in 1879. As to measures which were graduated on one side only, he believed that they were only the cheaper ones.

The President said that they were much indebted to Professor Redwood, for bringing before them at the present time the subject of measures, weights and scales. It had been stated by one gentleman that it would have been better if chemists' measures had been left out of the Act; but if that had been done their weights and measures would not have been legal unless there had been a special exemption with regard to apothecaries' weights and measures. He thought that those now present could not take too serious a view of this matter, and more especially at the present time when pharmacy was taking a very much higher position than it had hitherto done. The greatest care ought to be taken to get the most accurate measures, weights and balances. Professor Redwood had reflected on the hand scales, but he (the President) was very much in favour of the hand scales if they were properly used and kept in a proper condition. He preferred them to the counter scales which were used on the Continent. It would be impossible for the pharmacist to get through half his business if he had to use such a delicate balance as that which was exhibited on the table. As to conical measures, he quite agreed they were not so accurate for small quantities as cylindrical measures, and he would never use them. A cylindrical measure could be cleaned out without much difficuly. The pipette which had been shown seemed to be very accurate, but he did not think that it could be very well used in practice; it would be almost one person's work to keep the pipette clean.

Professor **Redwood**, in reply, said, with regard to the observations which had been made about the balances, that it must be borne in mind that he merely brought them forward to indicate the sort of balances which he thought every pharmacist ought to have, with which to test his weights, and such ought to be used exclusively for weighing such things as strychnia and morphia. He would not contend that they should be used in all dispensing, but he believed that a balance suspended in the same way, though not in a glass case, would admit of quite as rapid dispensing as the ordinary hand balance. Mr. Oertling supplied a delicate balance in a glass case for about £3 7*s*. 6*d*. He, Professor Redwood, strongly recommended pharmacists to introduce such balances into their establishments, and he believed if prominently set before customers, they would produce a beneficial effect. Such a balance should be appealed to whenever any very important medicine was ordered, rather than one of the ordinary kind. There was a great necessity for some improvement in the provision which was made for accurate weighing and measuring in dispensing. He agreed with what Mr. Bland had said as to the use of the term "meniscus," but, nevertheless, the term was employed as one which fairly represented the appearance of the curve at the top of a liquid when it was observed in a measuring glass. As to the desirability of substituting weighing for measuring, that was a question with which he had nothing to do on the present occasion. He could not quite agree with his colleague, Professor Attfield, that the Act ought to be designated one for regulating the weighing and measuring of water. The Act applied to dry measures and to measures of all descriptions. He fully admitted that there was some force in Mr. Bland's argument that if a measure which had been graduated to the bottom of the meniscus was used for a liquid which did not exert the same adhesion on the surface of the glass as water it would not be a perfectly correct measure. He would like to ask Mr. Bland how he would provide a remedy. The evil would be quite as great if they took any higher part of the meniscus. But what he (Professor Redwood) contended for was that there was only one part of the meniscus which could be clearly defined, and that was the bottom. He received every day, from manufacturers and dealers and druggists, verified and marked measures, that he might give his opinion as to whether they were accurate or not. There were not more than one or two in every dozen on which he should be prepared to put his mark. He believed if the Board of Trade found the Pharmaceutical Society ready to back them in measures which they proposed to suggest to the trade generally, that a remedy would speedily be found for that which was now a very crying evil, namely, that chemists all over the country were using measures which had been graduated and verified according to different systems. Only the other day he found a measure with 2 ounces graduated upon it at the bottom, but which really contained 2 ounces 3½ drachms in the space marked 2 ounces. Such results were coming constantly under his observation. It was time that they came to some agreement as to the mode of marking. It did not matter much which plan was adopted, if all the measures were made in the same way. It behoved the Society to consider the present variations, and to try to find a remedy. On that account he urged pharmacists, when purchasing glass measures, to require a guarantee that the measures had been graduated from the bottom of the meniscus.

A vote of thanks was accorded to Professor Redwood, and the meeting adjourned.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

February 2, 1881.

Present—Professor Tichborne, President; Sir G. B. Owens, Messrs. Allen, Bennett, Brunker, Collins, Grindley, Hayes, Hodgson and Oldham.

The minutes of last meeting were read and confirmed, and the consideration of letters was then proceeded with.

The first, from Mr. J. P. Harold, M.P.S.I., acknowledging the receipt of the Registrar's communication informing him of the resolution passed by the Council at last meeting, and saying that when he should have necessity to again address the Council upon similar matters he would more specifically define the portions of the Act alleged to be infringed.

The second, from Mr. Joseph Holton, asking the Council not to require him to produce a certificate of having attended a course of Practical Chemistry as required by the regulations of the Society.

The Registrar was directed to inform him that the Council had no power to abrogate the bye-laws.

The third, from Mr. James Rooney, asking if it would be legal for two persons, one of whom was qualified and the other not, to open shop for the sale of drugs.

Mr. Hodgson said it would be contrary to the Act.

Mr. Oldham pointed out that it would be distinctly illegal.

The Registrar was directed to inform him that such a course would not be legal.

Mr. Solomon Donovan, Downpatrick, having been duly proposed and seconded at last meeting, was elected a member of the Society.

Mr. Grindley proposed, and Mr. Bennett seconded—

> "That a committee be appointed to make arrangements for the Members' Annual Dinner of 1881."

Mr. Grindley said that most present would recollect that about two years ago they had their first annual dinner, and that last year from some cause which did not transpire there was none; he thought that it should not be allowed to drop, and with that intention had brought the matter before the meeting, as it was a custom prevailing in most societies and was conducive to good fellowship between members who would be otherwise unknown to one another.

The President said he did not think that the previous dinner had been a success, and suggested that a much better one should be provided in the event of their arranging for it.

A long discussion followed, in which Messrs. Hodgson, Brunker, Oldham, Hayes and Sir G. Owens took part, and ultimately Mr. Grindley modified his motion to read as follows:—

"That a Committee be appointed to report upon the advisability of holding an annual dinner, 1881," naming as a committee Messrs. Draper and Allen, with the proposer and seconder, and the amended motion was then passed.

Messrs. Ponsonby and Murphy's account for printing from October 17, 1878, to September 30, 1880, amounting to £51 15*s*., was presented for payment.

Mr. Hodgson complained of the length of time the account had been running, and thought that they ought to get the printing of the Calendars done by contract.

The President agreed that such a course would be much better.

Mr. Grindley mentioned that the average cost of the Calendars was £15 per annum.

After some discussion, Mr. Hayes proposed and Mr. Allen seconded, that the account be paid, and the resolution was adopted.

The report of the examiners for the licence of the Society, examination held January 5, was laid upon the table. Eight candidates entered their names; six presented themselves for examination, of whom the following five passed:—

Bernard Joseph Costello ....87, Lower Gardiner Street.
Thomas Hamilton Edgar.........7, Digby Terrace.
Thomas Edmund Golden.........Parsonstown.
William Mark Oldham ......6, Ulverton Terrace, Dalkey.
Edward Patrick Walsh ....10, North Earl Street.

The meeting then adjourned.

EVENING MEETING.

The second Evening Meeting of the present session was held in the King and Queen's College of Physicians, Kildare Street, Dublin, on Tuesday, February 1, 1881.

The chair was taken by Mr. R. Donovan, M.P.S.I.

Owing to the unavoidable absence of the Honorary Secretary, Dr. Tichborne, the minutes of the last meeting were read by Mr. W. N. Allen and confirmed.

Amongst the members present were Messrs Grindley, Harold, Draper, Allen, Wells, Patterson, Evans, Conyngham, etc.

A valuable and interesting paper of great pharmaceutical interest, "On the Nitro-prussides of the Alkaloids," was read by Dr. E. Davy, M.R.I.A., Examiner in Chemistry, Pharmaceutical Society of Ireland.

Dr. Davy exhibited samples of the nitro-prussides of quinine, strychnine, nicotine, and morphine, and explained the methods for their preparation.

Mr. Draper, F.C.S. said that the paper was an important one, specially interesting to pharmacists, and expressed a hope that the members of the Society would follow the example of Dr. Davy and participate in the work of original research.

The other communication was by Mr. Draper, F.C.S., "Note on the Purification of Oleic Acid." Mr. Draper exhibited samples of purified oleic acid. After a discussion relative to the employment of the purified acid in the preparation of some official preparations, the meeting adjourned.

PRIZE ESSAYS.

Two prizes, of the respective value of two and three guineas, are offered for the competition of candidates who are members of the Society, or have passed its Preliminary examination.

The essays must be sent, addressed "Secretary of Prize Essay Committee," not later than June 1 next, and are not to be signed by the authors, but accompanied by a sealed envelope containing his name and address, and referring to an initial or *nom de plume* at foot of the essay.

I.—Three Guineas.

(*Offered by Mr. H. N. Draper.*)

For an entirely trustworthy and yet easily practicable method of determining the purity of lithium carbonate.

II.—Two Guineas.

(*Offered by the President.*)

For the best essay on improved formulæ for the syrups of the Pharmacopœia (particularly in reference to the syrups of hemidesmus, poppies, roses, senna, and ginger).

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The seventh general meeting of the thirty-second session, was held at the Royal Institution on Thursday evening, January 20, the President, Dr. Symes, in the chair.

The minutes of the previous meeting were read and confirmed and the following donations announced:—'The Journal of the Liverpool Polytechnic Society'; 'Proceedings of the Liverpool Geological Society'; 'Year Book of Pharmacy'; the current numbers of the *Pharmaceutical Journal*; *Canadian Pharmaceutical Journal*, and the *Chemists' Journal*.

Mr. Granville H. Sharpe and Dr. George Tate were elected members.

The following communication was then read:—

Adulterated Linseed Oil.

BY ALFRED H. MASON, F.C.S.

A few weeks ago I was consulted by a friend as to a method for the detection of a known adulterant in boiled linseed oil. My friend had previously taken the opinion of five well-known professional chemists, and as their results were somewhat divergent, it occurred to him that I perhaps might know of, or could ascertain some project for its certain detection, or as a buyer of the article for export I might have noticed the adulteration.

It has been definitely ascertained that about 250 tuns of this adulterated oil have been shipped from Liverpool to foreign ports, and as the adulterated article is unfit for the purposes to which boiled linseed oil is applied, it is rather a serious matter, and a fraud of this nature affects the commercial reputation of our city. I take it, therefore that the nature of the fraud having been detected and being in possession of the facts as to the method of procedure, it is a duty to make these facts public, and perhaps this Association will be doing a good service to our merchants by making them cognisant of the risks they incur.

The adulterant employed was mineral oil, sold as neutral oil. This oil has a specific gravity of ·865, and it flashes at 280° Fahr. Genuine boiled linseed oil does not flash until heated to 540° Fahr, the adulterated oil flashed at 330° Fahr.

The specific gravity of genuine boiled linseed oil is ·940; of the adulterated sample ·9146.

It has been ascertained that in the manufacture of this adulterated oil, about 30 per cent. of neutral oil is mixed with the linseed oil, previous to boiling.

To determine the adulteration, Thomson's method was employed. The sample was boiled with an alcoholic solution of caustic soda, by which the vegetable oil was converted into soap. This is then mixed with sand, and treated and washed with pure petroleum spirit,—distilled at a temperature under 190° Fahr.—which dissolves out the mineral oil, leaving the soap insoluble. The spirit is then distilled off from the spirit solution of mineral oil, at a temperature not exceeding 220° Fahr., and the residue of the mineral oil weighed and calculated on the weight of the original mixed oil taken.

By this method 24 per cent. by weight of mineral oil has been abstracted from this sample, specific gravity

·8720, the sample itself being ·9146, far below that which genuine boiled linseed oil ought to be.

An interesting discussion followed in which many of those present joined.

Mr. T. Farmer then read the first part of a paper on "The History of Chemistry," of which the following is a short abstract:—

NOTES OF A PAPER ON THE HISTORY OF CHEMISTRY.

BY THOMAS FARMER.

When the foundation stone of chemistry was laid, we cannot even suggest. It probably originated in the east, was built up during the middle ages and completed by Lavoisier, Black and Priestley. The word χημεία first occurs in the lexicon of Suidas, a Greek writer, of the eleventh century, he defines it as "the preparation of gold and silver." Robertus Constantinus, in 1592, gives the same definition and quotes Suidas as an authority. Olaus Borrichius holds there were Greek writers before Suidas. It is said that the King's Library in Paris contains a Greek manuscript of the fifth century, but it was probably written about the tenth century by monks, either of Alexandria or Constantinople. The word "chemistry" is thought by many to come from χέω = to fuse or melt, or χύμα = that which is poured out. Plutarch tells us that Egypt was called *Chemia* on account of the dark colour of its soil, the word is related to the Coptic *Chem* or *Kheims*, which signifies obscene, occult. This is probably the true derivation of the word chemistry. The earliest writer on chemistry known with any degree of certainty was Geber, who lived in the eighth century; he was acquainted with many chemical substances and all the processes practised by his successors during the following eight or nine centuries. The theory of our elements is perhaps the oldest physical theory with which we are acquainted, it being certain that it was adopted one thousand five hundred years B.C. There was a great tendency among the ancient Greek philosophers to make one element fundamental and from it evolve the rest. Thales, who lived in the sixth century B.C., held that water was the principal element; Anaximenes, air; Herekleitos, fire; Pherekides, earth. The theory of Thales had many supporters in the middle ages, among whom was Van-Helmont. It was brought to an end by Lavoisier in 1770, after enduring twenty-four centuries. The ancients had an idea of atoms. Leukippos held that the world was produced by the falling together of small indivisible atoms which possess rapid circular motion and are the principles of things. Demokritos (460 B.C.) extended the atomic theory of Leukippos. The greatest writer among the ancients was Aristotle; he wrote several works; his views were generally accepted during the middle ages and he was the first to introduce the ether or fifth element into Greek philosophy. He held that the four elements were convertible into each other and regarded them as states or conditions of matter rather than the matter itself. It is certain that the ancients had no idea of practical chemistry as we understand it. There was no connecting link between chemical facts and theory; the thought of the age was against such a possibility, a man who would make an experiment being thought unworthy of the name of a philosopher. Seven metals were known to the ancients, gold, silver, copper, tin, lead, iron and mercury. They were unacquainted with any other metals in an uncombined state, but in a combined state their knowledge of them was very considerable. They were also acquainted with dyeing, the "purple of Tyre" obtained from the "Buccinum" or "Purpura" of Pliny being their most valuable and esteemed dye. Probably the strongest acid known to the ancients was acetic acid or vinegar. To a believer in the Aristotelian theory nothing would appear simpler than the transmutation of one substance into another, and the conversion of the baser metals into gold would be left quite open. We can thus understand the diligence with which the old alchemists worked to discover the philosopher's stone, the source of all happiness. Although alchemy was a secret science, the amount of literature on the subject was enormous. Zetzner, of Strassburg, in 1602, published more than one hundred tracts by notable authors; later on was published two large volumes containing one hundred and twenty-two alchemical treatises. Greek manuscripts number eighty-seven. To these we may add MSS. in Arabic and Persian, and treatises in Spanish, Italian, German and English. If we consult these works, of no matter what date or author, we find mention of Hermes Trismegistus, who was supposed to have lived some two thousand years B.C. His tomb was said to have been discovered by Alexander the Great, in a cave near Hebron; in it was found a slab of emerald on which were written the precepts of the great master on the art of making gold. The style of the inscription bears such a very strong resemblance to the style of the alchemical literature of the middle ages, that we are perfectly justified in believing that Hermes never had any existence at all. The alchemists firmly believed in him, and even called themselves "Hermetic Philosophers." A few of the principal alchemists were Albertus Magnus, S. Thomas Aquinas, Bacon, Raymond Lulli, Arnoldus and Basil Valentine.

The usual vote of thanks to Mr. Farmer brought the meeting to a close.

BRISTOL PHARMACEUTICAL ASSOCIATION.

The annual meeting was held on the evening of Wednesday, January 26, at the Museum and Library, Queen's Road. Mr. G. F. Schacht, the President, occupied the chair.

The following report was received and adopted:—

"The members and associates have met from time to time during the past year, and when the proceedings have appeared to possess any general pharmaceutical interest, they have been published in the Journal.

"The Council are glad to be able to report that the books of the library are much read. A systematic inspection of the state of the shelves and of the entries in the catalogue has enabled them with some confidence to announce this gratifying fact. They take the opportunity, however, of urging all who take the books away to comply with the rule of recording the fact in the catalogue, according to the regulation explained in its first page. Owing to carelessness upon this point, the Council are unable to trace two of their volumes, viz.:— Roscoe and Schorlemmer's 'Chemistry,' vol. 1, and Gubler's 'Pharmacy.'

"They are also glad to announce that every specimen of materia medica which they possess is now properly named and arranged on the shelves of their museum. For this most useful work, the Association is indebted to the ability and kindness of Mr. Arthur Little, who has bestowed much knowledge, time and labour upon it, and who has further undertaken to continue the work as soon as fresh material is placed in his hands.

"The Council of the Pharmaceutical Society of Great Britain have most generously directed their Curator to select such duplicate specimens from their own museum as can be spared for the completion of that of the Bristol Pharmaceutical Association. It is expected that these will be delivered in the course of a few weeks, and when arranged by Mr. Little they will, with those already possessed, constitute a museum of materia medica of real educational value.

"The financial statement for the past year is herewith appended. It will be seen that the operations of the Association, although conducted with the utmost economy, leave but a small balance in the Treasurer's hands.

"Having in view the large and direct advantages the pharmacists of the neighbourhood are able to reap from the Association, the Council appeal with confidence to them all, masters, assistants and apprentices, to join its ranks and thus increase its sphere of usefulness."

FINANCIAL STATEMENT.

Treasurer in Account with Bristol Pharmaceutical Association.

	£	s.	d.
Dr.			
1880.			
To subscriptions of 34 members at 10*s.* 6*d.* each	17	17	0
„ „ of 30 associates at 2*s.* 6*d.* each	3	15	0
	21	12	0
Cr.	£	s.	d.
By balance due Treasurer for 1879	1	11	7
„ hiring rooms	3	0	0
„ attendants	1	0	0
„ annual payment to Treasurer of Bristol Museum and Library	12	12	0
„ stationery and Secretaries' account	2	18	10
	21	2	5
Balance in hand	0	9	7
	21	12	0

The following were elected to act as the Council for the current year:—Messrs. Allen, Berry, Pitman, Plumley, Schacht, Stroud, Warren and White.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual supper of the above Association was held at the Flying Horse Hotel, on Wednesday, January 26. Mr. W. H. Parker, the Vice-President, occupied the chair in the unavoidable absence of Mr. R. Fitz-Hugh, the vice-chair being occupied by Mr. J. Lewis. There were about thirty-five members and friends present. The cloth being drawn and the usual loyal toasts having been given, Mr. George proposed the toast of the evening, viz:—"Success to the Nottingham and Notts Chemists' Association," a in very suitable speech, which was replied to by the Chairman. Other toasts followed, the one of "The Lecturers" being responded to by Mr. C. L. Rothera, B.A. Messrs. Cockrem and Massey gave some very pleasing pianoforte pieces, and Mr. Mark Meats also contributed to the enjoyment of the evening by giving a series of humorous and characteristic songs and impersonations.

Messrs. Evans, Lescher and Co., Clarke, Bleasdale and Co., Oldfield, Pattinson and Co., and Mr. J. S. Haywood, promised handsome donations and prizes to the Association. The usual vote of thanks concluded the evening.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The fourth meeting of the session was held in Anderson's College, 204, George Street, on February 2, and in the unavoidable absence of the President, Mr. Robert McAdam, the Vice-President, Mr. Robert Brodie, was called to the chair.

After the minutes of previous meeting had been read and approved, Mr. Brodie asked Mr. Archibald Paterson (Govan) to read his paper on "A Visit to the late Gas Exhibition."

Mr. Paterson began his remarks in a racy and humorous manner on the various uses to which gas could be applied, from the heating of a plaster iron to the infusing of a cup of coffee in the shop, if at any time the chemist and druggist required to do so. He referred to the various materials used in some of the gas stoves to give the appearance of coals burning, *e.g.*, pumice stone, asbestos, fire clay, etc.; he also adverted to the use of gas as a motive power, as shown by the action of several machines which were propelled by means of gas. Mr. Paterson alluded to the amount of information to be derived from such exhibitions, where the various inventions for the utilization of gas are brought together so that they can be examined and their respective merits seen. The other products of coal were then touched upon, such as the exhibits of shale oils, paraffin, and a whole series of the aniline colours. He then made a short reference to the electric light, which was well shown by two different companies, and threatens to rival gas for lighting large spaces, although in the meantime the gas is more economical. In conclusion, Mr. Paterson said the visitor, on leaving the exhibition, was enabled to see cooking carried on in all its branches by gas, as the refreshment department got its heat for cooking from gas stoves; and on getting outside the exhibition the attention was attracted by the model lighthouse, the light being gas instead of oil; also the floating gas buoy of Pintsch, which was supplied with compressed gas to give a light for twenty days and nights, and could be used to warn mariners of shoals and sunken rocks. Lastly, an immense block of coal arrested the attention from its hugeness, and the mind reverted to an epoch far distant from the present, when no doubt the mineralized vegetal material of which it is now composed was once the inhabitant of some primeval forest, there basking in the heat of the sun, and being refreshed by rain from the clouds.

An animated discussion followed the reading of the paper, in which Mr. J. A Clarke, Mr. Lees, Mr. Brodie and Mr. Hunter, took part.

The next business was a short paper, by Mr. G. Gilmour, on "Botany."—The author treated upon the various parts that go to form a plant, *e.g*, root, stem, leaves, flowers, and fruit; he also adverted to their functions and the fertilization of a plant by pollen from its own stamens and that carried on by insect agency. He then showed some diagrams illustrating some of his remarks and recommended young students to follow the plan of Dr. Silver, which is, to cut pieces of paper of the same shape as the various forms of natural leaves. By doing so the mind becomes more impressed and their various forms better remembered.

A short discussion on the paper ensued, after which the Vice-President called upon the members to give Mr. Paterson and Mr. Gilmour a hearty vote of thanks for their respective papers. This was duly awarded.

The Secretary placed on the table a copy of the 'Year-Book of Pharmacy,' presented by the Pharmaceutical Conference, also a copy of the 'Progress of Pharmacy,' presented by the Pharmaceutical Society. He was instructed to convey the thanks of the Association to both Societies for their gifts.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The sixth meeting of the session was held in the Church Institute, on Monday evening, February 7, Mr. J. Boyd, Vice-President, in the chair.

After the minutes of the preceding meetings had been read,

The Chairman called upon Mr. Harrison to read a paper on "Gum Acacia."

The essayist commenced by describing the sources of the gums used in commerce, pointing out the difference in appearance of the Turkey, Senegal, Barbary, Cape, East Indian, and other varieties. Mr. Harrison then gave the uses, adulterations, and chemical constituents of gum acacia, showing experimentally the methods for the detection of starch, etc.

An interesting discussion followed the reading of the paper.

Proceedings of Scientific Societies.

THE BRITISH PHARMACEUTICAL CONFERENCE.

A meeting of the Executive Committee was held at 17, Bloomsbury Square, London, on Wednesday, February 2, 1881, Mr. G. F. Schacht, Vice-President of the Conference, in the chair.

Professor Attfield, F.R.S., Messrs. T. Greenish, S. Plowman, Charles Ekin, M. Carteighe and Dr. Symes were also present.

Letters of apology for non-attendance were read from the President (Mr. R. Reynolds), Messrs. Grose, Hughes, Benger and Umney.

The minutes of the previous meeting were read and confirmed.

The Sub-Committee appointed at the last meeting reported that they had received twenty-five applications for the post of Secretary, in response to advertisements inserted in the *Pharmaceutical Journal*, *Chemist and Druggist*, *Nature* and the *Chemical News*. Three of the applicants were recommended to the Committee as being eligible for the appointment.

A ballot having been taken, Mr. Philip Princep was elected Secretary for the current year.

An honorarium of £10 10s. was voted to Dr. Senier in acknowledgment of his services to the Conference during the whole time he had been one of its officers, and especially during the past six months.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, February 3, 1881, Dr. Gladstone, Vice-President, in the chair.

The following certificates were read for the first time:—W. E. Adeney, R. A. Edgell, M. Hiddingh, O. V. Pisani, L. T. O'Shea.

It was announced that a ballot for the election of Fellows would take place at the next meeting of the Society, February 17.

The following papers were read—

On the Estimation of Organic Carbon in Air. By Drs. DUPRÉ and HAKE.—In a previous paper (*Journ. Chem. Soc.*, March, 1879), the authors demonstrated the possibility of estimating gravimetrically minute quantities of carbon by burning in a current of oxygen, absorbing the carbonic acid in baryta water, converting the carbonate with sulphate and finally weighing the barium sulphate thus obtained, the substance thus formed weighing 19·4 times as much as the original carbon. The air to be analysed was conducted by glass tubing into the laboratory, and there, after filtration through asbestos, divided by a T piece and suitable pinchcocks into two equal currents; one of these was sucked through an absorbing apparatus containing baryta water, the other passed first through a porcelain tube containing copper oxide heated to redness, and then through an absorption tube. The result obtained with the first current obviously gives the CO_2 in the air, that with the second the CO_2 in the air + the CO_2 due to the combustion of any organic carbon. Ten litres of the ordinary air round the laboratory after filtration through asbestos gave ·0001 to ·0002 grain of carbon present as organic carbon. The quantity of air employed in each experiment varied from 4½ to 16 litres. Details of the various experiments are given. The authors have not yet attempted to estimate the suspended organic carbon. The authors criticize the results previously obtained by Boussingault, who found in 10 litres 0·0019 grain carbon, and by Verser, who obtained in 10 litres 0·00154, about ten times as much as the mean result obtained by the authors (0·000154). They also refer to the results obtained by Pettenkofer in his well-known experiments on the elimination of H and CH_4 by animals. Pettenkofer seems to have assumed that the air in his experiments was free from organic carbon, and thus to have laid his results, on that subject, open to a serious fallacy.

The Chairman remarked on the importance of having a method for estimating satisfactorily the organic carbon in the atmosphere, especially in towns subject to the visitations of fog, etc.

In answer to some questions, Dr. Dupré stated that the greatest precautions were taken in making the joints; the glass tubes always overlapped, so as to expose the air as little as possible to the caoutchouc tubing. Ordinary metal gas tubing was at first employed, but absorbed so much CO_2 that its use had to be abandoned. The excess of carbon found by Boussingault might perhaps be explained by the copper employed by him containing carbon.

Mr. Williams pointed out that ordinary black rubber tube was very pervious to CO_2.

The next paper was—

On the Action of the Copper-Zinc Couple upon Nitrates and the Estimation of Nitric Acid in Water Analysis. By M. W. WILLIAMS.—The estimation is conducted as follows:—Some strips of zinc foil are placed in a wide-mouthed stoppered bottle, and covered with a 3 per cent. copper sulphate solution. When the zinc has acquired a sufficient coating of copper, the solution is poured off and the copper-zinc couple washed with distilled water and finally with the water to be analysed. The couple is again drained and the bottle then filled with the water, stoppered, and placed in a warm (24° C.) situation, until the reduction of the nitrates is completed. The clear fluid is then withdrawn, and titrated directly by the Nessler method; about 1 square decimetre of zinc should be used for every 200 c.c. of water containing 5 parts of NH_3 in 100·000. By saturating the water previously with CO_2 or by adding a little pure sodium chloride to the water the reaction can be expedited so that it is completed in a few hours. The nitrates are apparently first converted into nitrites and the nitrites into ammonia. As soon as the water contains no nitrites the conversion of the nitrates into ammonia is complete; in order to ascertain when this is the case, the author employs metaphenylene diamine, which in acid solution gives an intense yellow colour with nitrous acid. To calcareous waters, which give a turbidity when the Nessler reagent is added, the author adds a fragment of pure oxalic acid, allows the oxalate to settle, and titrates the clear liquid. The author has investigated the effects of temperature, and the addition of various substances on the rapidity of the above reaction. At low temperatures, the formation of ammonia is much retarded. The presence of alkalies, sodium hydrate, calcium hydrate, etc., retard, whilst carbonic acid, sodium chloride, etc., accelerate the reaction. The author also gives tables showing the amounts of nitrous acid and ammonia formed at different intervals after the commencement of the experiments. In conclusion, the author stated that he had applied the reaction so as to shorten the well-known process of Frankland and Armstrong considerably, and had been able to avoid the addition of sulphurous acid in the process; he hoped to publish these results shortly.

In answer to a question of Mr. Groves, the author stated that bicarbonate of soda hindered the reaction quite as much as the carbonate.

Mr. Maxwell Lyte suggested that, as the action of the copper-zinc couple seemed to be electrolytic, the retardation produced by sodium carbonate and the acceleration by sodium chloride were simply due to alterations in the electrical conductivity of the solution.

Professor Tidy did not quite understand the special advantage of this process; by the indigo method, following out some suggestions given him by Dr. Voelcker, he was now able to estimate the nitrates present in a water with perfect accuracy in ten minutes. In his hands the aluminium method had failed.

Dr. Dupré thought that the great value of Mr. Williams's process was in connection with Frankland and Armstrong's combustion method; if the use of sulphurous acid could be avoided and the nitrates got rid of by the copper-zinc couple, this method of water analysis would be almost perfect.

Mr. Warington made some remarks as to the precautions which should be taken in employing the metaphenylene diamine test for nitrites; solutions of different strengths could not be compared together. He had found the method given in Frankland's treatise on water analysis work well. He did not quite see the advantage of the author's method of estimating nitrates over the indigo method.

Mr. W. Thorp thought that the author's method would be of more importance in connection with the estimation of organic carbon and nitrogen in waters than as a method for estimating nitrates. He did not feel inclined to join in Professor Tidy's condemnation of the aluminium method; he had had much experience with it at one time, and found that it worked satisfactorily. He had some difficulties with it with two classes of waters, rain water and sea water. He agreed with Mr. Warington that a direct estimation of the ammonia in water (without distilling) was never satisfactory.

Mr. Lloyd had used the indigo process and the copper-zinc process side by side; in his opinion the first, as modified by Dr. Voelcker, was the most expeditious.

Mr. Williams, in reply, said that he did not distil the water before nesslerizing. To calcareous waters he added a crystal of pure oxalic acid, which precipitated the lime; he had not found it necessary to distil the water. He thought that when his process was combined with Frankland and Armstrong's, chemists would prefer it to the aluminium method. He asked Mr. Thorp, how he ascertained when the action of the aluminium had ceased.

Mr. Thorp replied that as all action ceased in five to six hours and no more ammonia was formed in forty-eight hours than in six, he concluded that all the nitrates were decomposed. He thought that although the lime might be precipitated the natural colour of a water would often interfere with the nessterizing unless the water was distilled.

On the Position taken by the Nitro Group on nitrating the Dibromotoluenes. By R. Nevile and A. Winther.—The authors conclude that bromine as well as CH_3 has a tendency to cause the nitro group to take up a position para to it, or if the para position be occupied, then an ortho position; and further, that the combined influence of CH_3 and one bromine atom can cause the nitro group to take a position meta to the second bromine atom.

On some of the Various Derivatives of Toluene and the Toluidines. By R. Nevile and A. Winther.—The authors have prepared and studied bromnitrotoluene obtained by the action of ethyl nitrite on bromnitrotoluidine, m.p. 74°–75°. By the action of tin and hydrochloric acid on the first mentioned substance an oily orthobromparatoluidine was formed, which after solidification melted at 25°-26°. By the addition of bromine water to a hydrochloric acid solution of this substance tribromoparatoluidine was obtained, m.p. 82·5°–83°. By converting dibromonitrotoluidine, m.p. 125°–130° into diazoperbromide and decomposition with glacial acetic acid tribromonitrotoluene, m.p. 105·8°–106·8° was obtained. By reduction with iron and acetic acid tribromotoluidine, m.p. 118°–118·6° was procured. A tetrabromoparatoluidine was obtained by the action of bromine water on dibromoparatoluidine in HCl solution. In conclusion, the authors give a table containing the various bromine, nitro and bromonitro derivatives of toluene and the toluidines investigated by themselves and other chemists.

The Society then adjourned to February 17, when a ballot for the election of Fellows will take place, and the following papers will be read:—"On a new Apparatus for showing the Dissociation of Ammonium Salts," by D. Tommasi; "On the Estimation of Organic Carbon and Nitrogen in Water Analysis simultaneously with the Estimation of Nitric Acid," by M. W. Williams.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual dinner of the above Association took place at the Holborn Restaurant on Wednesday, January 26; Professor Bentley in the chair. Amongst those present were Dr. Stoeker, M.D.; Dr. Berkart, M.R.C.P.; J. Hornsey Casson, Esq., M.R.C.S.; Messrs. Greenish, Robbins, and other eminent pharmacists.

After the usual loyal toasts had been duly honoured, the Chairman gave the toast of "The Medical Profession," which was suitably responded to by J. Hornsey Casson, Esq., who stated that, in his opinion, the progress made during late years in medicine was undoubtedly due, to some extent, to the partial separation of prescribing and dispensing; and he ventured to predict that, in course of time, this separation would become more complete, to the mutual advantage of both branches of the profession; but, to hasten this result, pharmacists must exhibit a spirit of concession as regards what is termed counter prescribing.

The Chairman then proposed the toast of "The Pharmaceutical Society," which was responded to by Mr. Thomas Greenish, the President, who alluded to the efforts of the Pharmaceutical Society in promoting the advancement of pharmacists generally.

The next toast proposed by the Chairman was that of "The Chemists' Assistants' Association." He congratulated the members respecting the work achieved by them, and stated that the position attained by the Association showed how much might be done by unaided but well-directed effort.

This toast was responded to by the President, Mr. F. W. Branson, who alluded to the steady increase of the members and the very satisfactory state of the funds of the society. During the present session eight papers had been read, with an average attendance of twenty-six. In concluding, he thanked the preceding speakers for the kind sentiments expressed towards the Association.

The toast of "The Visitors" was responded to by Dr. Stoeker, and that of "The Pharmaceutical Press" by Mr. A. C. Wootton.

Mr. Branson then proposed the toast of "The Chairman," which was received with musical honours, and tendered to him, on behalf of the members, their most hearty thanks for so efficiently fulfilling the duties of Chairman that evening.

Professor Bentley, in reply, stated that he had derived great pleasure in being present, and assured the Association of his hearty goodwill.

The National Anthem concluded the evening's proceedings. A varied musical programme was contributed by members and their friends.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, January 27, Mr. D. Hooper, Vice-President, in the chair.

The Secretary read a Report on Analytical Chemistry, by Mr. C. H. Hutchinson, F.C.S., which had for its subject,—"Soxhlet's Researches on the Quantitative Estimation of the Sugars." This paper will be published in a future number.

A discussion followed, in which the Chairman, Messrs. Elborne, Senier, Symons and Thompson took part.

The Secretary having replied to the questions raised in the discussion, the thanks of the meeting were awarded to Mr. Hutchinson for his Report.

Mr. Symons then made a Report on Pharmacy, in which he described various experiences with vaseline as an excipient. This paper will be published in a future number.

The paper was illustrated by numerous specimens kindly lent for the occasion by the Cheeseborough Company.

A discussion followed, in which Messrs. Bird, Davies, Elborne and Senier took part.

After passing a vote of thanks to Mr. Symons the meeting adjourned.

Correspondence.

The Pharmacy Acts Amendment Bill.

Sir,—It appears to some of us that the cry of a "sentimental grievance" rests, not with those who oppose this obnoxious 5th clause of the so-called amended Pharmacy Act, but with those who are its advocates, and upon whom rests the responsibility of having set this unfortunate ball rolling.

Their plea is, "Our aim is justice, and the protection of the public." To this we reply, Why, in the name of justice, have you not introduced a clause to prevent proprietors of branch shops carrying on businesses which are not under personal surveillance, and where, in many cases, the public are not even protected by the employment of a qualified assistant?

Where then lies the logic of advocating the retention of this clause on the principle of personal qualification? Surely, sir, apart from any sentiment, true or false, the widow should have equal justice meted out to her, by being allowed to carry on her business by means of a qualified assistant, if she be so advised, after the death of her husband. The question of rich or poor has nothing to do with the subject, and can be of no concern whatever to any member of the Council. We stand upon the principle of even handed justice—even justice to the widow—and we claim for her—protection.

The shallow argument, used on one or two occasions, that a doctor's or a lawyer's widow might urge the same plea, is not to the point, and is of little worth. We belong to a trade, and not to a profession, and it will be quite time enough to argue that point when we have reached the order professional, and can enjoy their unmistakable privilege, "protection."

I am free to confess my obtuseness in not being able to understand how it can be logical to allow a widow to carry on the business of a deceased husband for three years (or more, if, on application, the Council in their wisdom shall see fit to permit it), even by a qualified man, when (so say the sages) the interests of the public so loudly demand that personal qualification of the principal is the one thing essential to their protection.

These earnest logicians call upon the long suffering public to be patient whilst they are manipulated by the hands of the unqualified proprietor for three long years, at the expiration of which time, they—the sages—will annihilate the widow, and set them free.

It is simply nonsense to say that if the carrying on of businesses by widows were legalized, it would be legalizing it for private firms and individuals.

There is no analogy in the case. The widow does simply what her deceased husband would have done, struggle for a living. She did not open the business, it has become her legacy, and the qualification necessary for its continuance injures none, and the interests of the public are protected, whether it be for three years or a lifetime.

The private individual, or firm, or co-operative store, establishes upon an unqualified basis, and the aim is, pure and simple, to make money.

I have my own opinion upon the desirability or expediency of a business being carried on after the death of the proprietor, but I have not seen a valid argument advanced which at all justifies this unnecessary interference of the Council by inserting such an unjust clause in their Bill.

It would be no difficult matter to cite cases similar to the one given by Mr. Richardson, where the result was adverse to the widow; but I would remind him, as well as your readers, that there are two sides to this question.

Some few years ago an old friend of mine died, leaving a widow and two children. It was not a large business. The widow was advised to continue it with an assistant; she followed the advice given; the business is in existence still, and is answering well. So much for the contrast.

In country places this can be done, and should not be hindered by any false notions which those gentlemen with "fat" businesses may hold, as they can know but little of those of the "leaner" kind, which are to be found in small towns and large villages.

A word in closing. If large firms and men of capital in our own ranks had abstained, and would abstain from—I cannot call it co-operation—this deliberate robbery of their neighbours and *confrères*, there might be some good result from further legislation; but until that healthier time arrives I, for one, would say "cui bono."

Brighton. G. G. Hornsby.

Sir,—I have watched with some interest the discussion that has taken place at the meetings of the Council relative to the proposed amendment of the Pharmacy Act, and also the correspondence that has been carried on in your columns.

I cannot but feel myself, that the insertion of what is called the "widows' clause" is both impolitic and unjust. I have never yet heard that the public, for whose benefit we are told this Bill is being projected, ever object to widows conducting their businesses, of course with the assistance of a qualified man; in fact, the number of businesses thus conducted, most of them very lucratively, points to the opposite.

Now I venture to assert, that every argument urged against the conduct of chemists' businesses by widows might, with equal cogency, be advanced against the practice, now so prevalent, of conducting what are called branch businesses.

As the Bill at present stands, could anything more inconsistent be imagined so far as the public safety is concerned? For instance, A. may have two, three, or more businesses in the same town or city, or in different towns, each managed by an assistant, but in the event of his death his widow would not be permitted to continue one of them, although she would most likely be able to command the services of the same assistants, who were perfectly competent to conduct the business during her husband's lifetime.

Surely those who are thus opposed to this new attempt to impose upon us one of the disadvantages of a profession, ought to be met with some better argument than that it is a matter of sentiment.

It does not appear to me to be a very sentimental matter that our wives should be deprived of the means of supporting themselves and their little ones, and in many cases reduced to poverty,—and for what reason? Not because the business would not prosper in her hands, or the interests of the public suffer, but that we may endeavour to assume the rank of a profession, which we can never reach, but must remain, as we are, traders to the end.

There can be but one reason why the Society does not interfere with the question of branch businesses, that it knows that there are men owning several businesses (large capitalists generally) who would bring such an amount of pressure to bear upon the Society that the projected Bill would have to be immediately withdrawn, a sacrifice that had better be made rather than we should be so unjust, illogical, and inconsistent as to deny to the poor widow what we are afraid to refuse to the man of capital.

In conclusion allow me to express my thanks to the members of the Council for endeavouring to grapple with our present serious difficulties; but I believe if they persist in keeping the 5th clause in the Bill, there will be such a strenuous opposition raised to it throughout the country that it will never pass.

Let them omit it, and I am sure the Bill will have the support of the whole trade, and would greatly increase the prestige of the Society that I am afraid has of late been rather waning.

62, *Vassall Road.* Alfred J. Gower, A.P.S.

Sir,—Several chemists have expressed their opinions of the proposed Pharmacy Bill about to be presented to Parliament. A few agree with Mr. Sandford in pleading the cause of the widow and fatherless, in whom we are all equally interested; but others of us may have a different channel in making the necessary provision.

As Mr. Symes has said, "of two evils it is but common sense to choose that which is by far the least." It is absolutely necessary that individual proprietors of chemists' shops should be qualified, and that a qualified assistant cannot confer qualification on the employer.

Again, branch shops should be managed by qualified assistants only. Let us then strive for legislation that will restrict the dispensing of prescriptions and poisons to chemists, and thus by building up a good establishment, chemists will be better able to enjoy the comforts of life, and leave behind them a fair competency for widows and the fatherless. Moreover, I would recommend that each chemist should take out a life policy, which would materially assist to increase the same fund.

To chemists who have paid ten guineas, and received their diploma of qualification, it is surely a small favour to ask Government to limit the sale of drugs to chemists only. After all, the amount of drugs used by the larger households, compared with the consumption of provisions, is a mere trifle. The family that spends £150 annually on groceries, will probably not use £3 of drugs. I know of a *bonâ fide* case, which I shall call "luxurious extravagance" —a lady, who paid the sum of £70 for a single jacket, and who was afterwards told that £40 was the real value. I have reason to believe that the same lady would send to the store if it were to save 3*d*. in the 1*s*. on the purchase of a drug.

I consider that the system of free trade, as carried on in this country, is tending to undermine the prosperity of the State. That country is the most flourishing where one section of the community contributes to the support of the other.

A. P. S.

Sir,—Notwithstanding all that has been said by correspondents for the retention of clause 5 in the New Draft Pharmacy Act, and though it has again been discussed by the Council, and put to the vote with a majority of five in its favour, I cannot help thinking that an act of injustice, in the sacred name of justice, is being perpetrated by its presence in the embryo Act. The case of a widow or children of a registered chemist deserves something better from the hands of the Pharmaceutical Society than that it should be the instrument of blighting the prospects of the family of a member whom they assume to protect. Surely it is not dignified for the Society to act a part similar to that of the inexorable creditor, who, "forasmuch as he (the debtor) had not to pay," ordered "wife and children to be sold and all that he had."

Neither does it seem according to the spirit of English law, which, apart from vested interests (and the widow of a chemist may put in a claim on that score), recognizes certain privileges and rights accruing to women in virtue of their marriage.

"A war for an idea" seems to me to be the part acted by those who contend that we cannot ask Parliament to prevent grocers, companies, and other unqualified individuals and corporations from embarking and engaging in the trade of a chemist, because here and there a widow may be found carrying on the business of her late husband for the sustenance of herself and children.

Again, the case of doctors, or lawyers, is instanced; their widows cannot continue their practice. But the case of a chemist is not parallel. The business of a doctor is simply the exercise of brains; that of a chemist is in his stock of drugs, etc., which his widow, advantageously or not, equally with widows carrying on other descriptions of trade, has a right to retain.

Sir, I will ask one question. If clause 5 is to be retained, cannot a proviso be added that if a chemist by his will appoint a registered chemist as one of the trustees, who shall carry on the business for the benefit of his widow and family, or children alone, then she or they shall be suffered to retain possession of what, according to all English law and precedent is truly and really their property?

PHILOS.

Sir,—There seems to be a considerable diversity of opinion anent the different clauses of the proposed amendment of the Pharmacy Act. This was to be expected, and I am rather sceptical of the result being a successful one.

Clause 5 has had most attention. Sentiment, rather than argument, has prevailed. In common with the majority of the Council, I believe that the eliminating of this clause from the Bill would strike a blow at its very essence and principle, viz., personal qualification. Following out this same principle, the Bill should seek to provide for all branch businesses being in charge of qualified persons. There is a ring of class legislation in the idea of allowing one person (qualified) to keep open, it may be, half a dozen branches under the direction of unqualified persons, while you ask for power to prevent a body corporate trading with properly qualified management. I would urge the necessity of proprietor and manager of every branch being qualified, thus affording the desirable protection to the public and destroying, to a large extent, the plea for justice, which stores and a large section of the community are very apt to demand.

The patent medicine clause is a step in the right direction, although it will still leave outside much of the trade in these articles, articles of a kind for which it would be impolitic to ask protection. I hail this clause also as a means to the end of putting down quackery, especially that drugging quackery which is so largely practised among all classes of society.

The difficulties pointed out by Mr. J. R. Cooper anent stock of patents on hand prior to January, 1882, can be easily overcome by leading evidence to prove such to have been the case. As regards prosecution for non-labelling I would suggest that the retailer be responsible for external, and the maker for internal labelling. By so doing it would place each in their proper sphere of responsibility with least trouble.

Peebles. R. L.

The Relations of Medicine and Pharmacy.—Some letters on this subject have been received, but we are compelled to defer their publication until next week.

Dialysis.—The gelatinization may be due to the process of dialysis having been carried too far, and the same result is said to follow contact with an atmosphere containing ammonia. To restore a gelatinized solution to the fluid condition Hager recommends the addition of dilute solution of chloride of iron, but in so small a quantity as not to give a reaction with nitrate of silver.

Nemo is recommended to consult the Index to his Pharmacopœia.

E. B. C.—It is not legal for any unregistered person to sell laudanum, even if he should label it "poison." If you possess evidence that "shopkeepers other than chemists take to retailing poisons" you are recommended to forward it to the Registrar.

"*Actor,*" whose question we do not understand, is referred to the rule respecting anonymous communications.

"*Improver.*"—The symbol "O" is defined in the Appendix to the British Pharmacopœia as equivalent to "20 fluid ounces," and in the absence of evidence of a contrary intention on the part of the prescriber, this definition should guide the dispenser.

Associate.—Full information respecting the Appointment of Dispensers in Her Majesty's Naval Hospitals will be found in the Calendar of the Pharmaceutical Society or in the *Pharmaceutical Journal* for November 9, 1872, p. 364.

"*Ammonia.*"—See the article on the subject in Watts's 'Dictionary.'

W. Proctor.—We should think the information could be obtained from the Registrar under the Trade Marks Act, Southampton Buildings, W.C.

P. H. Mason.—Chrysophanic acid is soluble in benzol, oil of turpentine, olive oil and other volatile and fixed oils; probably experiment in this direction will furnish you with what you want.

Associate.—The following recipe for bay rum, from an American source, has already appeared in this Journal: alcohol, 4 pints; water, 3 pints; Jamaica rum, 1 pint; oil of bay, 1 drachm; oil of pimento, 2 drops. A few drops of liq. ammoniæ will give the colour. Brilliantine is a solution of castor oil in eau de cologne (1 in 4). A more complex receipt will be found in vol. viii., p. 419.

J. Green.—There is no recognized form for making tincture of gelsemium, some houses preparing it of a strength equal to 1 in 5, others 1 in 10. See report of a discussion at the Swansea Conference, before, p. 242. Recipes for chromograph compositions have been given recently.

Expectorant.—The only effectual way of protecting a proprietary article, if it be a novelty, is to take out a patent. It may be also protected indirectly by registration under the Trade Marks Act.

A Local Secretary.—In the first case the use of the title in the plural would, in our opinion, be illegal; in the second the use of the title at all would be illegal.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Eyre, Tully, Will, Orton, Fowler, Fargher, Annette, Blanchard, Mansfield, Mason, Kermath, Walker, Chapman, Wade, Inquirer, Scrupulum, C., M. P. S., A. B. C., B. S. J.

NOTE ON CAPE TEA.

BY PROFESSOR A. H. CHURCH.

In this Journal for January 8, and 15, 1881, a paper on Cape Tea by Mr. Henry G. Greenish appeared. The author describes the results of a most careful botanical and chemical examination which he has made of the leaves of certain species of *Cyclopia*. His primary object was to learn whether or not the interesting substitute for tea, known as Cape Tea, Boer Tea or Bush Tea, contains the alkaloid theine. During this inquiry he recognized the existence of several apparently new substances, amongst which one, to which he assigned the name of "cyclopiafluorescin," occurred in yellow crystals soluble in alkaline solutions with a fine green fluorescence similar to that of uranium glass. Mr. Greenish is obviously unacquainted with the inquiries made by myself into these questions. A reference to the *Chemical News* for July 1, 1870, [vol. 22, p. 2], would have enabled him to see an abstract of the results which I had obtained and published more than ten years ago. I reproduce the abstract in question *verbatim* here:—

ON CYCLOPIC ACID, A NEW FLUORESCENT SUBSTANCE EXTRACTED FROM THE CYCLOPIA VOGELII.

BY ARTHUR H. CHURCH, M.A. OXON., F.C.S.

One of the plants used by the African Boers for tea is the *Cyclopia Vogelii*. Endeavouring to extract theine, from the dried leaves and flowers of this plant, I met with a substance apparently new to science, and possessing one remarkable property, that of a high degree of fluorescence. This character is best seen when a crystal or two of the new body is dropped into a solution of caustic soda and viewed in sunlight. An intense greenish yellow fluorescence is perceived at first, but disappears in the course of some hours.

I have named the new substance cyclopic acid. It is extracted by enclosing a pound or so of the dried leaves in a cloth, and immersing this for some days in water at about 30°–40° C., occasionally squeezing the cloth. A yellow powder gradually accumulates at the bottom of the vessel of water, and should be dissolved in a mixture of ether, alcohol, and water, acidified with a drop of acetic acid. By two or three recrystallizations from weak alcohol, the cyclopic acid is obtained pure. It contains only carbon, hydrogen, and oxygen; different samples gave closely accordant results on analysis:—

	Percentages of carbon.	Percentages of hydrogen.
1.	53·43	5·78
2.	53·58	5·92
3.	53·40	5·13
4.	53·36	5·62

These numbers correspond pretty fairly with the formula $C_7H_8O_4$, which demands the following percentages:—

Carbon	53·84.
Hydrogen	5·13.
Oxygen	41·03.

The formula $C_7H_8O_4$ is rendered more probable by the result of neutralizing cyclopic acid with a standard solution of ammonia. The formula indicated for the ammonium cyclopate thus produced was

$$C_7H_6\,[NH_4]_2O_4.$$

It is possible, however, that cyclopic acid contains more hydrogen than assumed above, in which case it would have the formula $C_{14}H_{18}O_8$, and its ammonium salt be $C_{14}H_{14}\,[NH_4]_4O_8$.

I do not purpose criticizing the results of Mr. Greenish, which, indeed, in some particulars agree precisely with mine; but I think it may be of use if I give, in as compact a form as possible, the analytical results which the examination of the substance termed "cyclopic acid" afforded me.

	Date of analysis.	Percentage of carbon.	Percentage of hydrogen.
i.	6 November, 1868	53·43	5·78
ii.	13 „ „	53·58	5·92
iii.	27 May 1869 . .	53·40	5·13
iv.	6 April, 1870 . .	53·36	5·62

Analyses i. and ii. were made with the same preparation of cyclopic acid; the analysis iii. with another preparation, and analysis iv. with a third sample. A portion of the last was also taken for the neutralization experiment mentioned in my original paper. In that case ·06 gram of cyclopic acid required 9·92 cubic centimetres of a standard solution of ammonia of which each c.c. contained ·00142 gram of NH_3. If we assume the bibasicity of the acid, we may, from this result, conclude that its molecule is $C_7H_8O_4$, and not $C_{14}H_{16}O_8$. But too much stress should not be laid upon a single determination of this kind.

It may be of service if I now compare the mean percentages obtained in the analysis of cyclopic acid with the nearest theoretical numbers demanded by the formulæ:—

Percentages.	Experiment, mean.	Theory. $C_{14}H_{16}O_8$.	Theory. $C_{14}H_{18}O_8$.
Carbon .	53·44	53·84	53·50
Hydrogen	5·61	5·13	5·73
Oxygen .	40·95	41·03	40·77
			100·00

It is somewhat singular that Mr. Greenish's analysis of the body which comes nearest to my cyclopic acid should have yielded only 44·86 per cent. carbon at the most; while several of the other bodies described in his paper contained as much as 51 to 55 per cent. of that element. That his proposed formula for cyclopiafluorescin should be $C_{14}H_{18}O_{12}$ instead of $C_{14}H_{18}O_8$, which I suggested for cyclopic acid, is a curious coincidence.

I may add that Professor Stokes examined the fluorescence of my cyclopic acid about ten years ago. And further, I should state, in a more definite mode than that employed in the condensed account of my research as it appeared in the *Chemical News* of 1870, that I utterly failed to detect a trace of theine in my sample of Boer tea.

STUDIES OF THE GENUS STRYCHNOS.

BY G. PLANCHON,

Professor in the Ecole Supérieure de Pharmacie, Paris, and Honorary Member of the Pharmaceutical Society of Great Britain.

(*Continued from page 592.*)

V. CURARE OF FRENCH GUIANA.

At the opposite extremity of the course of the Amazon, quite near to its immense delta, there is seen upon the map of La Condamine, the mouth of two rivers, the courses not being marked but for a very short distance. The easternmost is the Yari; the other bears the name of the Paru or Parou. For a long time unknown through a great part of their course, they have recently been explored by Dr. J. Crévaux: the former in a journey undertaken by him in 1876–77, from the coast of the Caribbean Sea to the Amazon across the mountains that form the high part of French Guiana; the second in 1878–79.

The Paru runs parallel to the Yari, from which at its source it is only distant two days' journey on foot.

The mountains which separate the two streams have only a slight elevation. The upper part of the river is occupied by the Trios and Roucouyennes Indians, and it was in this region that M. Crévaux saw them prepare the product which they call "ourari," and which they use to poison the arrows intended principally for the chase of a large black monkey called the "couata."

In a letter addressed on the 15th of January, 1879, to M. Leroy de Méricourt, M. Crévaux sent a photograph of a plant, designated, like the product that it yields, under the name "ourari," and adds:—I believe that it has to do with the real curare, since the root bark, steeped in brandy, has produced in various animals effects absolutely identical with those of curare (experiments made at Pará before Dr. Bricio).

The product is essentially yielded by the juice extracted from the root of the plant "ourari." This liquid is added to the juice of other plants which do not possess any toxic property (experiments upon animals and man). To make the curare the Indians that I have visited soak the roots, remove the bark with a cutting instrument and express the juice with their hands. The juice, added to some other unimportant substances (among others a capsicum), is very slightly heated and dried in the sun.

The juice of the root is very bitter, and stains the hands brown, like tincture of iodine. It may be handled with impunity, provided there are no excoriations.

I have already stated that the plant, first photographed and then brought to Europe by M. Crévaux, is a new species of *Strychnos*, to which I have given the name *Strychnos Crevauxii*. The following are the characters together with the figure:—

The plant is a climber which rises to the height of 40 to 45 metres. The stem bears numerous branches (fig. 1), furnished at intervals with crosier-like tendrils, swollen at their extremities. The slenderest branches are covered with short yellowish hairs. The moderately thick coriaceous leaves are 5 to 8 centimetres long, elliptical, lanceolate, shortly acuminate, mostly attenuate at the base upon a short petiole of 4 to 5 millimetres. The upper surface is glabrous and shining; the inferior surface is dull, also glabrous, except the large veins, which bear sparse appressed hairs. From the well-marked midrib there is given off right at the base two fine nerves which run along the margin, and at a certain height two other more marked curvilinear nerves directed towards the apex. The inflorescence is axillary, much shorter than the leaves, with opposite bracts, bearing small pedicellate flowers. The flowers (figs. 2 and 3) have a calyx with five lanceolate divisions; an infundibuliform corolla, much longer than the calyx, with five valvate divisions, reflexed and covered upon their internal surface with whitish hairs; five stamens with adnate anthers. The ovary is globular, surmounted by a rather long style, slightly dilated, and bilobed at the summit.

One rather curious peculiarity of this species is the presence of small, more or less forked, very slender branchlets, which occur at the axil of many of the leaves. The axes of these branchlets and the small opposite leaflets, which are only 2 to 5 millimetres long, are covered with small recurved hairs.

Together with the plant, M. Crévaux communicated some fragments of root and stem. The portion of root that I have been able to study is 2·5 centi-

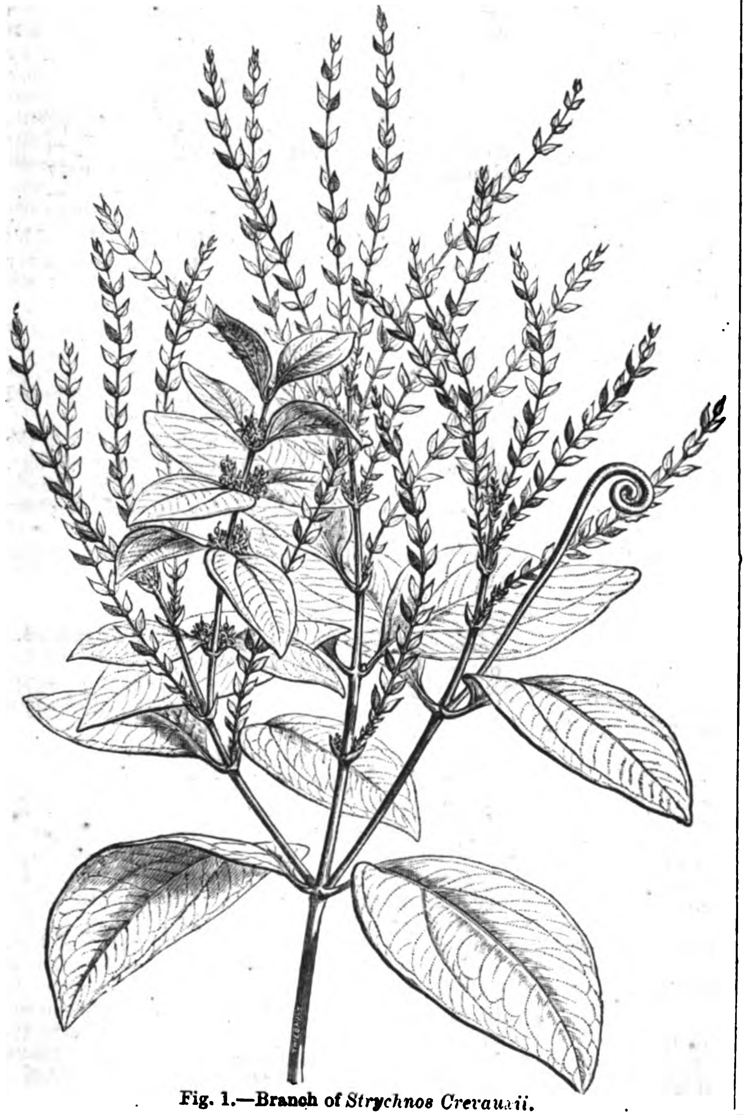

Fig. 1.—Branch of *Strychnos Crevauxii*.

metres in diameter. The bark is of a uniform reddish-brown colour, marked with several longitudinal blotches, occurring at tolerably regular intervals, striæ and circular openings. Inside this thin bark (1 mm.) is an extremely porous wood marked with very numerous fine radial striæ. There is no trace of a pith.

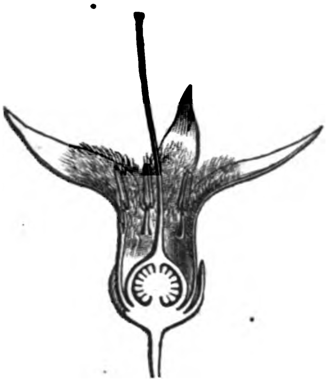
Fig. 2,—Longitudinal section of the flower.

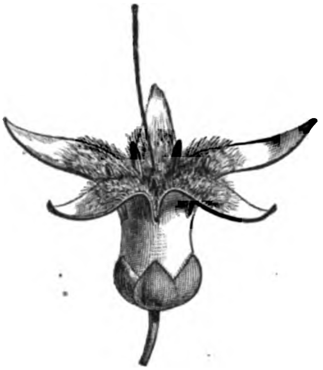
Fig. 3.—A single flower.

The anatomical structure of the bark is that of a *Strychnos*, as it has already been indicated, with the following peculiarities:—To the suberous tissue, formed of twelve to fifteen regular rows of tabular cells, which are brown, and strongly compressed in the exterior portions, succeeds, without anything intermediate, the relatively thin stony layer, formed of at most four or five rows of moderately sized cells. The liber zone is relatively large, twice as broad again as the other two zones united; it is remarkable because it contains very few stone cells, and, on the other hand, a very abundant parenchyma filled with small-sized starch grains collected in great number in the cells.

The wood is remarkable for the very considerable number and the dimensions of the lacunæ which form the numerous orifices visible to the naked eye. These lacunæ frequently show in their interior an irregular network of large meshes; they do not contain any resinoid matter. The very numerous and well-developed medullary rays, and the ligneous parenchyma, which forms concentric curves, contain some crystals in their large cells, but especially a quantity of starch grains analogous to those in the bark.

The stem of *Strychnos Crevauxii* that I have examined has a diameter of 9 centimetres. The very thin bark, scarcely 2 millimetres thick, is greyish-white, with brown marks upon the blotches where the external tissue has been worn off by friction. It is warty, marked with irregular slight prominences, extending longitudinally. Its structure recalls that of the root bark in the considerable development of the liber zone charged with starch, and the relative narrowness of the stony zone. It differs from it in the more considerable development of the suber, and by the presence between the suber and stony zone of a reddish parenchymatous layer containing some cells with much thickened walls.

The wood is of a grey colour and is pierced by an infinite number of pores, which are still more developed than those of the root. The lacunæ present the same tissue in their interior, the medullary rays and ligneous parenchyma are also filled with starch granules, so that upon touching any point of these woody layers with iodine a deep blue, nearly black, spot is immediately formed.

The accessory plants which M. Crévaux has reported to me as entering into the preparation of the curare of the Upper Parou all belong to the Piperaceæ. They are—

(1) A species bearing on the Upper Parou the name "alimiéré." It is represented by a young shoot, the roots of which have a pungent flavour. The striated stalks bear at intervals large nodose swellings from which are given off coriaceous leaves upon thickened petioles 1·5 centimetre long. These leaves are oblong or elliptical, slightly unequal at the base, 18 to 22 centimetres long, some narrow (5 centimetres), others broader (10 centimetres), glabrous, and having 8 to 10 secondary nerves springing from the base of the middle nerve and recurving towards the margin of the leaf. The plant is a *Piper* that I have not been able to determine.

(2) A species with very slender, striated, nodose branches, bearing shortly petiolate oblong or lanceolate leaves, 12 to 15 centimetres long, 4 to 6 centimetres broad, narrowly acuminate at the summit, alternate and slightly unequal at the base, scarcely coriaceous, glabrous, bright green above, greyish underneath, with 8 to 10 secondary nerves, anastomizing in a curve towards the margin of the leaf. Very short slender catkins, 1 millimetre long, appear opposite the superior leaves. The plant agrees tolerably well with the specimens of *Piper lætum*, C.D.C. (*Ottonia læta*, Kunth), which I have seen in the herbarium of the Museum.

(3) A species called "potpeu" in the Upper Parou. The leaves by which it is represented are shortly petiolate, ovate-oblong, acuminate at the summit, slightly unequal at the base. The nerves are covered underneath by a short pubescence, as also are the young branches. The plant approximates to *Piper Hostmannianum*, C.D.C. (*Artantha ramiflora*, Miq.).

(4) A species named "aracoupani" by the natives, the nodose stems of which bear, at the end of petioles 2 centimetres long, leaves which are 7 to 8 centimetres long, cordiform at the base, ovate, imperceptibly and long acuminate, glabrous, dark green on the upper surface, paler on the inferior surface, with three strongly ascending secondary nerves. It is one of the Piperaceæ, but one to which I have found nothing analogous in the herbarium of the Museum.

I mention only to record a specimen of *Hura crepitans*, L., which M. Crévaux has added to the preceding species, but which does not come from the curare region. It was collected on the banks of the Amazon, near to the mouth of the Parou. It appears that the juice of this plant is used to poison arrows. The species bears the name of "ouassacou."

(*To be continued.*)

VASELINE.*

BY W. H. SYMONS, F.R.M.S., F.C.S.

Although petroleum in some form or other has been in use for two thousand years (Herodotus, born B.C. 484, is the first writer who distinctly refers to it), petroleum jelly or vaseline has only been known during the last few years, and is said to have been discovered by Mr. R. A. Chesebrough, of the Chesebrough Manufacturing Company. I have been unable to find any authentic account of the manufacturing process, but according to the pamphlet which I have on the table, and which most of you have doubtless read, it is the residue from the distillation of petroleum purified by an elaborate system of filtration, known only to the company; or, at least, so says the pamphlet. This secrecy of its manufacture is one of the greatest drawbacks to its usefulness and official recognition.

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* A paper read before the School of Pharmacy Student Association, January 27, 1881.

Vaseline was the subject of an original paper read by Mr. J. Moss at the meeting of the Pharmaceutical Society, on February 2, 1876. He describes it as a pale yellow, translucent, slightly fluorescent, semi-solid, melting at 37° C. and having a specific gravity of 840 at 54° C. It is insoluble in water, slightly soluble in alcohol, freely so in ether, and miscible in all proportions with fixed and volatile oils. It is not acted upon by hydrochloric acid or solution of potash, and has all the other characteristics of a mixture of paraffins: an ultimate organic analysis made by him gave 97·54 per cent. of hydrocarbons.

Under the microscope, vaseline, in common with most other fats, is found to contain numerous small acicular crystals, doubtless consisting of a paraffin of higher melting point than the mass, but these do not in any way interfere with its usefulness, because of their extreme minuteness and easy fusibility.

Vaseline may be kept indefinitely without becoming rancid; this is its chief characteristic, and together with its indifference to chemicals and its readiness to take any perfume is sufficient to recommend it for pharmaceutical and toilet purposes in place of the fats generally used.*

If vaseline be considered too thin it may be thickened to any extent with paraffin wax. I have found one to seven a good basis for general use, or one in ten would answer for most purposes; but to obtain anything like smoothness in the mixture it must be thoroughly beaten whilst cooling. Vaseline alone being used for making such ointments as that of ammoniated mercury, or for diluting mercurial or the nitrate of mercury ointments, a partial separation takes place on keeping; but if a mixture of paraffin wax and vaseline be used no such separation occurs.

With regard to the preparations of the Pharmacopœia, in which vaseline has been suggested as a substitute for the basis in present use, first and foremost I must mention the nitrate of mercury ointment. Squire states that this can be prepared from white vaseline by substituting it for the lard and oil in the official formula. I tried the experiment on half a pound of white vaseline, using the B.P. quantities of nitric acid and mercury, and a temperature rising to 214° F., but it was a decided failure. I could obtain nothing but a mechanical mixture, the vaseline being changed in colour from white to pale yellow, and the acid solution continually weeping out and nearly all of it could be separated by pressure. It may be that failure arose from a lack of manipulative skill on my part, but I have generally been able to get fair results with the B.P. process. I have on the table a specimen of citrine ointment, prepared from a mixture of white wax and vaseline and about the same quantity of mercury, but rather less nitric acid; this specimen is about eighteen months old and is as good as when first made. As far as my experience goes, vaseline is not suitable for making citrine ointment of full strength, but it certainly is useful for its dilution. Here is some fresh official ointment, and also some recently diluted with vaseline. I likewise have a specimen which I prepared two years ago, its colour is still good. I found that the vaseline had partly separated from it, and in future shall make it with one-eighth paraffin wax.

The next troublesome ointment I think, is that of red oxide of mercury. I have here a sample of the official ointment, which has been kept for over two years, and is now certainly an unsightly preparation; also some made with prepared lard, quite as bad. Benzoated lard seems to have answered very much better, but still more successful is the mixture of castor oil and beeswax, suggested some years ago in the *Pharmaceutical Journal*. Vaseline, however will take the palm for more elegant appearance, and it will keep any length of time unaltered.

Compound lead ointment has been spoken of as very liable to change. I have some here made from the official formula, which has been kept over a year, and also some made with vaseline eighteen months ago; likewise a sample of zinc ointment. The official ointments, although only a few months old, are quite rancid, but the samples made with vaseline show no alteration after being kept eighteen months.

Mercurial ointment is also very advantageously made with vaseline and wax, instead of with rancid fat, as is usually the case. Under the microscope, samples of both ointments exhibit globules of mercury of about equal size.

Iodine is soluble in about twenty times its weight of vaseline, therefore vaseline is very suitable as a basis for iodine ointment. I am not aware of any action occurring between iodine and the paraffins, although action does take place with chlorine and bromine under favourable circumstances. I prepared some a few days ago, of B.P. strength but without any iodide of potassium.

The crowning success for vaseline is in the preparation of cold cream, and if this were the only compound in which it could be used with advantage its mission would, I think, be fully accomplished. I have made my cold cream for some time with white vaseline and have found a very marked increase in my sale for that article. I have kept a sample freely exposed to air in a warm place for some months without any alteration, except loss of water. I make it by dissolving ℥ij. of white wax in one pound of white vaseline by heat, adding ʒiss. of borax dissolved in ℥ix. of water, and perfume with ʒss. of oils, stirring until nearly cold and then pouring into pots.

Vaseline, with or without paraffin wax, is undoubtedly the best basis for pomades, and only requires one half the quantity of perfume common fats do.

Vaseline has been suggested for internal administration, but it is not the province of the pharmacist to discuss the relative merit or demerits of any therapeutic agent; it behoves him, however, to study the best method of exhibiting it and to bring it to the notice of the physician.

The Chesebrough Company prepare vaseline in the form of pastilles, which they say contain 33 per cent. of vaseline, with a like quantity of sugar and gum; these they flavour with wintergreen oil, which is very much appreciated by our cousins across the Atlantic, but not so much so on this side.

Vaseline can be emulsified with the usual agents. The emulsion made with gum acacia is tolerably permanent, also that with yolk of egg. If for external application the vaseline can be mixed with one eighth its weight of white wax and then emulsified with borax or any alkali. The sample on the table was prepared by triturating ʒij. of white vaseline and gr. xv. of white wax with ℥xiv. of water containing gr. xv. of borax in solution.

I am totally unacquainted with the various imitations of vaseline now in the market. I think that as long as the original company supply a pure article at a reasonable price, we should not help others to reap the benefit of research and enterprise in which they had no part. I do not look upon vaseline as a nostrum or I certainly should not have brought it before your notice this evening. It is true we have not yet been let into all the details of its manufacture, but it may be that such disclosure is not far distant. Because the manufacture of Duncan's chloroform is kept a profound secret among the partners of the firm, has that prevented the medical profession from insisting upon that particular preparation as an anæsthetic? If medical men do not hesitate, when it falls in with the interest of the profession and the public, to recommend a particular preparation of a particular firm to the exclusion of all others, I do not see why chemists should consider it *infra dig.* to recommend and use such an elegant and useful article as vaseline. One trouble looms in the far distance,—will the supply of vaseline last as long as the demand for it? Coal may be replaced, and heat and light obtained from electricity by unknown means, but how shall we find a substitute for vaseline, unless, indeed, we be able to make it from its so-called elements? The supply of petroleum does not, however, seem to show any signs of decrease at present; sources known two thousand years ago still yield bountifully, and if the American supplies prove as permanently productive as those of the Old World, we may leave this question for the present.

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* One improvement seems to me possible, and that is the isolation of single paraffins, of various melting points, one suitable as a basis for liniments, another for ointments, in place of the mixture of paraffins sold as vaseline.

DIALYSED IRON.*

BY R. ROTHER.

The fact seems to be not widely known that the so-called dialysed iron of the United States market is not prepared by dialysis. It is nevertheless the veritable article as produced by the dialytic process, but obtained by a much improved method, which dispenses with the diffusion drum. The new operation consists in mixing a small proportion of chlorhydric acid with washed ferric hydrate, precipitated by ammonia, and setting the mixture away for about three weeks, when the clear solution is decanted from a slight residue and is then ready for use. This knowledge, however, is so special and is kept so sedulously secret by the manufacturing fraternity that a practical chemist of much experience, on entering another establishment, was laughed at for his simplicity when he proposed to make dialysed iron by dialysis. The writer himself obtained this knowledge from one of the initiated only after having proposed his own method as being new and important, and incidentally said, as much superior to the manufacturers' process as this is to dialysis. The writer was at the same time informed that if the factories were restricted to dialysis for their product, they could not begin to supply the demand; which shows that dialysed iron must be very saleable goods.

Before proceeding with the exposition of his process, the writer will first discuss a few points in the nomenclature and notation of this subject.

According to the new chemistry, the terminology and notation are chiefly based upon the valency, apparent or real, of the elements. This admirable plan is not yet by any means perfected, but is even unaccountably encumbered by various ambiguities and conspicuous inaccuracies, which long since should have been remedied. Prominent among these is the term anhydride, generally and erroneously used to indicate either a basic or acid oxide. If there attaches any meaning to words, an anhydride would indicate a compound deprived of its constituent hydrogen. For instance, sulphur and phosphorus are the anhydrides of hydric sulphide (H_2S) and hydric phosphide (H_3P) respectively. And dimethyl or ethane (C_2H_6) is the partial anhydride of methane (CH_4). But according to the accepted terminology, the anhydrides of hydric sulphate (H_2SO_4) and hydric phosphate (H_3PO_4) are not SO_4 and PO_4 but SO_3 and P_2O_5, that is, the hydrides, not alone deprived of hydrogen, but also of oxygen in equivalent proportion, in other words freed from the elements of water, or dehydrated. Consequently an anhydride ambiguously means an anhydrate.

It certainly is not correct to say potassium hydrate [$K(OH)$], calcium hydrate [$Ca(OH)_2$], etc., since that would indicate the hydrate of an elementary radicle, which is not the case. It has, therefore, been proposed of late to call them hydroxides, a term consistent with the notation and more in harmony with fact. But even this nomenclature cannot obviate the necessity of terming acid and basic oxides anhydrates. Yet a distinction is endeavoured to be made between hydroxides properly so-called, and salts which crystallize with water, designating the latter only as hydrates. A salt freed from water of crystallization would accordingly be styled an anhydrate, whilst a hydroxide freed from water is an anhydride. This attempt at a fundamental distinction is, however, utterly erroneous, as will be presently seen.

The formula of water may be written $H(OH)$, a hydroxide of hydrogen or hydric hydroxide. Now it would be as incorrect to call this hydrogen hydrate as to say that $K(OH)$ is potassium hydrate, in fact the errors are analogous. It is, however, perfectly correct to say that $H(OH)$ is hydric hydrate belonging to the general class hydrates, of which potassic hydrate, ferric hydrate, etc., are particular members, whose special characters are due to the nature of the metallic radicle replacing the hydrogen.

A fundamental distinction is also made between two classes of salts, denominating them as basic or acid salts, according to whether the normal salt has attached to it basic oxide, hydrate, or both, or either acid oxide, hydrate, or both. Salts containing excess of acid oxide are further distinguished as anhydro-salts. The formulas for these compounds as generally written are crudely analytic and represent an irregular order of union between heterogeneous molecules, apparently at variance with the law of valence. The writer will now, however, show, as already announced above, that no such deviation exists, and that all such combinations, inclusive of those of the water of crystallization, are all subject to the law of atomicity and the principle of the coalescence of the same kind or similar molecules. This method of notation, in contradistinction with the now prevalent one, is intensely synthetic and at the same time comprehensibly analytic. The union between the ultimate realities composing an elementary molecule represents a degree of force of the highest intensity. But in the union between such molecules the original force by continued subdivision, according to the degree of complexity of the compound molecule, is proportionately weakened through all stages of transition down to the lowest order of stability. Now, considering that iron is undoubtedly hexadic, then the ferric molecule may be written Fe^{VI}_2 indicating that the two Fe's are united by six links or subdivisions of the primative intramolecular force (not to be understood as a force of traction). In ferric chloride Fe_2Cl_6 or $Cl_3Fe{=}FeCl_3$ three of the links are externally distributed among the chlorine, whilst three remain intramolecular. But if we now substitute eight-ninths ($\frac{8}{9}$) of the chlorine with hydroxyl, then we must employ a triple ferric molecule to represent the change, thus, $(Fe_2)_3Cl_2(OH)_{16}$ or $Fe_3Cl(OH)_8$. In this instance, the intramolecular links are redistributed so as to connect the three ferric molecules. This redistribution of the links of valence among multiple molecules is in most case graphically representable, but may also reach an extreme degree of diffusion as in the absorption of water of crystallization. These synthetic formulas are remarkable for their compactness and convenience of manipulation. Thus, the so-called acid potassium acetate is written $KH(C_2H_3O_2)_2$ instead of $KC_2H_3O_2.H,C_2H_3O_2$. The so-called di and triplumbic acetates

$$Pb(C_2H_3O_2)_2.Pb(OH)_2 \text{ and}$$

$Pb(C_2H_3O_2)_2.2(Pb(OH)_2)$ are $Pb(C_2H_3O_2)(OH)$ and

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* From *New Remedies*, January, 1881.

$Pb_3(C_2H_3O_2)_2(OH)_4$. The ferric acetate of the German Pharmacopœia $2\,Fe(C_2H_3O_2)_3.Fe(OH)_3$ is

$$Fe_2(C_2H_3O_2)_4(OH)_2.$$

Potassium anhydrochromate $K_2CrO_4.CrO_3$ is $Cr_2O_5(KO)_2$ and the phosphoric acids HPO_3, $H_4P_2O_7$ and H_3PO_4 are $P_2O_4(OH)_2$, $P_2O_3(OH)_4$ and $P_2O_2(OH)_6$. Whilst the present formulas of the phosphoric acids are absolutely right, they are yet relatively wrong, since if pyrophosphoric acid is tetrabasic, the ortho-acid must be hexbasic and the meta dibasic. This incongruity the writer had already pointed out some years ago.

The nomenclature used with these proposed synthetic formulas is in conformity with the notation. All salts containing hydroxyl, and no matter whether so-called acid or basic, are termed hydro-salts, the basic or acid nature being inferable from the structure as determined by the valence of the radicles. Thus $Fe_2CO_3(OH)_4$ is called ferric hydrocarbonate, $Fe_2Cl(OH)_5$ ferric hydrochloride, $(Fe_2)_3Cl_2(OH)_{16}$ triferric hydrodichloride, and $(Fe_2)_3(NO_3)_2(OH)_{16}$ triferric hydrodinitrate.

The reason why ferric hydrate precipitated by ammonia dissolves so slowly in acids is due to the fact, as the writer has elsewhere shown, that it is an oxyhydrate $(Fe_2O(OH)_4)$ which in order to be decomposed by acids must first be changed into the normal hydrate by the addition of a molecule of water. The reason for the insoluble residue remaining is that all monad salts (ammonium chloride excepted), especially sulphates, precipitate the ferric hydro-salts, and that therefore the insoluble residue corresponds to the amount of monad salt adhering to the ferric oxyhydrate used. The dialysed iron of the market is usually represented to contain a certain per cent. of ferric oxide purporting to be in the colloidal or soluble state, no mention being made of any chlorine present. Strictly speaking, however, no colloidal ferric hydrate or oxide really exists. The compound, in order to possess solubility, must contain a certain proportion of chlorine, that is, must be a hydro-salt. Deprive the dialysed iron of its chlorine, and insoluble hydrate or oxyhydrate will result.

After the successful application of ferric hydrocarbonate in the preparation of ferric citrate and hydroacetate, the writer used it in the preparation of the official solution of ferric nitrate. In the act of dissolving the ferric hydrocarbonate, it was noticed that much less than the normal quantity of nitric acid sufficed to effect a solution of all the carbonate. This liquid, having an unusually deep red colour, was submitted to a prolonged boiling heat, with the expectation of precipitating a so-called basic nitrate. No such result happening, the writer then subjected the German solution of ferric acetate, prepared from ferric hydrocarbonate and glacial acetic acid, to the same treatment and obtained a like result, no precipitation taking place. Chlorhydric acid was then employed in one-sixth the normal amount, aiming at the ferric hydrochloride, $Fe_2Cl(OH)_5$. On the application of heat, solution resulted almost instantly with copious effervescence of carbonic oxide. The deep brown-red liquid, when evaporated to a syrupy consistence and spread on plates to dry, yielded similarly coloured non-deliquescent scales of great solubility. Chlorhydric acid in one-ninth the normal amount and the use of heat gave a similar solution of triferric hydrodichloride $Fe_6Cl_2(OH)_{16}$ which readily yielded soluble scales. Chlorhydric in one-twelfth the normal proportion and the use of heat formed a solution at first which on continued absorption of iron ultimately gelatinized from the effects of heat. It appears, therefore, that among these compounds there is limit to the stability under heat. Nitric acid readily forms hydro-salts analogous and similar to the preceding. Acetic acid (glacial) cannot effect a solution in less than one-third the normal amount. But in this proportion it gives ferric hydro-diacetate $Fe_2(C_2H_3O_2)_2(OH)_4$ which contains only half as much acetic acid as the German preparation. It is perfectly stable under heat, but yields a scaled salt which does not redissolve without decomposition. Sulphuric acid is anomalous, it produces with difficulty the salt $Fe_2(SO_4)_2(OH)_2$ which differs by only one-fifth less sulphuric acid than Monsel's salt. The writer will state in this connection that by the addition of ammonium sulphate to Monsel's solution an iron alum in abundant beautiful white crystals was obtained, showing that the mother-liquor must have contained a hydro-salt having proportionably less acid than the original liquor.

As a substitute for the dialysed iron of the market, the writer now proposes a solution of triferric hydrodichloride equivalent in iron strength to the official solution of ferric sulphate. Its preparation is as follows:—Upon 15 troy ounces of disodic carbonate pour half a pint of water and apply heat until a hot solution is obtained, then pour into this one pint of solution of ferric sulphate in a rapid and continuous stream and with constant stirring of the mixture. Keep up the heat a few minutes until effervescence nearly ceases, and add water to the measure of 2 gallons. After a sufficient repose, decant the supernatant liquid and wash the precipitate three or four more times in a similar manner or until the washings yield no trace of reaction with barium chloride. Collect the ferric hydrocarbonate upon a filter, and when the excess of water has drained away, dissolve it in 1 troy ounce of chlorhydric acid with the aid of heat and evaporate to the measure of one pint if necessary.

Detroit, Mich.

THE MIGRATION OF EUROPEAN ANIMALS TO AMERICA AND OF AMERICAN ANIMALS TO EUROPE.*

BY PROFESSOR E. W. CLAYPOLE, B.A., B.SC. (LONDON),
OF ANTIOCH COLLEGE, OHIO.

(Concluded from page 616.)

In this connection I should like to commend to any one who may read these pages, the works of the Entomological Society of Ontario. All interested in the farm and garden in the Dominion should know of its existence, and give it all the aid in their power, especially by becoming members. The monthly numbers contain many valuable papers, chiefly original and interesting to entomologists, while the annual reports are full of excellent information for the general reader. The latter alone is worth the whole subscription for the year (one dollar) to the practical man. They contain full accounts of many of the insects here briefly alluded to, and may be obtained from the President, William Saunders, Esq., or the Secretary, James H. Bowman, Esq., both of London, Ont. In particular, I would refer vine-growers, in view of the fact that attempts are now being made to carry on this branch of horticulture on a larger scale in Canada, to the brief history of this grape vine louse in the Annual Report for 1874,† by the Rev. C. J. S. Bethune.

The details above given bring out strikingly the facts that, as with plants, so with animals the march is westward; that European animals cross the Atlantic, and settle in America, multiplying with enormous rapidity, and doing incalculable mischief; while, with a few exceptions, American animals fail to establish themselves‡ in Europe, or if established there, fail, save in one notorious instance, to do appreciable mischief.

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* Reprinted from the 'Fourth Report of the Montreal Horticultural Society,' 1878.

† I should like also here to suggest to the Council of the Society the advisability of advertising and selling their reports separately, and at a certain price, so that those who do not wish to read the technical details of the monthly numbers, may be able to obtain these exceedingly useful annual summaries.

‡ The statement has been made that the American quahog, or round clam (*Venus mercenaria*), has been found living in English waters, introduced accidentally with American oysters.

It is also worthy of remark in passing that the European insect often far surpasses the native of similar habits and habitat. "The imported onion fly is a grievous pest in the East." The native onion fly has only been noticed by a few observers in the West. "The imported meal worm swarms throughout the whole country, and is a great pest; the native species is comparatively rare, and scarcely known to the millers and flour dealers." "The native American bark louse is of little moment; the imported bark louse is one of the most dangerous foes of the apple tree in America."

In view of these facts, what will be the future history of the Colorado potato beetle (*Doryphora decemlineata*)? Will it cross to Europe, and devastate the potato fields there as it has done here? Or will the Atlantic, or rather the European condition of life on the other side, prove more than a match for it? It is hard to reply positively. This insect has abandoned its native food plant in the West, and has travelled eastward, ravaging the fields and gardens on its way, until now it stands on the Atlantic seaboard longing for more worlds to conquer. Advanced detachments have crossed, but have thus far been met with characteristic energy and uncompromising determination, both in England and Germany, and stamped out. This forlorn hope will be followed by others. Government edicts may do something, but cannot permanently prevent their spread unless other causes combine to check them. The grape vine louse has largely abandoned its native food, and seized the European vine, with results in Europe detailed above. The potato beetle may do the same. On the other hand, the plum weevil has seized the European stone fruit, and its ravages are here enormous, but it has not yet crossed. The ash-grey blister beetle destroys the European Windsor bean in America, but is in England unknown. The same is true of the bean weevil and several other native insects. If the analogy of the majority may be trusted, there is ground for hope that with care these pernicious insects may be unable to injure the potato fields of Europe. New enemies may also there assail them, and find in them the very food of which they are in want. But there is not sufficient ground for confidence. No precaution should be neglected, no Order in Council revoked. The risk is too great and the possible consequences too disastrous. The presence of this beetle in the potato fields of Ireland might renew in part the horrors of 1847, and start a new tide of Irish emigration to Canada and the States.

The facts above mentioned show conclusively that the European fauna acts precisely as the European flora was shown to do.* Its members cross the Atlantic to America; they settle in the country; they multiply faster than at home, oust the competitive native races, and as most of them belong to what we call the injurious classes, they work here destruction unknown to the old country. How shall we account for these facts?

Some years ago the late Mr. Benjamin D. Walsh published the following remarks:—"Our animals mostly belong to an old-fashioned antediluvian creation, not so highly improved and developed as the more modernized creation which exists in Europe. Consequently they can no more stand their ground against European competitors introduced from abroad than the Red Indian could stand his ground against the white Caucasian race. If by chance an American animal finds its way to Europe it can as a rule no more stand its ground there than could a colony of Red Indians in England." To a cause somewhat similar I last year attributed the wholesale migration of European weeds to this country, and their naturalization here. And there can be no doubt that Mr. Walsh has suggested a real cause. No naturalist doubts that America with its opossums is far more antiquated, zoologically speaking, than Europe, where all such old-fashioned beings are shut up fossil in the rocks, and would look strangely out of date if, Rip Van Winkle-like, they should come to life again. This higher development of European life—a result of the sharper competition there existing between closely allied forms of the more recent geological changes which have there occurred—gives the European immigrant an advantage in the struggle for life wherever conflict occurs. And in many instances this cause alone is sufficient to ensure its supremacy over its old-fashioned antagonist.

But I think this cause alone, however real, is insufficient to account for all changes similar to those mentioned above which have occurred. For a complete solution of the problem the following additional considerations require mention.

The introduction of so many European plants, and their wide extension over this continent, must, to some extent, have contributed to produce this result. Many of these imported plants are the natural food of some one or more of these imported insects. The weeds alluded to last year, the various field crops and garden vegetables, maintain their peculiar insect population. So great an abundance of insect food as is supplied by the spread of these plants over the whole continent could not but be attended with an increase of these insects. Where food is abundant there population rapidly increases, both insect and human. The sudden development over America of the productions of another hemisphere could not but be attended with a disturbance of the balance of life which cannot at once be removed. European insects hold carnival in such a vast expanse of country, covered with imported vegetables and other plants long familiar to them, but never in such abundance.

Moreover on crossing the Atlantic many of these insects left behind them their hereditary foes—the parasites that kept them in check in Europe. Every one of them is there a prey to some one or more of these, by which its excessive and permanent multiplication is prevented. It is easy to see what must be the effect of introducing a European insect to the wide fields and gardens of America, and at the same time leaving behind its most deadly enemy—the most useful parasite. The new country is a perfect paradise for the happy new comers. They have it all their own way, and multiply and feed and multiply again until stopped by the mere exhaustion of their food supply. No parasite burrows in their bodies or sucks their blood, and the ruin they can in this condition work for man is simply incalculable.

The most destructive insect mentioned in this paper, the wheat midge, is exactly in this condition. "To this day," says Mr. Walsh, "it is not known that any indigenous parasite has attacked the wheat midge since it landed on our shores," some fifty years ago, nor, with one doubtful exception, "does any North American cannibal insect prey upon it within the United States." And Dr. Fitch, writing in 1862, says: "How does it happen that the midge in this country is vastly more destructive than in its native haunts? I can impute it only to one thing: The other insects which have been created for the purpose of quelling this species, and keeping it within its appropriate sphere have never yet reached our shores. We have received the evil without the remedy."

The currant saw fly, mentioned above, is at present in a similar condition of freedom from its natural enemy. Hence the enormous and unchecked depredations which it annually commits. Many others might be added to the list, which live here in perfect security, with the Atlantic between them and their destroyers.

It has often been suggested that, as man has accidentally introduced so many injurious insects from Europe, he might intentionally introduce their parasites. This is reasonable, and would undoubtedly prove of great advantage to the country. Possibly it will some day be done in that happy future, when science and intelligence have more weight in the councils of the nations, when officials are appointed to office because they are competent to discharge its duties, and not because of their political opinions, when men can combine for the national good as well as for party purposes, and when so-called statesmen regard the permanent weal of the nation at least as much as their own personal aggrandizement. But that day is not yet. To quote Mr. Walsh again, "Is it to be expected that a crowd of men, members of legislatures, whose heads are mostly full of such important things as cognovits, and assumpsits, and demurrers, and torts, and caucuses, and conventions, should condescend to think about 'bugs'? What do they know about farmers, except that they have got votes?" Meanwhile the Wheat Midge, Currant Sawfly and Co., do just as they please, no one interfering to check them in a way that would prove most effectual. And why? Because the cost and toil would come on the individual, and the advantage and profit on the nation. Could these parasites be introduced and covered with a patent in Canada and the United States, they would be here before another year had passed, some one would make a fortune, and the wheat-growing part of the community would be enriched. Such work is national work, and some day the nation and its legislators may find time to do it and to pay for it.[*]

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* *Pharm. Journ.*, [3], x., 404, 464.

But when everything has been done which science can suggest to remedy or palliate this great evil, I fear there will always remain a difference between this continent and England, to the disadvantage of the former. Nature indicates this. In a hot climate, or in a climate where the summer is hot, insects are always abundant. The cool summers of England are unfavourable to them. The hot American summers are highly favourable. Granting then, that all the European parasites are some day introduced and that they do their duty to the utmost, yet a larger number of insects will be annually produced. It is true a larger number will be destroyed. But their destruction by parasites will not entirely remedy the evil. Every entomologist knows that most insects do their mischief while in the larval condition. That is pre-eminently, and often solely their eating stage of existence. Now, most parasites lay their eggs in the body of the larva, not destroying its life, but preventing the development of the perfect insect. It is evident, therefore, that the advantages accruing from the action of the parasite, immense as it would be, would be limited to checking the multiplication of this species by one means. The number of both would be increased, pest and parasite, but greater mischief would nevertheless be done by the former before its destruction was accomplished by the latter. Thus, how great soever the advantage of importing the parasite would be, and I can hardly over-rate it, the entomologist is too sanguine who anticipates from their presence immunity from insect depredations equal to that enjoyed in England.[†]

The best remedy for this evil will not be found until a better system of farming is adopted—until the plan of skinning the land and going west has given place to permanent occupation—until the farmer sows what he hopes to reap. Many of these insect depredators would be serious in England were the average yield there no greater than it is here. But from an average of 28 bushels of wheat to the acre, the farmer does not miss what would cause heavy loss if taken from an average crop of 13 to 15 bushels. Better and cleaner farming, heavier crops from less land, combined with what most Canadian and American farmers excessively dislike—close and constant attention to little things—will be the most successful and practical remedy for the evil—perhaps the only one within the reach of the individual.

In conclusion then, we see:—

1stly. That European insects, like European weeds, migrate freely to America and become naturalized here.

2ndly. That when here, they multiply at a rate unknown in Europe.

3rdly. That their depredations are consequently on a scale unknown in Europe.

4thly. That many of them are here free from parasite and other enemies, which checked their increase there.

5thly. That American insects, with few exceptions, fail to emigrate to Europe and become naturalized there.

6thly. That this difference between the eastward and westward migration of animal life is due to the several causes above named—the higher development and greater complexity of European life, and consequent superior ability to contest the ground—abundance of food, absence of European enemies, and slovenly farming and gardening.

7thly. That even after all has been done to remedy the evil that can be done, there will probably yet remain a greater loss from the ravages of insects than is experienced in England, which can only be countervailed by increased yield from the extent of land—a result of greater care and better farming. Eternal vigilance is the price of a good crop.

ETHERIFICATION OF HYDROBROMIC ACID.[*]

BY A. VILLIERS.

The extent to which hydrobromic acid, when treated with absolute alcohol and a mixture of alcohol and water, undergoes etherification varies greatly with the temperature. Absolute alcohol, with different proportions of hydrobromic acid, and heated at different temperatures, gives the following results:—

	Percentage of acid etherified.	
	$\frac{1}{2}HBr+C_2H_6O$.	$\frac{1}{10}HBr+C_2H_6O$.
At ordinary temperature, limit 658 days . . .	68 0	52·5
At 44° temperature, limit 658 days	79·6	59·9
At 100° temperature, limit 658 days	88·7	80·0

The percentage of acid converted into ether is not so great as that of the carbon acids, moreover, it is not fixed, but increases with the temperature.

These results show that combinations of alcohol with hydrobromic acid are formed analogous to hydrates.

The presence of water decreases the extent of etherification, and in large quantity prevents any action from taking place; the quantity of water required to prevent the action increases with the temperature. This is probably due to the formation of hydrates of hydrobromic acid, and the dissociation of these hydrates as the temperature is raised.

PULVIS GLYCYRRHIZÆ COMPOSITUS.

Dr. E. T. Blackwell (*Med. Times*, Nov. 20, 1880) proposes the following modified formula:—

		In each teaspoonful.
℞	Sennæ Pulv.	8 grains.
	Sulphur. Loti	8 „
	Sacchari Albi, āā ℥ss.	8 „
	Fœniculi Pulv.	4 „
	Glycyrrhizæ Pulv., āā ℥ij.	4 „
M.		—

In all, 32 grains,—laxative 16 grains, excipient 16 grains,—an equal proportion.

This brings the quantity of sulphur to equal that of the senna. Such a powder is said not to be less acceptable to the taste, while it is better tolerated by the stomach.

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[*] If we may infer from the analogy of the Hessian fly, of the results of introducing the parasites of the wheat midge we must augur very favourably. To such an extent is this pest annually destroyed, that out of more than one hundred specimens collected last year in this locality, I could scarcely obtain a single fly, most of the "flax seed" yielding its well-known four-winged parastic fly (*Ceraphron destructor*).

[†] The opinion here expressed is borne out by the damage annually caused by the Hessian fly and cabbage butterfly, though parasites of both these insects have been in America for many years, and are destroying them wholesale.

[*] *Compt. Rend.*, 90, 1488-1491. Reprinted from the *Journal of the Chemical Society*, February, 1881.

The Pharmaceutical Journal.

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THE MEDICAL COUNCIL AND THE DENTAL ACT.

The sweeping and persistent asseverations of an active party among the dentists as to the incorrectness of the 'Dentists' Register' appear at last to have given rise to so much doubt as to necessitate the calling of a special session of the Medical Council, at an unusual time of the year, in order that the demand put forward for the removal of upwards of five hundred names might be decided upon before the 'Dentists' Register' for 1881 was printed.

It will be remembered that immediately after the appearance of the first 'Dentists' Register' it was pointed out that it contained the names of a considerable number of persons who, although their names did not occur in the Register of Chemists and Druggists, had effected registration under the terms of the Dental Act as having been, before July 1878, engaged in the *bonâ fide* practice of dentistry with pharmacy. It was urged that no person could be correctly described as practising pharmacy who was not registered as a chemist and druggist, and that therefore these persons had effected registration by means of illegal declarations. In fact, an organization of discontented dentists assumed an unwarranted, if not illegal, position, and sent out a number of "threatening letters" so suggestive of pains and penalties that about sixty persons, apparently unwilling to run the risk, applied formally to have their names removed from the Dental Register. A larger number, however, were not so easily frightened, and among these were some who were acting as managers, assistants, or apprentices to chemists and druggists, and considered that in that character they were practising pharmacy; others alleged that although not registered as chemists and druggists they were entitled to be so; and others were actually registered, but not identified through change of address. These illustrate the larger number of the cases.

The subject came under the consideration of the Medical Council at its meeting in July last, when it was resolved that each case should be decided upon its merits, and the Dental Committee of the Council, constituted under the Act, was requested to report on the facts, whilst the opinion of counsel was to be taken upon different points of procedure.

The report of the Committee just presented to the Medical Council is a most elaborate one; but it has, to all intents and purposes, been superseded and rendered nugatory by the "opinions of counsel" read and adopted by the Council for its guidance at the same time. Some of our readers who remember the history of the passing of the Dental Act will not be surprised to learn that in the opinion of the Solicitor-General and Mr. Muir Mackenzie the "words *bonâ fide* engaged in the practice of dentistry or dental surgery, either separately or in conjunction with the practice of medicine, surgery or pharmacy, have no reference to any legal qualifications to practise medicine, surgery or pharmacy; they are simply intended to indicate that if the person seeking registration is qualified by reason of his being *bonâ fide* in practice as a dentist, he is to be none the less so entitled because that is not his exclusive occupation, but is only carried on by him in conjunction with the practice of medicine surgery or pharmacy." And again, "The practitioner in dentistry is to be registered in respect of his dental qualifications only, and the Council need not inquire as to his right to practise medicine, surgery or pharmacy."

This opinion receives confirmation from the fact that in the Schedule to the Act the form of application for registration contains no provisions for distinguishing between persons practising dentistry separately and persons practising it in conjunction with medicine, surgery and pharmacy, and in altering the form so as to require such distinction it would appear that the Medical Council has acted *ultra vires.* Indeed the tendency has been to reverse the proper positions, and, instead of construing the Act to provide that the practice of pharmacy conjointly with dentistry was not to prevent registration as a dentist, to read it as stipulating that in some cases a pharmaceutical qualification was to be a necessary condition for such registration.

It almost follows from the foregoing that the words "with pharmacy," or like words, following the name on the Dental Register, are superfluous, and the Medical Council is advised that the Register should contain only the names of practitioners, followed by their dental qualifications, and not any reference to their qualifications to practise medicine, surgery or pharmacy.

The Medical Council is also advised that the words "*bonâ fide* engaged in the practice of dentistry" do not necessitate that an applicant for registration should have been in business on his own account, if he has discharged the duties of a dentist and really practised as such; practice being defined as not merely rendering assistance to his employer, but the independent performance of dental operations. With respect to apprentices, counsel are of opinion that except under the provisions of the 37th section they cannot claim exemption.

After consideration of the report of the Dental Committee and the "opinions of counsel," the Medical Council first passed a resolution that all statements with reference to the practice of medicine, surgery or pharmacy, now appearing in the 'Dentists' Register,' shall be erased. It then resolved that the Committee's report not having put it in possession of any evidence to show that the registered persons objected to by the Honorary Secretary of the British Dental Association or by Dr. JACOB were not at the time of their registration *bonâ fide* engaged in the practice of dentistry it was not prepared to order the removal of their names from the Dental Register. A further resolution provides that the persons who had their names removed from the Register at their own request, under the influence of the "threatening letter," shall, on application, have their names restored without fee, subject to the discretion of the Executive Committee as to the grounds upon which they claim registration.

No doubt these decisions of the Medical Council will be a severe disappointment to the aggressive section of the dental profession. But after all, in the recent legislation affecting dentists, as in all previous similar legislation, Parliament jealously provided against infringement of existing rights, and it must be acknowledged that the men whose registration has given so much umbrage can even now do nothing that they could not have done legally before the passing of the Dental Act. The attitude of the General Medical Council in respect to dental registration generally has also been the subject of sharp criticisms in the medical journals from the medical point of view, but this is a part of the subject with which we have no right to interfere.

A NEW MEDICAL ACT AMENDMENT BILL.

ALTHOUGH the prospect of carrying through legislative enactments this session seems to be very unpromising, a Medical Act Amendment Bill has already been introduced by Mr. HARDCASTLE, Sir TREVOR LAWRENCE and Dr. FARQUHARSON. This Bill is the latest expression of that effort to supersede the present Medical Council and to create a "medical parliament," which has hitherto frustrated all attempts to bring about medical reform. From a medical point of view it is characterized by the *Times* as a Bill which no British Parliament could ever sanction, since under a disguise of providing for medical education it is a measure of scarcely veiled trades unionism, containing provisions for the repression of the practice of unqualified persons, which would prevent the universities from sending any but registered medical practitioners to represent them on the new Medical Council, and thus deprive the Council of the possible services of eminent members of the older universities, who being scholars, or chemists, or philosophers, might often temper with advice of the utmost value the purely medical view of professional education.

To refer such a Bill to a Select Committee would be, in the opinion of the *Times*, a waste of time, and it is suggested as far more probable, as well as more appropriate, that the whole subject of medical reform should be referred to a Royal Commission that would calmly investigate what ought to be the relation of the State to the medical profession in connection with the interests of the public.

That portion of the Bill which most directly affects persons engaged in the business of pharmacy is the clause relating to unregistered persons, and it provides that if a person who is not for the time being registered in the Medical Register practises for gain, or attaches to his place of business the description "dispensary" or "medical hall," he shall be liable on summary conviction to a fine not exceeding twenty pounds.

The Bill provides for the repeal of the whole of the Apothecaries Act of 1815, but in the 26th clause it also provides, in lieu of the penal section of that Act, that any person not registered under the Act, who for gain engages in the medical treatment of diseases, shall for each offence be liable on summary conviction to a like penalty. In other words, this clause would, as the *Times* remarks, have the effect of mulcting unqualified sellers of pills in penalties which would involve the alternative of imprisonment.

Immediately following this is a provision that the 26th clause shall not interfere with the rights, privileges or titles conferred on persons by registration under the Pharmacy Acts, 1852 and 1868, and as this clause relates only to unqualified practice, it might be inferred from the phraseology that the rights, privileges, etc., thus referred to related to unqualified practice, if it were not the fact that neither of the Pharmacy Acts confer any rights or privileges in that respect. Whatever rights and privileges chemists and druggists possess in the matter of unqualified practice are of far older date than the Pharmacy Acts, or even the Apothecaries Act that is to be repealed by the Bill now referred to, and in so far the saving provision of its 26th section appears to be little better than a means of mystification.

It may, we think, be conjectured that the spirit animating this clause of the Medical Bill in regard to chemists and druggists is one imparted by some of those self-styled defence associations which not long since undertook to revive the contest between qualified and unqualified practitioners, and the nature of the clause is sufficient to indicate that though they have been beaten, they have not yet abandoned their endeavours to harass and interfere with the business of chemists and druggists. We fail to recognize any prospect of such endeavours contributing to a solution of the question concerning the practice of "counter prescribing." Whatever may be the opinion held of the propriety of that practice, it cannot be regarded otherwise than as a legacy inherited by chemists and druggists from the old apothecaries at the time when they to a great extent abandoned their legitimate business, and assumed the position of medical practitioners. Any legislation that should justly and satisfactorily deal with and remedy the confusion then inaugurated in regard to medical and pharmaceutical functions must not only deal with the practice of medicine by unqualified persons, but also with the practice of pharmacy by persons who are not specially qualified for that duty. Whether we shall ever have a law establishing such a sharp line of demarcation between prescribing and dispensing as is maintained in some countries is perhaps questionable, and it may also be questionable whether, in the interests of the public, that is to be desired, but certainly in any attempt to amend the present state of affairs and attain to the future which Mr. WADE rightly points to in his letter as the proper aim of the pharmacist, cognizance must be taken of the claims of the dispensing pharmacist as well as those of medical practitioners if any kind of satisfactory result is to be brought about. It may be that in the consideration of the subject of medical reform by a Royal Commision opportunity may be presented for dealing with these and some other points affecting the interests of pharmacists and their relations to medical practitioners as well as to the general public.

PHARMACY IN THE ISLE OF MAN.

ABOUT three years and a half since a correspondent called attention in this Journal to the non-existence of any law regulating the practice of pharmacy in the Isle of Man, and suggested that the Pharmacy Act, 1868, might with advantage be extended so as to include that island. Subsequently a petition, signed by a majority of the chemists and druggists in business in the island, was presented to the House of Keys, and in consequence, in December, 1879, a committee of the Tynwald Court was appointed to inquire as to the qualifications of chemists and druggists and as to the sale of poisons in the Isle of Man. This Committee proceeded to make a very thorough investigation as to the laws relating to the practice of pharmacy which obtain in the three kingdoms, and the information collected, together with the inferences drawn from it, have recently been issued in the form of a report.

On consideration of the whole subject the Committee expresses an opinion that it would be in the interest of the public that the practice of pharmacy in the Isle of Man should be, as in the United Kingdom, under legal recognition and control. To secure this end the Committee recommended that the local Legislature should pass an Act containing regulations similar to those in the Irish Pharmacy Act, under which whilst the sale of simple drugs, not being poisons, and "patent medicines" would not be restricted, the retailing, dispensing or compounding of certain scheduled poisons, and the dispensing or compounding of medical prescriptions, would be restricted to qualified persons "under regulations such as those contained in the Pharmacy Acts of the United Kingdom." The term "qualified persons" it is proposed to define as meaning legally qualified medical practitioners who shall, in order to obtain their diplomas, have passed an examination in pharmacy; licentiate apothecaries in England or Ireland; registered pharmaceutical chemists or chemists and druggists of Great Britain or Ireland; and all persons who have hitherto carried on in the island the "business of a chemist "and druggist in the keeping of open shop for the "compounding of the prescriptions of medical prac- "titioners and for the retailing of drugs and poisons."

With respect to registration, provision would have to be made for carrying it out and it is suggested whether the opportunity should not be taken to constitute a general medical registration, which might include the registration of persons practising pharmacy only.

The desirability of the practice of pharmacy in the Isle of Man being brought more into conformity with the conditions under which it is carried on in other parts of the United Kingdom can hardly be questioned, and we suppose in these days of home rule this can be effected with least friction by the island having the luxury of a Pharmacy Act of its own. But as both the British and Irish Societies contemplate applying to Parliament for alterations in the present laws, it would perhaps be wise for our Manx brethren to see what may be the outcome of these applications before they themselves proceed to legislation.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of this Association will be held on Thursday, February 24, at 8.30 p.m., when a paper will be read by Mr. C. THOMPSON, by the "Estimation of Manganese."

CHEMISTS' ASSISTANTS' ASSOCIATION.

A MEETING of the above Association will be held at the rooms, 32A, George Street, Hanover Square, on Wednesday next, February 23, at 9 p.m., when Mr. CHARLES E. STUART will read a paper on "Quebracho Bark, true and false."

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eighth general meeting of the thirty-second session was held at the Royal Institution, on Thursday evening, February 3, 1881, the President, Dr. Symes, in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations to the library were announced:—The current numbers of the *Pharmaceutical Journal*, and the 'Calendar' for 1881, from the Pharmaceutical Society; and the *Canadian Pharmaceutial Journal*, from the Editor.

Eugenol.

The President exhibited a sample of eugenol which had been placed in his hands on the previous day. He said it had recently been noticed as a very energetic antiseptic, and it was also said to be a remedy for toothache. Both these properties could be readily understood, as oil of cloves from which it was obtained, as well as oil of peppermint, had long been used to prevent ink, starch, paste, etc., from becoming mouldy. The oils had also been long regarded as remedies for toothache. It was also known as eugenic or caryophyllic acid, having a formula $C_{10}H_{12}O_2$ and forming salts with bases. He said, it would be interesting to determine its rotatory power as compared with oil of cloves, which he would do by the next meeting.

Frozen Lime Juice.

The Honorary Secretary (Mr. Conroy), called the attention of the meeting to a letter which had appeared in the *Pharmaceutical Journal* of the previous week, by Mr. W. H. Bisset, respecting the entire absence of citricity in frozen lime juice. Mr. Conroy stated that freezing in no way effected the citricity of the lime juice except by separating the other constituents from the water, which possessed the peculiar physical property of freeing itself from all other substances by freezing, hence the phenomenon observed by Mr. Bisset. The knowledge of this property of water was as old as the hills, and had long ago been proposed as a means of concentrating lime and lemon juices. Advantage was also taken of it for various other purposes. Ure mentions that the old nobles of Russia when they desired a more intoxicating drink than usual, placed their wines or spirits in the ice of their frozen rivers, until all the aqueous portion was frozen; when they drank the ardent fluid concentrated in the centre. Byron, in his 18th canto of 'Don Juan' has the following allusion to it:—

> "I'll have another figure in a trice:—
> What say you to a bottle of champagne?
> Frozen into a very vinous ice,
> Which leaves few drops of that immortal rain,
> Yet in the very centre, past all price,
> About a liquid glassful will remain;
> And this is stronger than the strongest grape
> Could e'er express in its expanded shape."

During the late severe frost he had examined some samples of frozen lime juice, and obtained the following results from the analyses:—

Sample A. in its natural state was found to contain 7·85 per cent. of free citric acid. Having remained in its frozen state for over an hour, it was thawed and found to contain exactly the same citricity.

Sample B. In this case the liquid portion was poured away from the ice, and was found to contain 12·75 per cent. of free citric acid, while the frozen portion after thawing tested only 4·45 per cent.

Sample C. represented a bucketful of ice taken from a puncheon of juice. The ice had been slowly thawing for several days, and the liquid portion allowed to flow away. On thawing and testing the remaining ice it was found to contain only 0·45 per cent. of free citric acid.

These experiments, he considered, conclusively proved, if proof were necessary, what had already been said.

Mr. T. Farmer made an interesting communication on some phenomena in connection with the "Mixing of Castor and Heavy Mineral Oils," which he practically illustrated.

This was followed by a communication on the so-called "Indian Opium," by Mr. A. H. Mason, after which he read the following paper:—

PEROXIDE OF HYDROGEN:—ITS MANUFACTURE, PROPERTIES, DETECTION AND ESTIMATION, APPLICATION AND USES.

BY ALFRED H. MASON, F.C.S.

This remarkable substance, though long known to chemists, having been discovered in 1818 by Thénard, only attracted the attention of pharmacists some twenty years ago, when Dr. B. W. Richardson, of London, published the results of his experiments regarding its physiological and therapeutical action. Its occurrence in nature has only within the last few years received much attention, but since it has been shown that it exists in small quantities in the atmosphere, and it has been found in rain and in snow, and that all kinds of aromatic plants produce it liberally, and its application commercially is being rapidly developed, I felt that a communication to this Association respecting it would not be without value, especially as I failed to find much information respecting it in the ordinary text-books of a chemist and druggist. Gmelin* gives several processes for the formation of peroxide of hydrogen, dioxide of hydrogen, oxygenated water, H_2O_2, but the method of the discoverer, Thénard, is given in elaborate and interesting detail, great precautions being necessary for its manufacture. He obtained it by acting upon barium peroxide with dilute hydrochloric acid:

$$BaO_2 + 2HCl = BaCl_2 + H_2O_2;$$

and in practice commercially, the rather crude method of transferring one atom oxygen from a peroxide of barium, or other substance, to water, by decomposing the peroxide with an acid forming a monosalt, is adopted.

I have placed myself in communication with several manufacturers and desire to acknowledge the courtesy with which they have received my communication, but with all the process adopted is a secret; however, from the researches I have made I venture to suggest that the method of Thomsen† is the one which receives most favour. Thomsen's method consists in decomposing hydrated barium peroxide with dilute sulphuric acid, thus:—

$$BaO_2 + H_2SO_4 = H_2O_2 + BaSO_4$$

The sulphate of barium forms a white insoluble precipitate, while the peroxide of hydrogen passes into solution at once.

In the first place, he is particular that the barium peroxide is pure, and for this purpose adopts the following method:—Finely powdered commercial peroxide of barium is dissolved in hydrochloric acid to neutralization; to the filtered and cooled solution baryta water is added in sufficient quantity to precipitate foreign oxides (ferric and manganic), alumina and silica, until a faint precipitate of hydrated peroxide of barium forms. The precipitate is then filtered off, and the clear solution is heated with concentrated baryta water, which throws down the hydrated peroxide of barium. This is well washed upon a filter until the washings no longer evidence hydrochloric acid; the moist precipitate is then transferred to well stoppered bottles, in which it will keep unchanged for a long long. To prepare peroxide of hydrogen the hydrate is gradually added to a cold mixture of dilute sulphuric acid (of not less than five parts of water to one part of concentrated sulphuric acid) with constant stirring, and this is continued until only a trace of free acid remains, when the sulphate of barium is allowed to subside, the liquid is filtered and then cautiously neutralized with dilute baryta water.

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* Vol. ii., 73.

† *Ber. Deutsch. Chem. Ges.*, vii., 74.

The aqueous solution of hydrogen peroxide thus prepared is brought over sulphuric acid *in vacuo*, water evaporates, and the solution of the peroxide becomes more concentrated.

Where this method is not employed, probably the substitution of hydrofluoric or hydrofluosilic acid is used, $BaO_2 + 2HF = BaF_2 + H_2O_2$, either the insoluble fluoride or fluosilicate of barium is formed, peroxide of hydrogen alone remaining in solution.*

Schonbein produced pure peroxide of hydrogen by agitating in a large flask, under access of air, amalgamated zinc in powder and distilled water. Oxygen is absorbed by both the zinc and the water under formation of oxide of zinc and peroxide of hydrogen; the latter he says is free from acid, keeps well without decomposition and does not contain any metallic trace.

R. Bottger produced a peroxide of hydrogen which he said was perfectly free from acid and would keep for weeks in corked vials, and may be exposed to boiling temperatures without decomposition. He presses the importance of this where the substance is required for medical purposes, the supposed instability having here been a great drawback to its medical application.

Kingzett produces peroxide of hydrogen H_2O_2, *in situ*, by the rapid oxidation of turpentine.

In the electrolytic decomposition of water peroxides of hydrogen and ozone are formed, and their relations are peculiar; at one time it was conjected that ozone was nothing else than peroxide of hydrogen. Peroxide of hydrogen being oxygenated water, that is water chemically combined containing in its molecule more oxygen than water does (and not simply admixed as in the case of aerated water), Schonbein was led to regard ozone as peroxygenated water, or in other words, a more highly oxygenated compound than peroxide of hydrogen; thus he represented ozone as equivalent to H_2O_3, peroxide of hydrogen H_2O_2, water being H_2O.

But the investigations of Andrews, Brodie, Odling and others have shown that pure ozone is free from peroxide of hydrogen, and is oxygen in a condensed state; not condensed in the sense that a given volume of gas may be made to occupy a smaller space by the influence of compression, but in the sense that the constituent atoms are so arranged that each whole molecule of ozone contains three atoms in space occupied by a molecule of oxygen consisting of two atoms.

It would not be of any service in this paper to detail the elaborate and patient investigations which have led to so much controversy amongst scientific chemists upon the distinctive characteristics of oxygen, ozone and peroxide of hydrogen, further than stating that oxygen gas exhibits but few direct chemical reactions which are not also shared by ozone and peroxide of hydrogen. It differs from them, however, in being less active in its properties; for instance, when brought into contact with a solution of iodide of potassium it does not exercise any influence upon it. It has no colour, taste or smell; it has not any action on litmus paper, does not oxidize silver, and it is stable at all temperatures, and it has such general negative characters that we can readily and unmistakably discriminate between it on the one hand and ozone and peroxide of hydrogen on the other. Dr. Cornelius Fox, in a work upon ozone, has fully epitomized the amount of work which has been devoted to the study of the subject.

I do not either purpose entering into details upon the various processes by which peroxide of hydrogen has been shown to exist in nature. C. T. Kingzett's work upon 'Nature's Hygiene' fully explains these.

Properties.—Peroxide of hydrogen is a colourless, transparent oily liquid of sp. gr. 1·452, does not freeze at 22° F., evaporates *in vacuo* at ordinary temperature without decomposition, though much less readily than water; does not redden litmus, but gradually bleaches both litmus and turmeric paper; has a harsh bitter taste, similar to that of tartar emetic; whitens the tongue and thickens the saliva; when placed upon the hand it instantly turns the cuticle white, and after a time produces violent itching; it has a faint odour, reminding both of ozone and chlorine. It retains the second atom of oxygen in a very loose state of combination. It escapes from the water under various circumstances, sometimes so rapidly as to cause violent effervescing, evolution of heat and explosion, accompanied sometimes with a flash of light.

The decomposition is effected by contact with the binoxide of carbon, binoxide of manganese, various other metallic oxides, by several metals, alkalies, and also by heat. Some oxides in effecting its decomposition are reduced to the metallic state or to a lower state of oxidation, such as oxide of gold, silver, mercury and the red and brown peroxide of lead.

In the case of silver, for example, the anhydrous compound is decomposed into oxygen and water. The same decomposition is also stated to take place with a dilute aqueous solution of peroxide of hydrogen, and the reaction represented by the following:—

$$Ag_2O + H_2O_2 = 2\,Ag + H_2O + O_2.$$

Here is the remarkable phenomenon of a powerful oxidizing agent exerting a reducing action upon metallic oxides, the metal being formed. The explanation, however, lies thus: silver possesses only a weak power of combination for oxygen, and the oxide accordingly decomposes into its element. When oxide of silver is brought into contact with peroxide of hydrogen which itself contains one atom of oxygen, but feebly united, an analogous reduction takes place; the one atom of oxygen in the peroxide combining with the one atom of silver in the metallic oxide to form a molecule of free oxygen.

The decomposition of peroxide of hydrogen is assisted by the contact of many substances (notably alkalies), and particularly by those which are themselves in a state of change or decomposition. On the other hand, the presence of a little ordinary ether restrains the decomposition, and not unlikely the reason for this is to be found in the fact that ether itself gives rise to the production of peroxide of hydrogen by contact with air or oxygen.

Peroxide of hydrogen is miscible with water in all proportions, and it also combines with the hydrated acids, with which it forms compounds in which it is less easily decomposed than when uncombined. It bleaches organic colouring matters, and as a bleaching agent is probably the most perfect form that will ever be discovered,—the second atom of oxygen uniting with the hydrogen or carbon of organic matter, and the result being simply reaction, or water and carbonic acid; no acid, as in the case of chlorine, breaking up (and so bleaching) an organic compound by uniting with the hydrogen, hydrochloric acid being formed, or sulphurous acid uniting with oxygen and producing sulphuric acid, or permanganate of potash uniting with hydrogen and depositing brown oxide of manganese and a salt of potash, etc., etc.

Detection and Estimation.—In order to detect the presence of peroxide of hydrogen in solution the liquid is rendered acid with sulphuric acid, some ether and a little solution of potassic chromate is added and the solution well shaken (care must be taken in testing a made solution containing the peroxide of hydrogen of commerce as violent effervescence takes place). If hydrogen peroxide be present the solution assumes a beautiful blue colour, and on allowing it to stand the colour is taken up by the ether, and a deep blue layer separates out: this blue compound is perchromic acid, and the reaction may in a similar way be employed for the detection of chromium.

When hydrogen peroxide is added to a solution of potassic iodide and ferrous sulphate iodine is set free, as may be easily proved by the formation of blue iodide of starch (Schonbein). This reaction is so delicate that one part in twenty millions may be detected; other oxidizing agents have the power of liberating iodine, but not in the presence of ferrous sulphate. Thus with chromic acid, it first of all forms a blue colour; the oxygen is then gradually evolved, the colour fading at the same time—

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* Abel and Bloxam, p. 117.

$$2\,CrO_3 + 3\,H_2O_2 = Cr_2O_3 + 3\,H_2O + 3\,O_2.$$

If an excess of peroxide of hydrogen be used in this experiment then a further reaction occurs, in which the H_2O_2 loses exactly double the amount of oxygen lost by the chromic acid, so the ultimate result is—

$$2\,CrO_3 + 6\,H_2O_2 = Cr_2O_3 + 6\,H_2O + O_9.$$

The strength of peroxide of hydrogen may be estimated by the following method:—A given volume is taken, and placed in a tube with excess of potassic bichromate. On agitation over mercury a volume of oxygen is evolved, which supposing 1 c.c. of H_2O_2 has been taken, expresses its strength in so many volumes. Thus 1 c.c. of a 10-volume solution would yield 10 c.c. of oxygen at 0° C. and 760 mm. pressure. E. Schöne's experiments upon the various reagents for peroxide of hydrogen have resulted in his being able to detect one two-hundredth millionth with certainty, and with some practice one two-hundredth and fifty millionth; but for the quantitative determination of hydrogen peroxide he does not consider these methods sufficiently sensitive. He therefore adopts a colorimetric test, which depends upon the formation of iodide of starch when solution of potassic iodide and starch are added to the liquid containing peroxide of hydrogen. He compares the intensity of the blue colour produced in a given volume of the liquid tested with a series of liquids of like volume, in which definite quantities of peroxide of hydrogen have been acted upon by potassic iodide and starch water, and which are contained in clear glass stoppered bottles of like shape and size as that in which the test liquid is contained. Ten such vials, representing 0·1, 0·2, 0·3, 0·4, 0·5, 0·6, 0·7, 0·8, 0·9, 1·0 milligrams of hydrogen peroxide to the litre, constitute his colorimetric scale, by which he is enabled to determine the one-eighteenth millegram of H_2O_2 in a litre accurately, and the one-hundredth millegram approximately. To ensure accuracy the colorimetric scale is prepared fresh every two weeks.[*] This test depends upon the fact that a neutral solution of hydrogen peroxide gradually liberates iodine from a neutral solution of potassic iodide, thus—

$$H_2O_2 + 2KI = 2KOH + I_2.$$

Applications and Uses.—Peroxide of hydrogen of commerce is a solution of from 30 volumes to 10 volumes, *i.e.*, a solution capable of evolving the quantity indicated of gaseous oxygen when fully decomposed. Thus a 10-volume solution represents the following:—100 c.c. evolves 1000 c.c. oxygen, or in other words, it contains 304 per cent. by weight of H_2O_2, and evolves 1·43 per cent. of oxygen by weight. There is not much difficulty in obtaining this solution by exhausting the quantity of oxygen contained in the peroxide of barium employed in the process. Respecting our knowledge of the physiological and therapeutical action of peroxide of hydrogen, the medical profession is indebted to Dr. B. W. Richardson, of London.[†] In relation to its influence on organic bodies, he found that to venous blood, deprived of its fibrin, it imparts oxygen, with an increase of heat and a change of the colour to red. Fibrin and cellular tissue cause it to evolve oxygen. Sugar and starch are decomposed by it, giving out carbonic acid. Albumen, gelatin, urea and cutaneous tissue have no effect on it. Injected into the left cavities of the heart of an animal it restores the irritability of that organ; but has an opposite effect on the right cavities. Thrown into the arteries, immediately after death it restores for a time the contractile power of the muscles, and suspends cadaveric rigidity, while it counteracts the influence of various medicinal substances that cause muscular spasms.

Dr. Richardson inferred from his experiments that the peroxide might be useful as an antidote to the narcotic poisons, as a local application to gangrenous ulcers, and as an internal remedy in low forms of fever.[*] Subsequently from various therapeutical trials of the remedy, he came to the conclusion that it is of great value in chronic and subacute rheumatism; acts in the removal of scrofulous tumours like iodine; relieves the paroxysms of whooping cough, and cuts short the disease more effectually than any other medicine; affords great relief in chronic bronchitis, with dyspnœa, and in phthisis; operates favourably in the early stage by improving digestion and giving increased activity to the chalybeate remedies; while in the advanced stages, it affords great relief to the dyspnœa and oppression, acting indeed in this respect like opium, without its narcotic effects. In general, it seemed to him to him to improve digestion, and therefore to be useful in cases complicated with dyspepsia. Sometimes, when freely employed, it produced profuse salivation, suggesting the idea that it might in other respects resemble mercury, and possibly be found capable of replacing it to a certain extent in the treatment of disease. Dr. Day,[†] Geelong, reports cases of diabetes, which resisted ordinary treatment, yielding under the influence of an ethereal solution of peroxide of hydrogen; but the experiments of Dr. Richardson[‡] and Dr. Pavy[§] shew that whilst it exercises considerable effect in diminishing the discharge of urine and the secretion of sugar, it does not prevent fatality.

Locally employed, peroxide of hydrogen sometimes acts very beneficially, especially in feeble, flabby, or ill-conditioned ulcers, in chancre and diphtheritic sores, in all of which it operates, not as a corrosive substance, but probably by imparting oxygen to the diseased tissues, and thus destroying them.

One would naturally think from the foregoing observations that we had a panacea for "all the ills that flesh is heir to," or even wonder, since the more recent demonstration of its existence under certain conditions in Nature, that those ills were present; but I am informed that the medical profession have given it a trial, and it has been found wanting, and they naturally hold these statements as impracticable, being unable to accomplish them. For medicinal use the quantity sold is very small. Dr. Richardson recommends the 10-volume solution. Dose ½ drachm to 2 drachms. But there is a large quantity of the so-called ozonic ether used in medicine, which consists of a compound of absolute ether with peroxide of hydrogen expressly made of 30-volume strength.

The best known application of peroxide of hydrogen is probably in its employment as an "auricome," for bleaching human hair, producing the yellowish tint, and making hair of any colour paler. For this purpose, also, a 10-volume solution is used; the hair is saturated with it, and then exposed for two or three days, when the oxygen is liberated and the hair partly discolorized. If wanted in a shorter time, after immersion the hair is dried in a water-bath for a few hours, but the ultimate result is not so satisfactory. A London hairdresser produces white hair, and it is conjectured that he employs a 20-volume solution to which is added some strong solution of ammonia, and by this means the hair is decolorized and bleached, and at the same time practically destroyed excepting so long as it holds together.

Peroxide of hydrogen was once proposed for bleaching blood serum, with the view of obtaining colourless albumen, and effectually, but it was found too expensive for practical application. Its use in the laboratory for practical purposes has found some favour, for the oxidation of sulphides into sulphates, etc., with the view of rapid estimation, etc.

It is also used for cleaning and bleaching old engravings and oil paintings, etc.; also for bleaching oil, wax, ivory and tobacco, and for these purposes the addition of a little liq. ammon. fort. ·880 renders the feebly combined oxygen more willing to leave the water. It is also used for certain purposes of printing colours on various fabrics; it is also the chief constituent of the antiseptic and disinfecting fluid called "Sanitas." For these latter purposes the H_2O_2 produced by Kingzett's method is preferred.

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[*] *Ph. Centralhalle*, No. 45, 1875, p. 380.

[†] *Lancet*, October 20, 1860.

[*] *Lancet*, April, 1862.

[†] *Lancet*, January 11, 1868.

[‡] *Medical Times and Gazette*, December, 1868, p. 62.

[§] 'On Diabetes,' 2 ed., p. 268.

It was its application to the bleaching of ivory that led me to bring the subject before your notice this evening. It is used in Sheffield to bleach the inferior ivory for knife handles. The liquid is supplied by an ivory dealer in London, and it consists of an aqueous solution containing 2·9 per cent. of a rather crude peroxide of hydrogen. The mode of procedure is as follows:—The ivory is first treated with a solution of common soda to remove the greasy matter and open the pores; then say, 2 quarts of the liquid are placed in a stone pot, 4 ounces of liq. ammon. fort. ·880 added, the handles immersed and the whole put over a common shop stove for twenty-four to thirty-six hours; the handles are then taken out and gradually dried in the air, not too quickly, or they would split. The deep colour of the common ivory is removed and a beautiful pearly white ivory results when polished.

Peroxide of hydrogen is manufactured largely in this country, also in America, and in Germany, but that of English manufacture maintains a superiority as it is still largely exported to those countries.

I feel convinced that the manufacture of this substance is well worthy of the attention of scientific and manufacturing chemists; its present cost being prejudicial to its employment. If a cheap article could be produced, its uses would almost be unlimited, and I think I have shown that mankind would be considerably benefited thereby.

A lengthy discussion followed, in which the President, Messrs. Chubb, Conroy, Tate, Watt, Williams and Wood took part.

Mr. Mason briefly replied to the points raised in the discussion, and a hearty vote of thanks to the author, proposed by Mr. Shaw and seconded by Mr. Chubb, terminated the meeting.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The annual meeting was held at the rooms of the Society on Wednesday evening, February 2, Mr. G. Ellinor in the chair. The annual report was read by the Secretary, which showed the Society to be in a flourishing condition, with a satisfactory balance in hand. The following officers were elected for the ensuing year:—

President, Mr. G. Ellinor, Ph.C.; Vice-Presidents, Mr. E. Radley Learoyd and Mr. G. Carr; Honorary Secretary, Mr. G. L. W. Newsholme; Teasurer and Auditor, Messrs. Jervis and Cubley respectively; Council, Messrs. W Ward, F.C.S., Burnell, Purton, Watts, Turner, Hall. W. Alcock and G. B. Owen, junr.

The President tendered his thanks for the honour conferred upon him in re electing him for another year. He said it was no doubt a pleasure to all that suitable rooms had been obtained for their meetings, and he hoped that the year upon which they had entered would be a successful and pleasant one, and that short papers and discussions upon the various subjects of pharmacy would be brought forward. All would regret so little had been done during the past few years, which could be accounted for by the loss of the old rooms, and the consequent absence of any fixed place of meeting. The furnishing and appearance of the new rooms gave one the feeling of olden times, and would no doubt stimulate all to increased activity. Some of the old specimens would require re-arrangment, and some replacement, which no doubt would be done, and the library would, doubtless, be of great use; it ought to be very much enlarged and should contain books pertaining to the trades of Sheffield. Percy's and Philips's 'Metallurgy,' and works on electro-plating, etc., should have a prominent place, seeing that the principal industry of Sheffield is metallurgy. There should also be a good work on microscopic analysis. The members should put their shoulders to the wheel and work steadily and carefully; they need then fear no foe. Their business was a personal one, and co-operative and so-called civil service stores might do their worst; there would always be work for the plodding pharmacist. Every true pharmacist had the confidence of his clients, and his own knowledge and skill could soon produce for him what he required. Hoping to have the support of the officers and members of the Society, he had every reason to anticipate a year of successful work and progress.

The Honorary Secretary announced the following donations:—'Year-Book of Pharmacy,' 'Calendar of the Pharmaceutical Society,' *Pharmaceutical Journal*, and *Magazine of Pharmacy*.

On the motion of the President it was resolved that best thanks be given to the several donors.

Votes of thanks to the officers for their services during the past year concluded the business of the meeting.

HALIFAX AND DISTRICT CHEMISTS' ASSOCIATION.

A meeting of this Society was held on Friday, January 28, 1881.

Mr. Shaw, President, introduced the clauses of the Amended Pharmacy Bill to the consideration of the meeting and a long discussion ensued as to their merits.

Mr. Dyer strongly objected to the clauses in reference to widows being compelled to sell their businesses within a certain period of three years, thinking this would be hard where a son was left who was intended for the business and who would not be of age in the time stated. He therefore moved the following resolution:—"That if, on the death of a member of the trade, a son is left of over fourteen years of age, whom the widow is desirous of qualifying, that no compulsory sale of the business shall then take place, so long as the widow gives satisfactory proof that the business is managed by a properly qualified assistant, and that the son is being regularly trained to the business; this state of things to continue until the son be twenty-two years of age, when if he has not passed his examination the business be then disposed of."

This was seconded by Mr. Hewens.

Mr. Councillor Brierley proposed, and Mr. Jessop seconded an amendment:—"That the amended clause compelling sale within three years is best." On being put to the vote the mover and seconder only voted for the amendment, whilst for Mr. Dyer's resolution all the other members voted.

No resolution was proposed in reference to the poison clause, a decided majority appearing in the discussion to be in favour.

It was intended to have discussed the patent medicine question, but the evening was now too far advanced, so it was decided to leave the subject for next meeting.

LEICESTER CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The general half-yearly meeting of this Association was held at the rooms, Halford Street, on Tuesday, February 1, 1881, the President, Mr. J. J. Edwards in the chair. After a few remarks from the President, a report of the past half-year's proceedings was read and adopted. The report stated that the number of members on the books had increased to thirty, and that two members and three ex-members had passed the Minor examination during the past session. The thanks of the committee were expressed to Messrs. Allen and Hanbury for a copy of 'Science Papers;' to the honorary members, who by their subscriptions had shown a practical interest in the welfare of the Association; and to the Pharmaceutical Society for valuable donations of specimens and cases. Thanks were also due to the gentlemen who had contributed to the interest and instruction of the members by reading papers, etc, The meeting then proceeded to the election of a committee for the ensuing session, with the following result:—Mr. H. J. Masters, President; Mr. J. J. Edwards, Vice-President and Honorary Secretary; Mr. W. B. Clark, Treasurer; and Messrs. S. F. Burford, F. W. Lewitt, W. Thirlby and G. M. Winter.

Parliamentary and Law Proceedings.

Supposed Death of a Child from Poisoning. A Chemist censured for Carelessness.

On Saturday afternoon Mr. Wightman held an inquest, at Sheffield, on the body of Jane Ann Truefitt, aged three months, a child that had died on Thursday morning under circumstances that called for inquiry. Mr. J. E. Dyson, chemist and druggist, and his shopboy, William Henry Duggan, were in the room during the examination of the witnesses.

The deceased was the illegitimate daughter of Jane Truefitt, who is only sixteen years of age. The child had suffered from convulsions from its birth, and also from coughing. In order to relieve the cough Mrs. England, the person who had charge of it, had given it four drops of paregoric at different times, and on Wednesday evening last, she sent her son with a small bottle to the shop of Mr. J. E. Dyson for a pennyworth of paregoric. The boy brought the bottle back, and she gave the deceased four drops of its contents. About eleven o'clock the child began "to look queer," to use Mrs. England's words, and she asked her husband to taste what was in the bottle. He did so at once, saying it was laudanum. He and his boy, an intelligent little fellow of twelve years, went to Dyson's shop. Mrs. Dyson opened the door, to whom England gave the bottle, saying that laudanum had been given for paregoric, and at the same time mentioning the child's illness. Mrs. Dyson took the bottle and returned with it after changing its contents. She also gave England a draught for the child to cause it to vomit. This emetic was administered without delay, but it had not the desired effect.

Mr. Edward M'Lean, surgeon, Paradise Square, was called in the morning, but he could do nothing, as the child was almost dead. The only signs of the presence of laudanum in the child were deadly coldness and very minute contraction of the pupils. In answer to the Coroner, he said these symptoms would also be compatible with death from convulsions. It was too far gone to enable him to say. If only four drops of laudanum had been administered they would not detect the poison in the body by means of a *post-mortem* or subsequent analyses. Four drops of laudanum given to a child of the age of deceased was almost certain to be fatal. In reply to a juryman, Mr. McLean said paregoric could not produce the effects he saw in the child.

William Henry Duggan, sixteen years of age, who had been in Mr. Dyson's employment for five years, said he did not recollect seeing the boy or selling him anything, but he would not go so far as to swear that he did not sell him something. When the bottle was returned he saw Mrs. Dyson pour the contents into a four-ounce measure to see what was left. There were only a few drops short of 2 drachms, the quantity of laudanum Mr. Dyson sold for 1*d.*

Caroline M'Millan, single woman, was the next witness. She said she was in Mr. Dyson's shop on Thursday, when she heard Mrs. Dyson say to Duggan that he was to tell the coroner he did not sell any laudanum except when the master or mistress was in. Duggan said he would say that.

The Coroner, in summing up, said this, like many other cases both here and at the Assizes, failed for want of definite evidence. After hearing the medical evidence, the jury could make no more of it. The action of Mrs. Dyson when the bottle was taken back to her was very strongly indicative of a conclusion on her part that the laudanum had come from there. He thought they would consider the version of the story told by England, his wife and the boy, who had given his evidence wonderfully well, the correct one. Still, it left them in this position, that there was not sufficient conclusive evidence that the laudanum killed the child. He was sorry it could not be brought to a more definite state. His experience was quite in accordance with the evidence of the medical man, that a *post-mortem* would throw no light upon it whatever, as far as laudanum was concerned. If it did he was sure he would be justified in saying it was the first *post-mortem* examination that ever had. It ended the case not very satisfactorily, for there had been very gross negligence and carelessness by a boy being allowed to sell to another boy laudanum instead of the article asked for.

Mr. Dyson and his assistant were recalled to hear the verdict.

Mr. Dyson, addressing the coroner, said it was his belief that the boy had made a mistake in supplying laudanum for paregoric.

The jury returned the following verdict:—"That the deceased died on February 10, having been subject to convulsions, and having had inadvertently administered to it an overdose of laudanum, but as to the actual cause of death there is not sufficient evidence to show; and the said jurors further say that Mr. J. E. Dyson, a druggist, at whose shop the laudanum was purchased, is highly censurable for the loose and careless manner in which laudanum is sold at the said shop."

The Coroner hoped Mr. Dyson would take this as a warning. If the doctor's evidence had been conclusive, he would have been at this moment in a very serious position, as the law held that if a chemist killed a person from not exercising sufficient care he was liable to a charge of manslaughter. The same remarks applied to the assistant, who was not old enough to be retailing to children of twelve years of age. The jury were quite of opinion that he (Mr. Dyson) was censurable for allowing a lad to serve out laudanum or other drugs, and to make such a grievous mistake as had been made in this case.—*Sheffield Daily Telegraph.*

Selling Deficient Chemical Food.

On Thursday, February 10, Hugh Wallace, grocer, 467, St. Vincent Street, was charged, at Glasgow, before Sheriff Balfour, with having sold to the assistant sanitary inspector, on January 13 last, a bottle of compound syrup of phosphates or chemical food, on which was a label bearing the statement that every teaspoonful of the food contained 2½ grains phosphate of lime, and 1 grain phosphate of iron, but which, on analysis, was found to contain only ⅓ grain of phosphate of lime and ¼ grain of phosphate of iron. He pleaded guilty, and his law agent (Mr. Bell) stated that there was no adulteration, but simply an insufficient quantity of the ingredients mentioned on the label; that there was no intentional fraud, and that the difference in value of the compound at it was, and as it should be, was only a farthing.

Mr. Ross, for the prosecutor, said the compound was a food used for young children.

The respondent, in reply to the Sheriff, said he bought the food made up in large quantities, and had no means of adulterating it, and that he was told by the seller that it was genuine. He had stopped the sale of the article, and returned what he had.

The Sheriff said the offence was more a formal than a substantial violation of the Sale of Food and Drugs Act, because the respondent did not manufacture the food, and had no means of testing it. Respondent was, however, the party responsible for selling it; and he would impose the modified penalty of £3.

POISONING BY CYANIDE OF POTASSIUM.

On Saturday last Mr. Hawkes, Birmingham borough coroner, held an inquest respecting the death of the Rev. Robert Lewis Haworth, proprietor of the Middle Class School, Frederick Street, who had been found lying dead in bed. There was a tumbler on the floor containing a small quantity of clear fluid and a slight sediment.

Mr. George Northall, assistant master to the deceased, said there was a chemical laboratory at the school, of which deceased kept the key. Amongst the preparations was a bottle of cyanide of potassium. Deceased, in conversation with witness, had expressed the conviction that suicide was not only a cowardly thing, but would bring punishment hereafter.

Mr. Henry Davis, surgeon, said the glass found on the floor contained cyanide of potassium, which had been dissolved in it. That chemical was a corrosive deadly poison. It would not have been possible for deceased to go to the dressing table to write on a paper and get into bed again after taking it. Witness never heard of cyanide of potassium being taken to sharpen the faculties.

Mr. Northall, recalled, said that in the arrangement of bottles in the laboratory there were four in the following order: liquid ammonia, liquid cyanide of potassium, cyanide solid, and ammonia solid. The solid ammonia bottle was missing.

A paper found by Mr. Davis upon the deceased's dressing table was handed to the jury. The writing appeared to be, "Foolish curiosity has made me take ——. May Heaven condone it. Hope to come to. Do not mind." Only the words, "Foolish curiosity has made me take," and "Hope to" are clearly legible.

The Coroner, in summing up, pointed out that the theory that deceased might have mistaken the cyanide of potassium bottle for the one containing ammonia was inconsistent with the paper found. If, as Mr. Davis said, it would not be possible for deceased to have written the paper after taking the poison, the only explanation would seem to be that deceased committed suicide, having written the paper beforehand to lead his friends to attribute his death to some other cause.

The jury, after a few minutes' consultation, returned a verdict that deceased died from taking poison, and that he took the same by misadventure.—*Birmingham Daily News.*

Obituary.

Notice has been received of the death of the following:

On the 24th of December, 1880, Mr. Edward Hodgson, Pharmaceutical Chemist, Stockton-on-Tees. Aged 74 years. Mr. Hodgson was one of the Founders of the Pharmaceutical Society, having joined it in 1841.

On the 6th of January, 1881, Mr. John Cowie, Chemist and Druggist, High Street, Falkirk. Aged 29 years. Mr. Cowie had been an Associate in Business of the Society since 1872.

On the 13th of January, 1881, Mr. Robert James Butler, Chemist and Druggist, Wandsworth. Aged 74 years.

On the 14th of January, 1881, Mr. John Brown, Chemist and Druggist, Ripon. Aged 63 years.

On the 20th of January, 1881, Mr. George Brisley, Chemist and Druggist, Little St. Andrew Street, London. Aged 54 years.

On the 22nd of January, 1881, Mr. Thomas Moses, Chemist and Druggist, Market Street, Northwich. Aged 36 years.

On the 23rd of January, 1881, Mr. John Moss, Chemist and Druggist, Market Street, Chorley. Aged 45 years.

On the 25th of January, 1881, at Brighton, Mr. Robert Barclay, of the firm of Barclay and Sons, Farringdon Street. Aged 70 years.

On the 27th of January, 1881, Mr. John Walkden, Chemist and Druggist, Thirlmere Road, Liverpool. Aged 40 years.

On the 6th of February, 1881, Mr. Edward Hughes, Chemist and Druggist, Bridge Street, Llanelly. Aged 66 years.

On the 10th of February, 1881, suddenly, Mr. John Rayner, Pharmaceutical Chemist, Long Row, Nottingham. Mr. Rayner had been a Member of the Pharmaceutical Society since 1854. He was one of the Founders of the Nottingham and Notts Chemists' Association, in which for upwards of fifteen years he filled the office of treasurer.

On the 13th of February, 1881, Mr. John Dickens, Chemist and Druggist, Bridlington Quay. Aged 50 years.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[500].

℞	Tr. Belladonnæ	ʒj.
	Liq. Morph. Hydrochlor.	ʒss.
	Syrupi Gummi	ʒvj.
	Tr. Pruni Virgin.	ʒij.
	Aquæ	ad ℥iss.

Will any of your readers kindly inform me what is meant by "Syr. Gummi"? I used the Syr. Gummi Arabici (from Beasley p. 417). Was I correct? or ought I to have dispensed the prescription with Squire's preparation, ("Syr. Gummi Rub.")?

MUCILAGO.

[501]. Will any reader kindly inform me what appearance the following mixture should have when properly dispensed?—

℞	Pot. Bromid.	ʒj.
	Pot. Iodid.	ʒss.
	Quinæ Sulph.	gr. xij.
	Æther. Chloric.	ʒij.
	Aq. Pur.	ad ℥vj.

Misce. ℥ss. bis die, cum ℥ss aquæ.

DISCIPULUS.

[502].

℞	Potass. Iodid.	gr. 40
	Potass. Bromid.	℥ss.
	Tinct. Quinæ	℥ij.
	Sp. Ammon. Arom.	ʒj.
	Aq.	ad ℥viij.

Misce.

The above prescription was handed to me a day or two since. Customer states it was made up in London perfectly clear. Can this be done without filtering out the precipitate?

INQUIRER.

[503]. I had the following prescription presented to me a day or two ago. Is it likely the prescriber intended ʒj. adipis? Is not it more probably ℥j?—

℞	Veratriæ	gr. iv.
	Sp. Vini Rect.	ʒj.
	Adipis	ʒj.

Ft. ung. Sig. The neuralgic ointment.

F. BLANCHARD.

[504]. Squire's 'Companion to the B.P.,' page 195, gives ʒiv. strong solution of ammonia in ℥xx. of tinct. opii ammoniata. Is liq. amon. fort. meant?—as it says, under heading "Ammon. Liq. Fortior," page 32, "best given in the form liq. ammoniæ."

INQUIRER.

[505]. Would some reader inform me why I obtained a curdy white precipitate on making up the following prescription? I may mention that, last of all, I added ½ drachm of acid. sulph. dil. to dissolve the quinine.

℞	Sodæ Salicylas	ʒij.
	Quiniæ Sulph.	℈j.
	Syr. Aurantii	℥j.
	Aquam	ad ℥vj.

Sig. ʒss. ter in die.

DALEX.

[506]. I shall be much obliged if some of your correspondents will kindly say if I should be justified in using tinct. valer. ammon. in dispensing the following prescription, as I am not aware of any liq. ammon. valer.

℞	Ammon. Muriat.	ʒij.
	Liq. Ammon. Valerian.	℥ij.
	Tinct. Aconiti.	♏ xij.
	Æther. Chloric.	ʒiij.
	Mist. Camphoræ	ad ℥xij.

M. Ft. mist.

APPRENTICE.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PROPOSED PHARMACY ACT AMENDMENT BILL.

Sir,—It appears to me that many who have sent their opinions to this Journal as regards the proposed Amended Pharmacy Act, entirely lose sight of the one great factor it is imperative to observe in framing any Bill introduced into Parliament, and which may subsequently be carried through the various stages to a successful issue, viz., What is the Legislature likely to grant? The question is, in fact, not so much what we may wish to obtain, as what can we get? and from this point of view alone may we hope to have remedied the defects of the Pharmacy Acts now in force.

To disarm outside opposition, as far as possible, must also be our aim; therefore, the proposed Bill should not be hampered with conditions to which objections may be taken, but on the contrary the clauses should be devoid of all undue appearance of selfishness, and so framed in the interest of the public as to disarm the enemies of future pharmaceutical legislation.

To this end there are three points which have been discussed in the Journal, requiring the serious attention of the framers of the proposed Act; for if the views expressed by many are embodied, I am afraid we may look in vain for an Amended Pharmacy Bill. The points alluded to are:—

1st. The widows' interest.
2nd. Plurality of shops.
3rd. Patent medicines.

1st. Many insist on the insertion of a clause to enable a widow to carry on the business of her late husband with the aid of a registered assistant. Such a course would be suicidal to the Bill; for although it is honourable to the feelings by which those who advocate the claim are actuated, it is both unpractical and impolitic, as the question would have to be answered, "What is the difference between a widow and a body corporate carrying on a chemist's business by proxy?"

Again, I am not alone in believing that it would be conferring a very doubtful benefit on widows, allowing them to carry on a pharmacy beyond the time necessary for disposing of it advantageously.

Chemists' assistants, like all other classes of society, consist of honourable and dishonourable members, as every employer knows who has been in business any lengthened period, and if a widow employs one of the former to carry on her business all well and good, but if she gets into the meshes of the latter her business will soon be worthless, or her assistant-manager may clandestinely work it into his own hands or otherwise to her disadvantage.

2nd. Another weak point in our case is the plurality of shops held by one person. This is a question not easily answered, and if a clause is not inserted in the proposed Bill, dealing firmly with this abuse, I would not give much for our chance of a reformed Bill.

It is all very well if Smith, Brown, Jones and Robinson have four shops, and each partner takes special charge of one particular shop, but if Smith or Jones is sole proprietor of four or five, "how can he superintend the lot?" What protection have the public—and especially if his assistants, as is often the case, are not on the Register? Again, what is the difference between branch shops and the stores, beyond the fact that the first may dispense medicines without the services of a qualified man, but the latter must retain one?

From another point of view, I consider the pluralist system highly objectionable; if a chemist has five or six shops (as I understand is the case not many miles hence), he draws an income from each, which allows him to sell at lower price than his neighbours who have only one source of income. Also does not the pluralist often stop the way of many deserving young men who wish to commence business on their own account?

To my mind there is great excuse for the widow continuing her late husband's business, but none for the pluralist.

3rd. There are those who wish to incorporate a clause confining the sale of patent or proprietary medicines to chemists; but, however devoutly that is wished for I do not think the free trade spirit which prevades both Houses of Parliament will allow it, since from time immemorial (figuratively speaking) the vending of patent medicines has been the common property of any tradesman who paid for a licence; my experience goes some fifty years back, and booksellers were the principal vendors of patent medicines in the city where I was apprenticed.

In conclusion, I may say that our aim, pure and simple, should be to obtain an Amended Bill securing the dispensing of medicines and the sale of scheduled poisons to qualified men, and if we obtain that our legitimate ends will be served.

41, *Market Street, Manchester*. THOS. G. GIBBONS.

Sir,—Referring to the draft of the new Pharmacy Bill, a great deal has been said about its several clauses, none more than that relating to widows, who by most writers are compared with and regarded as on the same footing as co-operative stores; all appear to overlook the fact that widows, like their deceased husbands, are mortal, and that death in due time will bring their duties to a close; perhaps they would not even require, in many cases, the three years' grace suggested. Of course provision should be made for a proper person to conduct the business for her. This is quite different to the stores, which is a perpetual business that never had a qualified owner, and never intends to relinquish its pharmaceutical department, since it pays.

Respecting the sale of general drugs and medicines in use for internal and external use, what are pharmaceutists examined in? Does it not include all pharmaceutical preparations? If the examination extends thus far and is necessary, it seems to follow, examined persons only should distribute them. Why examine one person in certain matters (the pharmaceutist), and allow another (the grocer or what not) to dispense or distribute them? For public good all that is necessary to examine in, should be protected from ignorant dealers. I think there is a system in some countries where medicines are dispensed by pharmaceutists only, excepting in districts a certain distance form any such man, when a licence is granted in outlying districts to a respectable tradesman to supply simple medicines.

It appears to me the best use is not made of the powers we have to suppress the sale of scheduled articles by general dealers. This neighbourhood abounds in such, which I think should be put down by existing machinery; the new powers sought will be a dead letter when obtained if more use be not made of it than that now in force.

In respect to patents on hand at the time of passing the Act, these may cause a little inconvenience, but I apprehend manufacturers will be willing to exchange such for a trifle or perhaps gratuitously; if not, it will be soon known what patent medicine requires to be labelled poison,—and the chemist can easily supply what is required,—either inside or outside as the case require. We shall all know what is wanted. Should the wholesale dealers supply contrary to law, the retailer has his remedy. Besides I expect the fears expressed will prove groundless.

H. R.

THE RELATIONS OF PHARMACY AND MEDICINE.

Sir,—On former occasions I have addressed you on the above subject and expressed my belief that "the future of the chemist is to dispense," and that help is not to be expected or obtained through legislation.

Having no faith in the Pharmacy Acts Amendment Bill giving protection to the chemist, and holding similar views to those so ably expounded by Mr. B. Proctor on the 29th ult., I read with satisfaction the letter of Dr. James Williamson in your issue of the 22nd of last month, and am astonished that your solicitation for the opinions of medical and pharmaceutical correspondents has not been responded to.

If, instead of hankering after restrictions on the sale of patent medicines, drugs and chemicals, we could arrive at a good understanding with the British Medical Association, and establish a better feeling between ourselves and the medical body, it would be the brightest dawn that pharmacists have awakened to, out of a night of darkness, for many days. If it could be arranged for the mutual benefit of practitioners and chemists, that each should limit their practices to their legitimate qualifications, confining themselves solely to their own branch of medicine, then should we be able to exalt our position, and leave the patent and proprietary trade, as well as numerous articles of retail, that ought not to be associated with respectable pharmacies, to sink or swim.

It may be premature for the chemist to enter into detail, notice only of a movement having been made by several members of the Medical Association, but there can be no doubt that it is a "step in the right direction," and I think I am correct in assuring Dr. Williamson that if he will make known the suggestions of his medical brethren, the members of the Pharmaceutical Society will be ready to give their aid to carry out so desirable a scheme.

The chief point foreshadowed as an "essential" element to the success of this project is, that "chemists should supply exactly and skilfully what is ordered, and charge as reasonable as possible for all medicines dispensed." To do so will rest as much with the prescriber as the dispenser, and when "sending their prescriptions to chemists in their neighbourhood," medical men must take care that they are not all directed, as is the case at the present time, to one or two favoured pharmacies with greater pretensions to excellence than their neighbours, who with fair proportions are as well able to supply ability and quality at moderate charges. If special recommendation is given to houses of note, failures will be the result, inasmuch as these will enjoy a monopoly, and the bulk of chemists will be compelled to fall into their old ways to obtain a living as best they can.

To bring the public into the arrangement with ourselves, there will require to be great reductions in medical fees, as well as a smaller charge for dispensing and supply of medicines; and if the people who now receive advice over the chemist's counter are all referred to the surgery nearest to it, there should be no difficulties in arranging such a tariff of charges that the fees of the surgeon and cost of the medicine would not be greater than is now paid. It ought, however, to be distinctly understood that after the advice has been given and the prescription paid for, the patient should be at liberty to have it dispensed wherever he or she desired, without being directed to take it to any particular shop. If the old argument is resorted to, that it becomes a medical man to make sure that what he orders is "skilfully and exactly" supplied, and he ignores the young beginner who has passed all his examinations in favour of a shop with a name, then farewell to all prospects of the plan succeeding, and the attempt will fall to the ground.

I am afraid the difficulties will be greater in persuading the medical man to give up dispensing his own medicine, than in inducing the chemist to reduce the charge of his dispensing, for there are still needy apothecaries in the land, as well as destitute chemists; but it will be a pleasing day when we find, instead of being jealous and envious of each other, the two divisions of medicine are working in harmony, for the good of the public, as well as their mutual welfare.

174, *Warwick Street, Pimlico, S.W.* JOHN WADE.

Sir,—With Mr. Robinson, I regret to find that Dr. Williamson's letter has met with so little response, due I think, not so much to apathy on the part of chemists as to the feeling that though the giving up of dispensing by medical men is a subject likely to be of more service to them, as a class, than any pharmacy law amendment, it is not one to be treated so much in a universal as in a local and personal manner, the relations between medical men and pharmacists varying so much in different localities as to require the treatment of the subject differently in different places. So important a subject is not to be considered in an arbitrary or hasty manner, neither is its entire realisation to be brought about all at once; but when a member of the medical profession, seconded by remarks from yourself, solicits expression of opinion thereon, it is a pity so little correspondence has been the result. So by way of giving a practical turn to the discussion, I would suggest that the plan most likely to be of service in the matter is the more general adoption by chemists of what is called "surgeons' dispensing," for though objected to by many, it is by no means uncommon at the present time—it is simply an arrangement by which a medical man in cases where he does not wish to give a patient a prescription, instead of supplying him with medicine from his own surgery, deputes a certain chemist (or more than one if he chooses) to supply the medicine and charge it to him (the doctor) at a professional or reduced price. Thus, of the three parties interested in the transaction, viz., the public, the doctor, and chemist, the public is not affected by the change; the doctor is relieved from all care and responsibility as to his dispensing, and, as the chemist does not repeat the prescription without orders, is able to give a visit when the medicine requires replenishing; and, lastly, the chemist, though he charges less for this sort of dispensing, secures a considerable amount of business which would otherwise go in a different channel, and which, moreover, is of a nature not likely to divert to the stores.

20, *Boundary Rd., N.W.* J. J. CHAPMAN.

Sir,—But little notice having been taken of Dr. Williamson's letter in the *Pharmaceutical Journal* of the 22nd ult., I beg to offer a few remarks thereon.

It would be far better for chemists, instead of uselessly wasting their time in trying to regain what may be regarded as the lost proprietary medicine trade, to endeavour to cultivate the most friendly relations with the members of the medical profession by trying to show them that we can be of the greatest service to them as well as to the general public, and that we are worthy of their patronage and recommendation. We should use every care in supplying their patients with exactly what is ordered and intended; but as a great proportion of the profession have no knowledge of pharmacy, it is our duty as "*ye doctor's cook*" to compound their prescriptions, etc., skilfully and intelligently, and present the medicines in as elegant a form as possible. It is also our duty to the public to vend them at reasonable prices, and were we to do so more generally, more medical men, "in large towns especially," would be only too glad to be rid of their private dispenser and dispensary. But they and the public often complain, and not without just cause, of the high, if not exorbitant, prices now charged for dispensing the most simple recipe. A dispensing chemist, they maintain, has no right to charge the same price for all medicines, whether the cost price is *3d.* or 1*s.*; but simply a fair and equitable profit on the ingredients of which the medicine is composed, and a small extra charge for compounding, etc. There is no very great science in putting the two or three ingredients together in a simple mixture, and the prices now charged by some houses in fashionable quarters is simply extortionate, and to a great measure, because when civil servants and others with limited salaries began to discover the profits made or charged by West-end shopkeepers, "chemists as well as others," they thought it quite time that something should be done to help themselves,—for this reason, principally, stores first came into existence. Doubtless had the West-end retailer's profits been more reasonable these supply associations would never have sprung into existence. Many of the public are now sufficiently educated to be able to tell the ingredients and quantities of many prescriptions, and so can judge if a fair price is charged; besides the price charged for dispensing varies so much in different localities as to induce patients to find out by any means the component parts of the said prescription, and often to purchase the articles separately, and mix for themselves.

Take the following ℞ for instance.—

Tinct. Ferri Perchlor. . . . . ʒiv.
Spt. Chloroformi . . . . ʒiv.
Aquæ . . . . ad ℥iv.
M.

A teaspoonful to be taken three times a day in half a wineglass of water.

This was first dispensed in a fashionable city, and the price charged in a plain corked bottle was 2*s.* 6*d.* The next time it was made up in another town, a few miles away, and the price charged was 1*s.* 2*d.*

Now I maintain that this latter price was fair and ample. There is not any great science required in dispensing such a ℞, and I have no doubt the ingredients were equally good at both shops. This medicine was prescribed by a general practitioner for a man in rather humble circumstances, and the first charge of 2*s.* 6*d.* is nearly as much as many surgeons would charge the class of customer for both advice and medicine, and it is partly this system of overcharging and trying to get as much as possible out of a customer that estranges many medical men from the chemist and druggist. It is unreasonable that the dispenser who uses no professional skill should receive so much remuneration for a few minutes' service, and until dispensing chemists see their way to fix their prices more in accordance with the marketable value of the commodities supplied for medical purposes, many medical practitioners will keep a dispenser and send out their own medicines.

Let chemists only begin to fill prescriptions, etc., at reasonable prices, a great many of the profession will soon be only too glad to do away with the bother of their dispensing, and relegate this duty to its proper place at the chemist's, and when that takes place it will matter but little into whose hands the patent medicine trade goes. That a mutual feeling between the profession and the chemists that each can work for the benefit of each other, and the great good of the public at large, will in time ensue is a consummation devoutly to be wished.

B. S. J.

HYDROCARBONS AS SUBSTITUTES FOR LARD.

Sir,—I quite agree with your correspondent, Mr. J. B. Summers, that more information as to the *modus operandi* of these preparations is required before we sanction their use in the place of lard as a basis of ointments, pomades, etc. I have seen considerable cutaneous irritation produced by their use, and they possess the great drawback of not being easily removed from diseased surfaces by the use of soap or weak alkaline solutions. On account of a peculiar adhesive tenacity I have frequently found them objected to as pomades, although as far as appearance and keeping properties go, they leave nothing to be desired. Probably a mixture of pure lard and vaseline would improve both and meet the demands of medicine. This question, one would imagine, could be soon set at rest by a series of experiments in some of the hospitals for skin disease.

72, Mansfield Road. WM. YOUNG.

Sir,—I can confirm the statement made by Mr. J. B. Summers in reference to vaseline.

A person having tried the latter to relieve eczema, it increased the irritation to such an extent that he was compelled to wash it off and use ung. zinci, as he had been in the habit of doing.

I also think the properties and action of the hydrocarbons should be fully investigated before adopting them as a substitute for lard in the ointments of the Pharmacopoeia.

M. P. S.

SPIRITUS AMMONIÆ AROMATICUS.

Sir,—In corroboration of Mr. Miller's letter on the merits of sp. ammon. aromat. made by simple solution, I may say that for the past six years I have adopted that process, and think the preparation in every way preferable to the variable product obtained by distillation.

Tunbridge Wells. J. TULLY.

TINCTURA RUSCI.

Sir,—Allow us to remark that tinctura rusci (*vide* recent number of your Journal) means tinctura olei betulæ empyreumatici, but not the tincture of some species of Ruscus. We give you one of the recipes at hand, which Hebra used to prescribe:—

℞ Olei Rusci (Ol. Betulæ Emp.) . . grm. 40.
Alcoholis,
Æth. Sulph. . . . . āā grm. 4.
Olei Lavand.,
,, Rutæ,
,, Rorismarini . . . . āā gtts. 20.
M. D. Sig. To apply with a bristle-pencil.

Vienna. G. AND R. FISK.

EFFECTS OF THE LATE FROST.

Sir,—Allow me to submit the following as a probable explanation of the phenomenon noticed by Mr. Bisset, and also by Mr. Lincolne, during the recent severe frost.

If water impregnated with CO_2 be frozen while exposed to ordinary conditions of atmospheric pressure, it will lose the whole of the gas during the process of freezing; but if it be frozen under pressure, such as in an ordinary aerated water bottle, it cannot so lose it; and on examining the resulting block of ice it will be found to be full of globules of CO_2. Mr. Bisset does not appear to have noticed any evolution of gas during the melting of the zoedone ice, although I have no doubt it did escape at that time.

The result obtained by tasting the zoedone ice seems to have been different with the two gentlemen; for Mr. Bisset found it "without taste," while Mr. Lincolne, says "there was no appreciable loss of flavour." The difference, however, is only an apparent one, as the following will show:—

If a column of water, holding salts in solution, be frozen, colouring and all truly extraneous matter will be thrown out and may be seen adhering to the sides of the ice. But the salts will be frozen in solutions although unequally distributed in the block of ice. They will be in the greatest proportion at the bottom. This is easily explained by the changes which take place in the density of the solution during the process of cooling and freezing. So that if Mr. Bisset's lime juice was frozen while the bottle stood in an upright position, a piece of ice broken from the top would have little or no acidity. He cannot have melted the entire frozen contents of the bottle, else the solution could not have been "quaffed without the least facial disturbance."

Some salts and gases are said to be tasteless in the frozen condition, and I believe it has been suggested as a method of administering them medicinally.

Belfast. R. MAUCHLEN.

R. Roberts.—We are unable to give you the information you ask for.

"*Ignorans.*"—A recipe for the preparation referred to is only a matter of calculation that presents no particular difficulties.

C.—We know of no published formula for lin. petrolei.

"*Student*" is referred to the rule as to anonymous correspondents.

"*Argos.*"—Infusion of red bark would be of a deep red colour, and very likely to contain more sediment than infusion of yellow bark.

O. A. S.—A little mucilage, previously dissolved in the water, will prevent the separation of the quinine. Similar questions have been discussed in the Dispensing Memoranda on several occasions.

"*Scrupulum.*"—It only requires a very simple calculation to answer the question.

COMMUNICATIONS, LETTERS, etc., have been received from Victoria Pharmacy Board, Messrs. Modlen, Jones, Shenstone, Newsholme, Warriner, Napier, Davy, Liversedge, G. P., R. C. P., W. P., W. G. T., Spondalium, Mr. Kinninmont is thanked for his communication.

"THE MONTH."

Although the London botanical gardens present a somewhat dreary and desolate aspect at present, the brief interval of sunshine and warm southerly breezes in the earlier part of the month has brought a few medicinal plants into blossom.

In the succulent house at Kew, there are now in blossom several aloes, one or two of which may be classed among medicinal plants. Of these *Aloe plicatilis*, with its oblong obtuse leaves, is one of the species said to yield Cape aloes.

From the Isle of Wight a correspondent sends a list of plants in flower, including *Daphne Laureola*, *Tussilago Farfara*, and *Taraxacum officinale*, while a few of the earlier flowers, such as the *Mercurialis perennis*, the snowdrop, and the primrose, are already peeping up through the damp hedgebanks, and the drooping tassels of the hazel and alder and the golden catkins of a few of the willows are heralding the approach of spring.

That singular plant, the *Ruscus aculeatus*, may now also be found in blossom, the minute greenish-white flower occupying the centre of what might at first sight be taken for a leaf, but which really holds the position of a modified branch or cladode, there being a minute scale-like leaf subtending its base. The plant is diœcious, the male flowers having an abortive ovary, with a three-lobed stigma, and three stamens united into a tube enclosing the pistil, but with the anthers free. In the female flower the stigma is peltate and entire, and the ovary is also surrounded by the staminal tube, but the anthers are not developed. The perianth consists of an outer row of three ovate and an inner of three linear segments. In the male plant also the cladodes or leaf-like shoots are narrower than those of the female plant, but in both plants they are slightly twisted at the base, which accounts for their horizontal position. The peduncle of the flower is considered to be adherent to the cladode, which causes the flower apparently to arise from the middle of the leaf. At the base of the flower may be seen a minute scarious bract. Its English name of "butcher's broom" is supposed to be derived either from its having been used to brush butchers' blocks, a purpose for which it is said to be still used in Italy, or to put over their meat to keep the rats off, whence its Italian name of "pontogopi" or "prick-rat." According to Gerarde, the decoction of the roots is diuretic and slightly expectorant; but it does not appear to have ever been used in cutaneous diseases.

The lavender fields are said to have been much injured by the severe frosts this winter, and English oil of lavender may therefore be expected to be of unusually high price next season.

An interesting fact has been observed by Dr. E. Tangl in connection with the seeds of *Strychnos Nux-vomica*, the date and some other plants. He finds that the cells of the albumen, especially those towards the centre, where the cells are larger and show a greater capability of swelling in the cell wall, are penetrated by a system of canals, by means of which communication is established between adjacent cells, causing a continuous connection of their protoplasmic contents, a structure which he believes to be of great advantage to the plant in the germination of the embryo.

Most of our readers who have examined leaf tissue under the microscope must be familiar with the fact that the upper side of the leaf is generally furnished beneath the epidermis with a dense layer of palisade cells at right angles to the surface of the leaf. Haberlandt has observed in several plants,—among which are *Aconitum* and *Sambucus*, and *Alstrœmeria* among monocotyledons,—that these palisade cells are not single cells but branches of cells. They do not appear, however, to differ in function from the ordinary kind. An investigation concerning the stomata, or underground axial organs of plants, by R. Holmfeldt, shows that they occur only on those plants whose habitat is sufficiently dry to be porous enough for gases to permeate. Thus none were found on the rhizomes of *Menyanthes trifoliata* or *Asarum Europæum*, while in the underground scale-like leaves of *Saponaria officinalis* as many as 272 per sq. mm. were detected.

In the *American Journal of Pharmacy*, Mr. Heinitsh gives an account of the cultivation of saffron in Lancaster county, where about 14 lbs. of it are annually produced. The corms are planted in June, and the stigmata collected in September, and dried in the shade. About 50,000 flowers yield 1 lb. of saffron.

In a letter addressed to M. Dumas, M. Béchamp has recently published (*Comptes Rendus*, xcii., 142), some interesting information respecting what he calls the "*microzymas pancréatiques*," or the parts of the pancreas capable of acting as a ferment. These can be easily separated, especially in winter, by triturating the gland with water slightly alcoholized, filtering and washing. The microzymes thus separated, being surrounded by a fatty paste, are treated with ether containing a small quantity of alcohol and then with water, which removes fat and substances soluble in water, such as traces of leucine. Obtained in this way the microzymes are described as having a diameter of at least 0·0005 mm., and being of a greyish-brown colour and free from traces of bacteria. They liquefy starch very easily and rapidly, and water in contact with them appears to acquire nearly indefinitely the same power of liquefaction. Twenty bullock's pancreases yielded 130 grams of moist microzymes, containing about 12 per cent. of dry matter, and some idea of the activity of this paste may be gathered from the fact that 3 or 4 grams left in contact with well pressed moist fibrin, at a temperature of 36° to 45° C., dissolved in two hours ten times its weight of the fibrin. It is worthy of note that the action of pancreatic microzymes upon albuminous matters differs from that of the gastric juice, inasmuch as the digested product of the former always contains leucine, which is never the case with that of the gastric juice. The microzymes do not appear themselves to undergo any change, and can be used again and again, and M. Béchamp considers them to consist of cells secreting a soluble contents in an insoluble envelope, the liquid, which is the active constituent, escaping by osmose.

As connected with this subject it may be mentioned that some experiments recently made by M. Hallopeau (*Rev. Med.*, January, p. 152), appear to prove that pepsine acts in a different manner, and that although it has hitherto been looked upon as a soluble ferment, it is in reality an organized ferment. When pepsine from a dog, suspended in water, or the gastric juice of a fish, is thrown upon a filter, it will be found that the liquid which passes through is inactive, whilst the substance which remains on the filter is active.

M. Wurtz, who has recently been studying the action of papain, finds that its apparently solvent action depends upon its forming a compound with fibrin, which compound is then decomposed by the water present, with formation of a soluble hydrated fibrin and the setting free of the ferment, which repeats its action on fresh quantities of fibrin.

It has long been known that opium and belladonna are natural antidotes; it has been proved that poisoning by strychnine has been cured by chloral, and that aconite poisoning may be expected not to prove fatal if atropine be used as an antidote, and yet fatal cases of poisoning by these drugs are not unfrequent. Although not within the province of a chemist to administer antidotes in cases of poisoning, it sometimes happens that his memory is taxed by a medical practitioner in the matter of antidotes, and it may, at all events, be desirable to place on record the fact recorded by Dr. Bartholow (*British Medical Journal*, February 12, p. 240) that one-twentieth of a grain of atropine is equivalent in toxic power to about a grain of morphia; but that as a rule the antidote should be always given in small doses, frequently repeated, until the respiration and circulation become natural.

Although Dragendorff, Husemann and others have directed that strychnine in cases of poisoning should always be looked for in the liver, as its occurrence in the brain is not easily detected, yet Lajoux and Grandial have detected it in the brain of a person who was poisoned by 2·05 grams of tincture of nux vomica (equal to 0·525 grain of strychnia), three-fourths of which were employed subcutaneously, and the rest administered by the mouth.

The action of picrotoxin has been investigated by Drs. Chirone and Testa (*Ann. Univ. di Med. et Chir.*, April, 1880), with interesting results. They find that it is capable of producing a true artificial epilepsy of spinal origin, while cinchonidine is capable of producing epilepsy of cerebral origin (*British Medical Journal*, February 12, p. 224).

Another supposed remedy for cancer has recently cropped up; but the news seems too good to be true, since the remedy is within the reach of all and, except in whooping cough, has no repute as a medicine. The remedy in question consists of clover tea made from the blossoms of red clover, which is infused like ordinary tea, and taken to the extent of about a quart daily, before meals and at bed time. A writer in the *Medical News* speaks of it thus:—"The clover tea has done wonders for us; my appetite is now good, my general health greatly improved, and the wound is healing."

New remedies seem to be the order of the day in the United States. In the *American Journal of Pharmacy*, under the name of "diabetes weed," a root which has long been used in Georgia as a remedy in dropsy is mentioned. It is recommended in that disease and in chronic cystitis, calculous affections, etc., and is given in the form of a tincture, one and a half to two drachms for a dose (prepared from 8 oz. of root to 16 oz. of sp. æther. nitrosi) or as an infusion. The root is that of *Actinomeris Helianthoides*. In size it varies from that of a quill to that of a knitting needle, and apparently contains an oil and resin giving it the taste and somewhat the smell of turpentine.

In the *New York Times* of January 15, attention is called to the "Georgia Bark" tree, *Pinckneya pubens*, Mich., a cinchonaceous plant found on river banks and in swampy localities from South Carolina to Florida. It is a beautiful tree, 20 feet or more in height, with large, ovate, acute, opposite leaves, and downy cymes of purple flowers which are radiant by the expansion of a calyx segment of the marginal flowers. Michaux reported the bark to be useful in intermittent fever, and his statement has since been corroborated by Dr. Law, of Georgia, and Dr. Fauntleroi, of Virginia. Cinchonine is said to have been detected in it, but the action of the bark is stated to be too slow to act as a substitute for quinine. It has the property, however, of usually producing diaphoresis. The bark is given in doses of 1 drachm, in the form of a powder or decoction.

The bark of *Holarrhena antidysenterica*, R.Br., has long enjoyed considerable repute in India as a tonic and febrifuge, and especially as a remedy in dysenteric affections. It was formerly imported into Europe under the names of "conessi bark," "codaga pala," "corte de pala," and "tellicherry bark." In 1858, an alkaloid was separated from it by Mr. Haines, and seven years after the late Dr. Stenhouse again described the alkaloid under the name of "conessine." The discovery, however, does not appear to have led to any results. Recently this alkaloid appears to have been again re-discovered by an Indian chemist, Babu Ram Chundra Dutta (*Calcutta Med. News*), and described by him under the name of "kurchicine," from a native name of the drug, and there appears to be some probability now that it will be utilized in medicine. Kurchicine is said to be white, non-crystalline, and very bitter to the taste. It is readily soluble in alcohol, ether and dilute acids, less soluble in chloroform and benzene. From acid solutions it is precipitated by soda, ammonia and potash. A crystalline acetate and tartrate have been obtained. The bark examined yielded about 3 per cent. of the alkaloid. It has been prescribed in the form of powder, in doses of from 2 to 5 grains, and as a solution of the strength of 2 grains to an ounce of water, the alkaloid being first dissolved in a little acetic acid. It is reported to have proved in no way inferior to the cinchona alkaloids as an antiperiodic, and not to produce nausea, vomiting or headache. The same alkaloid was found to be present also in the seeds.

At the Pharmaceutical Meeting, in January, of the Philadelphia College of Pharmacy, Messrs. Sadtler and Rowland described a colouring matter obtained from a West African wood, called "beth-a-barra." This colouring matter differs from chrysophanic acid (which it resembles in appearance) in fusing at 135° C., and in containing a larger percentage of carbon and hydrogen; but the authors suspect a relationship to that substance, and intend to investigate the matter further.

At the same meeting Mr. F. Slocum read a paper on absorbent cotton, and showed that it differed from ordinary cotton wool in being perfectly free from oily or greasy matter. He stated that the best mode of preparing it is to boil the cotton with a 5 per cent. solution of caustic potash or soda for about half an hour, wash it, so as to remove all traces of soap, press, and then immerse it in a 5 per cent. solution of chlorinated lime for fifteen to twenty minutes. The cotton is next again washed with a little water, dipped in water acidulated with hydrochloric acid, and afterwards boiled in a 5 per cent. solution of alkali; again washed, dipped in acidulated water, and lastly washed thoroughly with pure water. The washing away of the soap formed must be carefully attended to, lest the chlorinated lime cause the deposit of an insoluble lime soap on the fibre. The second boiling with caustic alkali removes a non-greasy organic matter. Professor Maisch remarked that cotton is usually considered to be pure lignin, but that under the treatment above described, it lost 10 per cent. of its weight, about half of which, at least, appeared to be fat, although benzin, ether, or similar fat solvents, removed but little from it, and improved but very little its absorbent properties.

The chemistry of the yew seems as yet by no means perfectly cleared up. D. Amata and A. Capparelle have obtained from the leaves of *Taxus baccata* a colourless crystalline alkaloid, giving dense white fumes with the vapour of hydrochloric acid and possessing a musty odour; also a volatile oil resembling wild fennel in odour, and a colourless crystalline non-nitrogenous principle. Both the crystalline principles are sparingly soluble in water, but readily in alcohol.

The possession of a little knowledge is sometimes a dangerous thing, and the attempt to air it is occasionally very amusing. A striking attempt to give unhesitatingly information of a dubious character in answer to an inquiry appeared some time since in a most useful natural history publication, in which it was gravely stated, as a well known fact, that the mandrake spoken of in the Scriptures was the *Podophyllum peltatum*. The facts that America was then apparently unknown, and that podophyllum is a North American species, were completely ignored. Again, a London chemist, within the last few weeks, was courteously informed by the wholesale herbalist to whom he sent for true mandrake root (*Atropa Mandragora*), that his books told him it was identical with white bryony root. This difficulty about names is one that is constantly likely to arise wherever vernacular names are used in prescriptions, and is the natural result of the names of English plants being applied to American ones.

At the drug sales this month there were observed a quantity of Japanese star-anise, and among other uncommon drugs, musk seed, Java galangal, and Ceylon cardamoms. Guaza, or Indian hemp, was offered in unusually large quantity, and the samples of jaborandi leaves and Palembang benzoin were of unusually fine quality.

The "*Cuprea*" cinchona bark is now coming over in considerable quantities, no less than 1950 packages having been sold at the drug sales during the first fortnight in February, according to Messrs. Lewis and Peat's circular. This bark is much better than a great deal of the so-called calisaya bark which enters retail commerce, and contains on the average about 1½ per cent. of quinine. It is easily distinguished by its remarkably smooth inner surface.

Dr. Liveing points out in the *British Medical Journal* (p. 227) that among the various remedies for ringworm the use of croton oil is very valuable for intractable cases. Dr. Malcolm Morris, however (*Lancet*, February 12, p. 242), prefers a milder treatment, and remembering that thymol has an antiseptic action eight or ten times greater than that of carbolic acid in preventing the development of bacteria, and that chloroform is more rapidly absorbed than alcohol, probably owing to its being more readily taken up by the sebaceous glands, he has tried, with success, the use of thymol or menthol mixed with chloroform, with oil added to hinder the rapid evaporation of the latter and to prevent it from acting as an irritant. The proportions used are, thymol or menthol, ½ drachm (or less when the skin is tender or irritable); chloroform, 2 drachms; olive oil, 6 drachms. He states that in this way the remedy is more easily absorbed and actually reaches and destroys the fungus in the hair follicles.

In the same journal, Professor Charteris, of Glasgow, speaks highly of the use of salicin in preference to salicylate of soda in acute rheumatism, and remarks that the thirst and delirium which the latter occasionally produces may be attributed to impurities in the artificial compound, probably to carbolic acid. He says that in some of the chief continental hospitals pure salicin is alone employed, and implicitly believed in for acute rheumatism.

Dr. B. W. Richardson has been further experimenting on the use of ethylate of sodium, and finds it can be used with remarkable success in the treatment of nasal polypus, tattoo and mother-marks, warts, and other cases. One point in connection with his remarks has a practical interest to dispensers. He states that chloroform must never be added to it to ease pain, as it may cause an explosion of some violence. If any anodyne be used it should be an alcoholic solution of opium. He remarks also that other alcohols, such as amylic, butylic, etc., yield corresponding compounds when treated with potassium or sodium, and that potassium ethylate is a much keener caustic than the sodium preparation.

Mr. L. E. Sayre states (*American Journal of Pharmacy*, January) that in the preparation of pepsine it should be thoroughly dried before mixing with sugar of milk; that if the mixture is made while the pepsine is moist, an incipient fermentation seems to be induced, and the product obtained has less digestive power than pepsine dried by itself and then mixed with milk sugar.

It may interest some readers to know the reason why medicine containing alkaline preparations of bismuth, such as the ammonio-citrate, are apt to blacken the patient's tongue. Mr. J. Laurence Hamilton, writing to the *British Medical Journal*, February 5, p. 193, states that it is probably due to the reduction of finely powdered metallic bismuth upon the tongue by the sugar formed in the saliva after eating starchy matters. He found that the saliva, taken after fasting several hours and added to a heated alkaline solution of bismuth, caused no blackening; but that after eating some bread, and then adding the saliva to the bismuth solution, a blackening of the mixture readily occurred.

In a communication to the St. Petersburg Technical Society, Professor Beilstein recommends the use of sulphate of aluminium as the best practical disinfectant. He states that the best method of making the salt for disinfecting purposes is to mix red clay with 4 per cent. of sulphuric acid and to add to the mixture some carbolic acid for destroying the smell of the matter to be disinfected. According to this authority lime and its salts only temporarily destroy bacteria, and under some circumstances contribute to their development, and sulphate of iron, even in a solution of 15 per cent., does not ultimately destroy bacteria, as they revive when placed in a suitable medium.

Mr. F. L. Slocum points out, in the *American Journal of Pharmacy*, that for the purpose of etching on glass a mixture of an equal bulk of sulphate of barium and ammonium fluoride, moistened with water and gently heated, acts much better than liquid hydrofluoric acid. The latter leaves a smooth surface and fluoride of ammonium alone a slightly rough one, while the above mixture produces a very rough, opaque surface.

The domain of physics continues to yield a rich harvest of discoveries. Close upon the publication of Professor Bell's interesting investigation as to the musical sounds produced by the action of an intermittent beam of light upon various solid bodies comes a paper read before the Royal Society, by Professor Tyndall, on the action of an intermittent beam of radiant heat upon gaseous matter. The apparatus used by Professor Tyndall consisted of a source of heat, silvered mirrors for concentrating the rays, and a circle of sheet zinc, provided first with radial slits and afterwards with teeth, mounted vertically on a whirling table, so that it could be made to rotate rapidly across the beam of radiant heat, near the focus. The passage of the beam through the slits in the rotating disk produced the desired intermittence, while a flask containing the gas or vapour to be examined, placed immediately behind the rotating disk, received the shocks of the beam. From the flask a tube of indiarubber, ending in a tapering one of ivory or boxwood, led to the ear, which was thus rendered highly sensitive to any sound generated within the flask. Upon placing a small quantity of sulphuric ether, formic ether or acetic ether in a bulbous flask (a test tube answers very well) and allowing the upper part to become filled with the vapour, and then placing the flask behind the rotating disk in the path of the intermittent beam a loud musical tone was produced. These sounds were loud in proportion to the absorbent property of the vapour, highly diathermous bodies, such as the vapour of chloroform and carbon bisulphide producing only faint sounds. The sounds were only produced when the intermittent beam fell upon the vapour, and when the beam was directed so as to fall on the liquid at the bottom of the flask the sound ceased. More than this, when an extremely thin layer of even an athermous liquid was placed between the rotating disk and a flask containing vapour the power to produce sound was intercepted by it. Gases were found to behave similarly. Dry air, oxygen and hydrogen yielded a very feeble musical note. When dry air was displaced by carbonic acid gas the sound became far louder than that obtained from any of the elementary gases. Nitrous oxide gave a sound more forcible still, and when this was displaced by olefiant gas "it gave birth to a musical note, which when the beam was in good condition and the bulb well chosen seemed as loud as that of an ordinary organ pipe." Gaseous ammonia also gave a loud note. It would appear that rigidity in the walls of the containing vessel is a *sine quâ non.* A soap bubble blown with nitrous oxide, or olefiant gas, and exposed to the intermittent beam, produced no sound no matter how its size might be raised. The pulses obviously expended themselves upon the flexible envelope, which transferred them to the air outside. That there was actual pulsation under these conditions was proved by the behaviour of a sensitive flame in the presence of such a bubble. The sources of heat used by Professor Tyndall were various. Commencing with a Siemens lamp connected with a dynamo machine the apparatus was gradually improved until satisfactory results were produced with a candle-flame, a red hot coal and a poker at a temperature just below red heat. Professor Tyndall also tried to extract sounds from the vapours of perfumes, which in 1861 he had proved to be absorbent of radiant heat. He limits his remarks to the vapours of patchouli and cassia, the former of which exercises a measured absorption equal to 30 and the latter equal to 109. Placed in flasks and slightly warmed, sounds were obtained from both these substances, but the sound from cassia was much louder than that from patchouli.

The contents of the British Pharmacopœia should be at the fingers' ends of every dispenser, but difficulties occasionally present themselves which require that other works be referred to, and a few that may be advantageously consulted will be briefly mentioned here. They will frequently be found valuable in determining the composition of a preparation for which there is no official formula in our national pharmacopœia.

One of the most useful is Squire's 'Companion,' which should occupy a place second only to that of the Pharmacopœia. In addition, Gray's 'Supplement' will be found worthy of a place, which the present edition may occupy until the appearance of another, now much needed. Beasley's 'Manuals' are also very valuable and furnish a large amount of information difficult to find elsewhere.

Perhaps next in point of usefulness may be mentioned Jourdan's 'Pharmacopœia Universalis,' as containing a vast amount of useful matter relating to foreign pharmacopœias. When the inquiry relates to a French preparation, Dorvault's 'L'Officine' is without a rival.

Germany is well represented by Hager's 'Pharmaceutische Praxis,' which may be considered the universal pharmacopœia of Germany. Almost every variety of prescription will be found in it. Many others might, of course, be added, but it is scarcely necessary to go beyond those mentioned, which claim a place in every pharmacy, and in their value for reference and occasional study will more than repay the moderate outlay required for their purchase.

Syr. gummi, No. 500, is a case in point. It originates in the French formula, which will be found in Dorvault under the head of "Syr. Gummi." As the preparation cannot be made extemporaneously according to the French formula, its place may be advantageously supplied by equal parts of syr. simp. and mucil. acaciæ, and these in fact will represent the original. See Dispensing Memoranda, No. 276, series 3, vol. ix., p. 869, and "The Month," p. 878. The syr. gummi rub. (Squire) should not be used, as it is a preparation made from a eucalyptus gum, an altogether different substance.

The appearance of No. 501 will very much depend on the manner in which it is prepared. Without the addition of mucilage an elegant mixture cannot be prepared; but if the quinine be first powdered, then well mixed with a little mucilage and largely diluted with water before the addition of the other ingredients, a satisfactory mixture will result, and one which will admit of the ingredients being given in accurately divided doses.

"Discipulus" should, when asking for information, have stated his own results or any difficulty that may have occurred when he dispensed the prescription. If anything special presented itself he should have stated the character of it, or if it had previously been dispensed different in appearance from anything he could produce. Fuller information on the part of those who seek assistance from the readers of these pages would be more interesting and more valuable.

It is sometimes difficult to determine what is exactly meant when a customer says that a mixture was perfectly clear. The prescription, No. 502, cannot be dispensed so as to form a perfectly clear mixture. The tinct. quinæ alone will give turbidity to the water, and the same applies to the sp. am. arom., and this is not diminished on the addition of the iodide and bromide of potassium. The casual statement of a customer cannot always be relied on as correct; there may be no intention to mislead, but the person may not have cultivated a habit of accurate observation. In this mixture a little mucilage may with advantage be added, but under no circumstances should the precipitate be filtered out of a mixture without the special directions of the writer.

It is most probable that the writer of the prescription given by Mr. Blanchard, No. 503, intended it to be made up in the exact proportion as written. The ung. veratriæ, B.P., is 1 in 60, but the U. S. formula is 1 in 25, and Hager, in his 'Praxis,' gives formulæ for veratria ointments of three different degrees of strength, the strongest being 1 in 30. Supposing in this prescription all the sp. vini rect. to be combined with the adeps, the proportion would be 1 in 30, and consequently weaker than that of the U. S. Pharmacopœia.

The formula for tr. opii ammon., Squire, is only a copy of that of the British Pharmacopœia. It would be better, therefore, to refer to the B.P. with respect to a B.P. formula. The strong sol. of ammon. referred to as one of the ingredients is the liq. ammon. fortior, which will be found under that term, and rendered into English by the name strong solution of ammonia. There should be no doubt in the mind of anyone who claims to have a knowledge of his Pharmacopœia as to its meaning. It is clear and definite; nothing can be more so. Liq. ammon. fort. should certainly be used. The meaning of the observation in Squire, "best given in the form liq. ammon.," is that when ammonia is given alone as a medicine, it is best given as liq. ammon.,—that is, diluted,—and in the tr. opii ammon. the liq. am. fort. is more diluted than in the liq. ammon., B.P. A reference to the ammonias of the Pharmacopœia should have rendered unnecessary the inquiry No. 504.

There is no published formula for liq. ammon. valer., but this preparation was discussed in the Journals of February and March, 1873, and on page 697 is given a formula from Ferrand's 'Aide Mémoire,' which may be referred to. Hager's 'Praxis' also gives a formula for the same preparation, containing 20 per cent. of valerianate of ammonia. A liq. ammon. valer. was several years ago prepared and introduced by Mr. Bastick, and there is every reason to suppose that the writer intended this preparation to be used. Of course tr. valer. am. may be intended; but as a preparation named liq. ammon. valer. exists, it would be proper in this case that it should be used in prescription No. 506. Of course, as has been remarked on previous occasions, the reference may be to some private or hospital preparation, which was in the mind of the writer when he penned the prescription. There is represented here one of the many difficulties which surround a dispenser and which require his undivided attention, assisted by practical experience, whilst engaged in dispensing physicians' prescriptions.

USES OF OIL OF ERGOT IN THERAPEUTICS.*

The fixed oil which occasions so much trouble in powdering ergot receives the following commendation from Dr. Shoemaker, in the *Medical Bulletin*:—

"The oil of ergot I have used for the past nine months with the most decided success in a number of cutaneous diseases.

"Since using this preparation I have carefully searched the various therapeutic works and the different journals, and have failed to find any one who has previously made any observation on its external use.

"The oil of ergot has long been known as one of the principal ingredients of the ergot as found in the laboratory of the chemist. It is the waste material that has been left after preparing the various ergot preparations. If specially prepared, it can be made by the addition of benzine to ergot by the process of displacement, and afterward allowing the benzine to slowly evaporate. When obtained from recently collected ergot it has a reddish-brown colour, and about thirty-five parts of it are present in every one hundred parts of ergot. It is a moderately thick, non-drying fixed oil, and contains resin, cholesterin, and lactic acid. It has a slight odour of herring pickle, an acrid taste, and is soluble in both alcohol and alkaline solutions. As a local remedy this refuse oil is much cheaper than any of the other oils and fats, and contains additional ingredients that make it a most important therapeutic agent. When applied to the skin it has both protective, soothing and astringent action, and by its absorption frequently assists in nourishing the diseased parts. It is a most useful application in eczema of the lips, in which the surface is tumefied and fissured, and readily bleeds upon the slightest movement of the parts. It is also equally efficacious in cracked nipple. Pieces of cotton saturated with oil of ergot, and placed over the lips or nipples for a short time each evening before retiring generally arrest the diseased state.

"Few remedies are so efficacious as oil of ergot in checking the formation of scales in seborrhœa of the scalp and other hairy parts of the body. If there be an accumulation of scales and sebum upon the scalp, and the hair be pasted down to its surface, the free use of oil of ergot, either alone or combined with alcohol, will bring about the most happy result. The oil of ergot is to be preferred for application in seborrhœa of the hairy parts to either olive, almond, or any of the bland oils, both for its cheapness and for its mechanical activity upon the diseased state of the scalp. It not only overcomes mechanically the condition of the parts, but likewise arrests by its soothing and astringent action the dry and lustreless state of the hairs and the deadened appearance of the scalp. This twofold purpose that the oil of ergot fulfils makes it superior to all the other medicinal preparations that are used for seborrhœa sicca at the present time. The oil of ergot is also of great service as a local application in erysipelas. Brushing frequently the surface in this disease with oil of ergot relieves by its soothing and astringent action the tender and hot sensation, and causes the puffy, dry and glazed appearance to abate. In rosacea, after depleting the parts, the application of the oil of ergot will soothe the part, constringe the blood vessels, and thus modify very much the diseased action.

"It is also efficacious in various affections of the mucous membrane. In catarrh of the nasal passages, applied by means of a probang, the results were most beneficial. It acted with great promptness in ulceration of the cervix. In gleet, some marked cures had followed by injecting it far back in the urethra. The oil of ergot made into an emulsion, and used in both gonorrhœa and leucorrhœa has been most successful in a number of instances."

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* From the *Druggists' Circular and Chemical Gazette*, January, 1881.

THE PREPARATION OF CATGUT FOR LIGATURES.

BY PROFESSOR LISTER.

The following passage is taken from a lecture on the Catgut Ligature, recently delivered before the Clinical Society of London:*—

"Catgut, as you are doubtless all aware, is prepared from the small intestine of the sheep. The gut is treated in what seems an exceedingly rude manner for so delicate a structure. It is scraped with some blunt instrument, such as the back of a knife, over a board; and by this means, as the people express it, the dirt is scraped out. That which these people call the dirt is the exquisite and complicated structure of the intestinal mucous membrane. But while the mucous membrane is scraped out from within there is also scraped off from without the circular coat of muscular fibres. The result comes to be that the intestine is converted into a comparatively unsubstantial material, consisting of two parts or bands, one more slender than the other. When the mesentery is stripped off by a butcher, the peritoneal covering of the gut shrinks into a narrow strip; and this, with some longitudinal fibres, constitutes the more slender of the two parts to which the intestine is reduced by this process of scraping. The other part is the essential material from which the catgut is prepared, and this is neither more nor less than the submucous cellular coat of the intestine. When I first visited a catgut manufactory I was astonished to find that after this scraping process the intestine could be blown up still as a continuous tube, as you see can be done with this specimen, which has been treated in the manner I have described. This exquisitely delicate structure is a beautiful anatomical preparation of the submucous cellular tissue, though made in so rude a fashion. This coat of the intestine which, in the sheep, has this extraordinary toughness, is the material out of which the catgut is prepared. For what the manufacturer calls the 'ones'—the thicker form of ordinary catgut—all that is done is to twist the entire tube by means of a wheel like a rope in a rope-walk, up to a considerable degree of tightness, and then allow it to dry. It is afterwards exposed to the fumes of burning sulphur, and for some more special purposes it is bleached by the action of potash. But the essential thing is the twisting and drying; it can be prepared without the use of sulphur, as well as without the use of potash. Some specimens which I have here are prepared by water only, without the use of any other ingredient. This exceedingly beautiful structure, as I think we must consider it, as fine as a horsehair, is prepared without any reagent whatever; nothing but the animal tissue twisted and dried. For the finer kinds the tube of the submucous coat is split up by means of razor blades more or less numerous, according to the degree of splitting required, connected with a conical piece of wood, which is pushed along the tube.

"Such, then, is the material with which we have to deal. The first of the more recent experiments which I performed with reference to it was made with a view of ascertaining, if possible, what part the water played in the ingredients used for the preparation by our old method. If I steep unprepared catgut in a mixture of dry carbolic acid and oil, however long it be so steeped, although it will be, of course, abundantly aseptic, it remains utterly unfit for the purposes of the surgeon; a knot upon it would still slip in a wound. But if, instead of using carbolic acid in the crystallized state, we use carbolic acid which has been liquefied by the addition of a little water, we get in course of time a properly prepared catgut. I wished to ascertain how much water was required. The carbolic acid would enable oil to dissolve a certain amount of water; would that amount of water be sufficient which carbolic acid enables oil to dissolve? Accordingly I prepared jars of carbolic oil, some containing the full amount of water we had used hitherto, some a smaller quantity, and some none at all, and placed in them portions of the same hank of catgut. In due time I proceeded to examine the result, by taking portions of gut and putting them into warm water, and leaving them for a certain time in order to ascertain how the knots would hold. To my great surprise I found that which had been steeping in the carbolic acid and oil without any water was just as good as that which was in the carbolic acid and oil with the water. This was contrary to distinct previous experience. Reflecting on the matter, I saw that the only possible explanation was that the catgut was already, so to speak, prepared before I put it into the liquid. Now it so happened that the catgut I had used was several years old; and it turned out that mere age of the catgut prepares it: that in proportion to its age it is rendered less liable to be softened by water or by blood serum, and a knot tied upon it will hold better. And thus I had, for the first time I believe, scientific evidence of the truth of what is popularly spoken of as the 'seasoning' of various articles made of animal products. I asked a person who sold violin strings if there was any result from keeping the strings a long time. He said, no; the only result he knew, was that they would probably get rotten. But it so happened just about that time there came an old fiddler to amuse the patients at the Royal Infirmary of Edinburgh at Christmas-time. The weather was wet, and he said that his fiddle would not work properly because the fiddle-strings were not properly seasoned. So that he was aware that fiddle-strings, which, of course, are catgut, are liable to seasoning, and require it. This was to me a very important fact, because it served to explain the success that I had had in my earlier experience with the catgut before I knew at all the proper mode of preparing it. I look back with horror at some of my early procedures with catgut. I have operated, for example, on an irreducible ventral hernia, opened the sac, divided the adhesions, returned the protruding intestines, stitched up the mouth of the sac with the catgut, and then applied stitches at considerable intervals in the skin. All went perfectly well: but the mode of preparation that I then used, if I had worked with catgut recently made, must have ended in utter disaster; the knots must have slipped in a few hours, and the intestines must have been protruded through the wound.

"I need hardly say that this mode of preparation, interesting though it is, would not be satisfactory; it would only have, in a more aggravated form, the inconvenience of the extremely long period which our old method requires; and, besides that, it by no means provides all the conditions that must be fulfilled in order to provide a perfectly satisfactory state of the catgut for surgical purposes. These conditions I will now mention. In the first place I have spoken of a short period of preparation. This is very desirable. Then it is essential that the catgut should have proper strength, so as to bear any reasonable strain that the human hands can put upon it in the thicker forms: as when used, for instance, in such cases as the circumferential ligature of the thyroid vessels, in the removal of a goitre, or for securing the pedicle in ovariotomy. And it is not sufficient that it should be strong to start with; it is easy to get catgut strong in the dry state; it is necessary that it should be strong after steeping in blood serum for a while. Take, for example, the case of tumour of the thyroid. I passed in that case six ligatures; and in a former case where the tumour was larger I thought it prudent to pass as many as eight, so as to subdivide more the mass that had to be tied; but it is not convenient to tie each of these ligatures as soon as it is passed; and the process of passing takes a considerable time. Now it would be a very sad thing if the residence of the catgut among the tissues soaked with serum for a few minutes, or even a quarter of an hour, should render the catgut so soft that it should give way when we put the strain of the hands upon it. That, then, is another point that is essential, if the material is to be useful for all the purposes for which it is desired. Then, again, it is necessary that a knot tied upon it should hold with absolute security, not merely in the first instance, but after soaking for an unlimited time in blood serum. It is further needful that it should not be too rigid; for, as we shall see immediately, it is possible for catgut to be over-prepared, in which case it may remain almost like a piece of wire among the tissues, and ultimately, perhaps, come away by suppuration in consequence of the mechanical irritation which it produces. But while the animal juices must be able to soften it sufficiently to render it mechanically unirritating, yet, on the other hand, it will not do for it to be too rapidly disposed of by absorption. If it is to do duty for the ligature of an artery in its continuity in the immediate vicinity of some large branch, it must remain for a considerable time of good strength, unabsorbed, and when it is at length absorbed it is desirable that it should be removed in such a manner that while it is reduced in thickness it should still, as long as any of it remains, retain its tenacity.

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* *Lancet*, February 5.

"Now these are a series of conditions which I assure you it is not easy to fufil completely. I have in various experiments complied with some of them easily enough, but failed in others. Sometimes I have succeeded with all but one, and one has baffled me. I have used various materials in experiments, as you will naturally suppose. One substance that suggested itself was tannic acid, so as to convert the fibrous tissue of the catgut into leather. I succeeded well enough in some respects with tannic acid applied in different ways, but in one respect I did not succeed. I have not obtained by means of tannic acid a kind of catgut that is not too speedily absorbed. Even a piece of kid leather, cut into a suitable shape for sutures, and rendered aseptic, became too rapidly absorbed. Chromic acid was another agent which I very naturally tried on account of its well known effect in hardening tissues. Chromic acid alone does not work very well, but I found that the addition of some other substance to it aided its action very greatly. By adding, for instance, to the watery solution a little glycerine, which produces a reducing action on the chromic acid, we get a different sort of liquid, which acts much more energetically on the catgut. I was highly delighted with the results of the action of this mixture of chromic acid and glycerine; and just about this time it happened that Mr. Oliver Pemberton, of Birmingham, applied to me for a piece of catgut for the purpose of ligaturing the external iliac artery in a remarkable case of three aneurisms in one limb—two in the femoral, and one in the popliteal. I thought I could not do better than send him a piece of my recently prepared chromic catgut. I did so; and a month afterwards he wrote to me saying that nothing could be more satisfactory than the result. He had operated antiseptically; the wound had united by first intention, and so far as the case could go well, all had gone well. There was, indeed, gangrene of the lower part of the leg, which Mr. Pemberton had predicted would occur in consequence of the existence of four successive obstructions in the course of the arterial channel—viz., the ligature and three solid aneurisms; but the case, under proper management, was doing well. Four weeks later, however, Mr. Pemberton wrote to me again, telling me that soon after his last report the patient had begun to show signs of suppuration about the seat of the wound. After a while the abscess opened in the cicatrix, and one day the ligature which he had placed on the artery was found lying unaltered on the granulations.* It is now on one of the cards before you —an over-prepared ligature, which had come away, rigid and wirelike, making its way out, as a piece of glass might have done by mechanical irritation. This opened my eyes for the first time to the possibility of having catgut over-prepared. This over-preparation by means of chromic acid is, I understand, to be found illustrated in a large German school at the present time. I have been told by an American physician, who has lately been in London after spending some time at that school, that the catgut ligatures come away from all wounds to which they are applied in that clinique. They count the ligatures as they put them on, and invariably see them all before the case is done with. The catgut has been over-prepared.

"It is by means of chromic acid, however, that I have at length arrived at a result which appears to satisfy all our conditions. But before speaking of the new method I wish to say a few words more with regard to the old. To what is it that it owes its virtue? In this bottle is some catgut which has been nearly ten months in our old preparing liquid—namely, 1 part of carbolic acid which has been liquefied by means of water to five parts of olive oil. In this other vessel, again, we have catgut which has been the same length of time in a solution of carbolic acid in water. Water will only take up one-twentieth part of its weight of carbolic acid; but the effect produced upon the catgut by the watery solution is very much greater than that brought about by the four times stronger oily solution. In the former case, as you can see, the catgut is almost black—a sort of purple-black—while the other is comparatively pale, very little altered from its original colour. This circumstance shows two things. In the first place, the effect of the watery solution of carbolic upon the catgut explains the efficacy of the water in our old method. It is the watery solution of carbolic acid in the liquid of the old method that is the effective agent. But while that is the case, when the watery solution is mixed with oil, the fact that it is so mixed limits and checks its operation. If catgut is kept in the watery solution only, there seems to be no limit to the degree of continuous preparation of the gut, so that it becomes more and more dark in colour, and more and more difficult of absorption by the tissues. It is otherwise when the watery solution is blended with the oil. Though the process does go on for many months, there comes a time when it comes to a standstill. You need not fear that catgut prepared by the old plan is ever over-prepared. There is a specimen on the table which at the end of twelve years is as limp, after steeping in blood serum, as it would have been at the end of a single year. Therefore, we possess in the carbolic oil a means of checking any mode of preparation that we may adopt, keeping it from that time forward not materially further prepared, while at the same time the large proportion of the carbolic acid to the oil (one to five) ensures the catgut being maintained perfectly aseptic.

"The method of preparation which I have now the honour to bring before you is the following:—I dissolve 1 part of chromic acid in 4000 parts of distilled water, and add to the solution 200 parts of pure carbolic acid, or absolute phenol. In other words, I use a 1 to 20 watery solution of carbolic acid, only that the carbolic acid is dissolved not in pure water, but in an exceedingly dilute solution of chromic acid. But minute as is the quantity of the chromic acid, it exerts, when in conjunction with carbolic acid, a most powerful effect upon the gut. The first effect of the addition of the carbolic acid to the chromic solution is to change its pale yellow colour to a rich golden tint. But if the liquid is allowed to stand without the introduction of the catgut, it changes in the course of a few hours to a dingy reddish-brown, in consequence of some mutual reaction of the two acids, and a considerable amount of grey precipitate is formed. If, however, catgut about equal in weight to the carbolic acid is added as soon as the ingredients are mixed, the liquid retains its brightness, and the only change observed is a gradual diminution of the depth of the yellow colour; the precipitate, which I presume still occurs, taking place into the substance of the catgut. As soon, therefore, as the preparing liquid has been made, catgut equal in weight to the phenol is introduced into it. If you have too large a proportion of catgut, it will not be sufficiently prepared; if you have too small quantity, it may run the risk of being over-prepared. At the end of forty-eight hours catgut steeped in such a solution is sufficiently prepared. It is then taken out of the solution, and dried, and when dry is placed in 1 to 5 carbolic oil; it is then fit for use. I have here a sample of catgut prepared by this method.

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* For an account of this case by Mr. Pemberton, see the *Lancet*, August 4, 1877.

Although it has been steeped in warm blood serum since this morning at 11 o'clock, it is still translucent and firm, without being rigid, and a reef knot tied upon it holds with the most perfect security.

"The strength of the catgut depends upon different circumstances. In the first place, sheep differ as to the strength of their intestines, and the catgut-maker, if he understands his business, will insist upon having his raw material of the proper kind. In the next place, the intestines must not be allowed to putrefy; they must be taken fresh. For these things you must, of course, rely upon the maker of the catgut. In the next place, the liquid causes a certain amount of softening of the catgut, and if it is introduced in loose hanks, this will tend to produce a little uncoiling of the twisted cord, and a still greater degree of uncoiling will take place during drying. It is of very great importance that this should not occur, because it involves weakening of the thread, and that in different degrees in different parts, and this may lead to the gut giving way when you subject it to a strain. The catgut, then, should be prepared on the stretch, both when it is put to soak and when it is put to dry.

"I need not enter into the mode in which this can be done by the manufacturer. I may only say this, that the surgeon who wishes to prepare it himself may do it in different ways. For instance, he may take two large test-tubes, one a little larger than the other, and he may wind the catgut on the smaller tube, fixing one end by sealing-wax, winding it round, and then bringing it up again, and fixing the other end with sealing-wax at a higher level than the liquid will come to, putting sufficient liquid into the larger test-tube, and introducing the smaller test-tube with the catgut wound round it, with a little shot to keep it down in the liquid. After forty-eight hours he takes out the smaller test-tube and leaves it till the catgut is completely dry. I merely mention this as an illustration, and also as furnishing a hint to some surgeons in private practice who may desire to prepare the catgut themselves. Or a couple of gallipots, one larger than the other, will do just as well. But, as I have already said, the principal uncoiling takes place during drying, and for all ordinary purposes a sufficiently good article is got by putting the catgut loose into the liquid, and putting it to dry on the stretch, by tying the ends of each hank to two fixed points in a room.

"In the dry state, catgut prepared by this method is as strong as need be. As to strength in the condition after steeping in blood serum, I confess it is only this very day that I have obtained evidence that catgut thus prepared is really all that we can desire in that respect. The catgut of the hank from which this specimen was taken measured in the dry state 2⅔ hundredths of an inch in diameter, and broke at 13 pounds 6 ounces. I have found by experiment that 10 pounds is the utmost strain that my arms are able to put upon a cord. Thirteen pounds 6 ounces, then, is amply sufficient; while, at the same time, the catgut is not at all too large for going into the eye of an aneurism needle. Having obtained the other day some fresh blood of a cow from the slaughter-house, I took some of the serum to-day and put two pieces of this same hank of catgut in the serum, and I placed it in a stoppered bottle in a warm box, at a temperature of 98° F. After more than half an hour I tested the breaking strain (I must not stop to explain how that is done), and I found that the breaking strain of the same catgut, which in the dry state had broken at 13 pounds 6 ounces, was 11 pounds 4 ounces; that is though suppled by the serum, it had only lost in strength 2 pounds out of 13 pounds. I think that is really all that can be desired."

THE COFFEE LEAF DISEASE.

Two interesting papers on this subject were read at the last meeting (3rd inst.), of the Linnean Society, the one treating of its ravages in India, the other its nature and spread in South America.

In the first Mr. William Bidio, in a letter to Mr. J. Cameron, of the Botanic Gardens, Bangalore, refers to the Coorg country situated in the Western Ghats where European enterprise in coffee has been wholly developed within the last twenty-five years, and where no disease was observed till four or five years ago. The author mentions that the disease appears to have been imported from Ceylon, by way of Chickmoorloor, a district of Mysore, 60 miles distant from Coorg. It seems worst in impoverished exposed fields, and least where there is shade and rich soil. A small red insect has been noticed feeding over leaves covered with the pest, but what the insect's relation is to the disease, as yet remains undetermined. Plants grown from Ceylon seed suffer most, while those trees of Coorg origin and growth are least affected. A system of "renovation fitting" has been successfully tried; pits being dug at short intervals, wherein after judicious pruning all the affected leaves are buried, and this precaution seems to check the spread of the disease, particularly among the Coorg coffee trees.

In the second paper, Dr. M. C. Cooke, describes and summarizes all the data extant up to the present time of the progress of coffee disease in South America. Plantations in Venezuela, Costa Rica, Bogota, Caraccas, and Jamaica have been affected. He discourses on the nature of the blight and is of opinion that the disease is a complicated one, being himself as yet unprepared to affirm that either the *Septoria*, the *Sphærella*, or the *Stilbum*, (three so called different kinds of fungi), or all together, is the true cause of the disease. At the same time he thinks it possible that none of these forms of fungus are autonomous and that all may be related to each other as forms or conditions of the same fungus of which *Sphærella* is the highest and most perfect manifestation. He observes that the discoloured spots may be without any visible fungus upon them, and exhibit no trace of mycelium in the tissues, or they may nourish a *Septoria* as seen by the Rev. M. J. Berkeley, or a *Sphærella* as found by himself, or finally a species of *Stilbum* as seen by Professor Saeux and himself. Further the *Stilbum* may occur on the same spot as the perithecia of the *Sphærella*, on both *perithecia* and *Stilbum*, the one without the other may be found occupying different spots. Dr. Cooke admits that altogether it is difficult satisfactorily to answer the question:—What is the cause of this form of coffee disease?

REPORT ON SOXHLET'S RESEARCHES ON THE QUANTITATIVE ESTIMATION OF THE SUGARS.[*]

BY C. H. HUTCHINSON, F.C.S.

The following is a brief *résumé* of some important and interesting work which Soxhlet published early last year;[†] since the examination of the reducing equivalents of the various kinds of sugar for alkaline, copper and mercurial solutions has been critically performed, and the results show us how much or rather how little absolute truth is represented by the ordinary method of quantitative estimation, I have deemed the subject worth consideration.

In order to eliminate any possible error arising from the use of impure substances considerable pains were taken to produce pure products, the methods are here appended as of value for themselves as well as giving an idea of the trustworthiness of the results of the work. We will first consider the preparation of the sugars.

Invert Sugar.—The best refined sugar of commerce, purified by crystallizing three times from water and dried *in vacuo* over calcium chloride at a temperature of 50° C. was used as the source of inverted sugar. Solutions containing 1 or ½ per cent. of the inverted sugar were made by dissolving 9·5 grams of this cane sugar in 700 c.c. water, acidifying with 100 c.c. of a one-fifth normal solution of hydrochloric acid, and heating for thirty minutes to a temperature of 100° C. on the water-bath, the solution being then exactly neutralized with a titrated soda solution and water added to 1000 c.c. or 2000 c.c. respectively. The change effected by this treatment is influenced by a longer duration of the heating, or the employment of a larger quantity of acid, for 0·475 gram cane sugar treated in the above manner is equivalent to 101·2 c.c. of Fehling's undiluted copper solution; but if heated three times as long only 100·5 c.c. are reduced, and if three times the amount of acid be added, and the heat continued for ninety minutes the reducing power is decreased to 100·2 c.c.

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[*] Read before the School of Pharmacy Students' Association, January 27, 1881.

[†] *Jour. pr. Chem.*, [2], 21, 227—317.

Grape Sugar, Dextrose.—When such a quantity as a kilogram of pure grape sugar is required, it is necessary first to provide oneself with a small quantity of the anhydrous substance, with which to start the crystallization of the larger amounts. If this cannot otherwise be obtained it may be made by introducing 160 grams of powdered pure cane sugar, in four or five portions, into a mixture of 500 c.c. of 90 per cent. alcohol with 20 c.c. of concentrated hydrochloric acid heated to 45° C. If thoroughly stirred this amount will be inverted in two hours. It is then left to crystallize, and as soon as the first few crystals appear (after six or eight days) the solution should be frequently shaken, by which means a fair crop will be obtained after one or two days more. The larger quantity is made by dissolving 4 kilograms of powdered cane sugar (the refined sugar of commerce) in a mixture of 12 litres of 90 per cent. alcohol, with 480 c.c. of concentrated hydrochloric acid, heated to 45° on the water-bath, the mixture being continuously stirred, and the temperature kept from rising much above 50°. In two hours this amount of sugar will be dissolved and inverted, yielding an almost colourless solution, which, when cold, should be brought to crystallize by introducing a small quantity of the previously prepared anhydrous dextrose. If frequently stirred the separation of the dextrose takes place in a few hours, as a finely divided crystalline powder, and after twelve hours 70 to 80 per cent. of the obtainable portion will have crystallized out; after standing twenty-four hours longer the crystals may be separated from the liquid by means of the filter pump, and should be washed with 90 per cent. alcohol until all traces of hydrochloric acid have been removed, when the mass is finally once washed with absolute alcohol and dried at a low temperature. The sugar thus obtained must, however, be purified by recrystallization; this cannot be more satisfactorily accomplished than by means of methylic alcohol (the methylic alcohol of commerce should be purified by mixing with 20 per cent. of water and distilling from a water-bath, retaining only the first four-fifths of the distillate which has, as a rule, a specific gravity of 0·810 at 20°), in which it is boiled five to ten minutes; the liquid is then filtered and quickly cooled, when it immediately becomes opalescent from the separation of crystalline needles of dextrose, a separation which is greatly accelerated by shaking, the principal quantity being obtained in twenty-four hours. By allowing hot saturated solutions to cool slowly, especially when the specific gravity of the methylic alcohol used has been brought to 0·825 at 20° by the addition of about one-twentieth of its volume of water, large crystals of anhydrous dextrose may be obtained, whose sparkling surfaces have great beauty, resembling the finest crystallized cane sugar. Commercial impure dextrose is soluble in nearly all proportions in boiling methylic alcohol, but the author of the paper states that he has not been able to get these to crystallize.

Milk Sugar.—The pure milk sugar of commerce, recrystallized four times, and dried at 100°, was the preparation used.

Lactose.—This variety of sugar was obtained by the action of a mineral acid on milk sugar, the details of the operation being: 1 kilogram of milk sugar was boiled for six hours with 4 litres of 5 per cent. sulphuric acid. The clear brown solution thus obtained was neutralized with barium hydrate (whilst the liquid was still acid, barium was found to be in solution. This is due to the formation during boiling of levulic acid, whose barium salts have an acid reaction).* The liquid filtered from barium sulphate was concentrated, and divided into parts, some of which were further evaporated, so as to produce syrups of various strengths; but even after standing six weeks in no case had crystallization commenced. The addition, however, of a little hydrous dextrose to a small portion caused this to solidify, after two days, to a yellow pasty mass, and by adding small portions of this to the chief quantities they were all caused to solidify. The separation of the crystals thus produced from the syrup by means of pressure was not possible until sufficient 80 per cent. alcohol had been added to bring the whole to the consistence of cream. By repeating this process, in all four times, a cake of snow-white lactose was obtained, the further purification of which may be effected by recrystallizing either from 70 per cent. alcohol or from methylic alcohol. In the first case, boiling 70 per cent. alcohol is saturated with powdered lactose, filtered, and allowed to stand, when after a few days a crust of fairly well defined crystals (prismatic columns and tables) will appear. In the second case, 100 grams lactose are dissolved in 100 to 120 c.c. of water on the water-bath, 350 c.c. methylic alcohol added, and the whole boiled and filtered whilst hot. Crystalline needles begin to be precipitated as soon as the solution cools, and the separation may be much accelerated by frequent shaking. This method does not yield well defined crystals, but is convenient from the rapidity with which crystallization takes place.

Two preparations were the subjects of examination, the one being three times crystallized from 70 per cent. alcohol, the other an equal number of times from methylic alcohol. It is specially characteristic of this kind of sugar that its hot saturated solutions solidify very quickly on cooling; even, for instance, on the filter in cases of filtration. Whether crystallized from alcohol or water the crystals produced are anhydrous; nevertheless, in all experiments the sugar employed was dried at 100° C.

Maltose, Amylon.—This was prepared in the following way:—2 kilograms of potato starch were stirred up with 9 litres of cold water, and gelatinized on the water-bath. After cooling down to 60° to 65°, an aqueous extract of from 120 to 140 grams of air-dried malt, obtained at 40°, was stirred into the mass, the whole being maintained at 60° to 65° for one hour, then brought to the boiling point, filtered whilst hot, and evaporated to a thin syrup, which was several times boiled up in portions with 90 per cent. alcohol. The extract obtained by distilling the alcohol from one of these was treated with absolute alcohol in order to obtain a small quantity of a pure and quickly crystallizing extract, which will yield a small quantity of maltose with which to start the crystallization of the larger portion. The alcoholic extract was therefore evaporated to a thin syrup, and allowed to stand in shallow layers, crystallization generally taking place after a few days. This treatment is, of course, unnecessary if a little crystallized maltose can be otherwise obtained. The rest of the 90 per cent. extract, after the chief quantity of alcohol has been distilled off, is concentrated to a thick syrup, and into this, when cold, a small quantity of the crystallized maltose is stirred. After three to five days the deep brown syrup solidifies to a stiff crystalline mass, which may then be rubbed down with methylic alcohol to the consistence of thin mud, from which the methylic alcohol is removed by means of the filter pump. After once washing with methylic alcohol the mass is pressed, and again subjected to the above treatment, when it may be crystallized from 80 per cent. alcohol or from methylic alcohol. It is desirable to crystallize first from 80 per cent. alcohol, which, when hot, must not be more than half saturated, so as to prevent the formation of syrup drops on cooling, and with this object each 100 grams of the maltose, pressed as dry as possible, and not containing more than 20 per cent. of liquid, is dissolved in 30 c.c. water on the water-bath, to which 260 c.c. of 90 per cent. alcohol are added, the whole being heated to the boiling point, and filtered. When cold a little crystallized maltose is added, and if frequently shaken the whole will in a few hours crystallize to a pasty mass. If crystals be not added, crystallization does not begin for at least twenty-four hours, and then takes place slowly, a thick crust being formed on the sides and the bottom of the containing vessel. It is advisable first to resort to disturbed crystallization, washing the product with methylic alcohol, and again crystallizing, this time quietly. The further purification is more rapidly effected by means of methylic alcohol, to which end 100 grams air-dried maltose are dissolved in 24 c.c. water over a naked flame; 600 c.c. methylic alcohol added, and the whole boiled and filtered; crystallization commences after a few hours, and may be accelerated by shaking.

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* H. Rodewald, 'Inaug-Dissert,' Gottingen, 1879.

The copper solutions employed were Fehling's alkaline copper and Löwe's alkaline copper and glycerol solution. Since Fehling's solution cannot be kept without decomposing, a quantity of pure cupric sulphate solution was prepared, containing 69·278 grams cupric sulphate to the litre, and to the required amount of this was added at the time of the experiment an equal quantity of alkaline Rochelle salt solution prepared fresh daily, the proportional composition of which was 173 grams Rochelle salt dissolved in 400 c.c. water, to 100 c.c. caustic soda solution containing 516 grams sodium hydrate in the litre.

Löwe's solution, which contains more copper than Fehling's, was used only for gravimetric estimation; it was made by dissolving 15 grams of hydrated cupric oxide with 60 grams glycerol, 80 c.c. of sodium hydrate solution of 1·34 sp. gr. and 160 c.c. water, made up to 500 c.c.

The methods of estimation employed were volumetric and gravimetric; early experiments, as well as the failure to obtain concordant results on the part of other experimenters, showed that some special conditions must be fulfilled in order to attain uniform results; it was, in fact, found that the reducing power of sugar for alkaline copper solutions is only constant under exactly the same conditions, and that if the same amount of sugar act in one case on an amount of copper solution which it is just able to reduce, and in another on an excessive quantity, the reducing equivalent will in the first case be found to be considerably less than in the second. From this, then, it is evident that if a solution of sugar be added by small quantities at a time to a copper solution, as in ordinary volumetric analysis, the amount of reduction effected by the first quantities will be greater than that produced by the last; such a method is therefore inadmissible. On this account the procedure adopted by Soxhlet was to add to a carefully measured amount of copper and alkaline Rochelle salt solutions at the boiling point, a certain amount of a 1 per cent. or ½ per cent. solution of sugar, allowing the two to react for a specified time, then filtering through a plaited filter, acidifying the first half of the filtrate with acetic acid, and testing for copper by means of potassium ferrocyanide, the experiment being repeated until two numbers have been found varying by not more than one-tenth of a c.c. Thus, to a mixture of 50·6 c.c. copper and 50·6 c.c. alkaline Rochelle salt solutions, were added 50 c.c. of a 1 per cent. sugar solution. After boiling and filtering, the filtrate yielded a deep red coloration. Repeating the experiment, using 50·5 c.c. of the above solutions and the same quantity of sugar, a filtrate was obtained yielding no reaction. The end point is therefore between these two = 101·1 c.c. Fehling's solution.

From this it follows that gravimetric estimations of sugar solutions are not possible except under certain special conditions. The author of the paper has only made use of them to determine the effect of excess of the copper solution on the action of the sugar. His method was to allow a known quantity of sugar and copper to react, and then weigh the precipitated cuprous oxide after reducing it to metallic copper; the filtering, reducing and weighing being all effected in the same tube. For this purpose a small calcium chloride tube, about 130 mm. long and 13 mm. wide, was used; the bulb of this was half filled with somewhat stiff fibres of asbestos, laid at right angles to the axis of the tube; the solution to be filtered was introduced by means of a funnel, the tube itself being attached to a filter pump. In this way the filtration may be effected with great rapidity. The precipitate was washed with hot water, then twice with absolute alcohol, and finally, once with ether; and when this had for the most part been expelled by a current of dry air, the broader end of the tube was connected by means of a cork to a hydrogen apparatus, giving it a slight downward inclination. The amount of heat required for the reduction was very little, and a small flame whose point is 5 c.m. from the tube was sufficient to effect this in two to three minutes. The difference between the weight of the tube before and after the experiment gave the weight of copper reduced. It is of course necessary to wash the tube thoroughly before taking the first weight.

Soxhlet convinced himself that only a low temperature is required for the reduction by some observations, in which a tube containing 4 grams of cuprous oxide was placed through the side openings of an air-bath, when he found that the reduction commenced at 130° and was complete in half an hour, during which time the temperature had only risen to 135°. This method has many advantages over the old one, not only on the ground of convenience and cleanliness, but also of rapidity and accuracy; for if alkaline solutions of copper be filtered through paper a very appreciable amount of copper is retained by the cellulose present, and according to Soxhlet, the oxidation of cuprous to cupric oxide can only be thoroughly effected by moistening with nitric acid and heating, and under these conditions a very perceptible loss may take place through the volatilization of a basic copper salt. The first part of this statement seems, however, open to question, since Brown and Heron, in their admirable work on the transformations effected in starch by diastase,* found that cuprous oxide was entirely oxidized by simple roasting in the air.

(*To be continued.*)

CONSTITUTION OF THE TARTRATES OF ANTIMONY.†

F. W. Clarke and Helena Stallo have made a study of the compounds which, like tartar emetic, are assumed to contain the group antimonyl (SbO), and come to the conclusion that they are not tartrates proper, but salts of a complex acid called tartrantimonous acid. They analysed the barium salt formed by adding barium chloride to tartar emetic solution, and prepared also corresponding zinc and cobalt salts, the percentages of the metals found in these compounds corresponding fairly to that demanded by theory. They attempted to prepare the free acid by precipitating the barium out of the barium salts, but found the acid very unstable, so that when the barium was removed it rapidly decomposed, depositing a white precipitate, which proved to be $Sb(OH)_3$. Their theory as to the constitution of tartar emetic, then, is that it is the potassium salt of an acid in which the dyad radical $C_4H_4O_6$ enters, replacing two groups, OH, of the antin urce -drate $Sb(OH)_3$, thus:

$$Sb\left\{\begin{array}{l}OH\\OH\\OH\end{array}\right.$$

cent. of the inv

grams of this cane sugar $C_4H_4O_6$

100 c.c. of a one-fifth normal

Antimonous hydra acid, and heating for thirty minutes.

or acid. e School of Pharmacy Students' Associ-

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* *Journal of* †1881.

† From the *em.*, [2], 21, 227—317. from the *Ame*

The Pharmaceutical Journal.

SATURDAY, FEBRUARY 26, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

AMERICAN VIEWS OF THE FUTURE PHARMACY.

WE learn from an American correspondent that the progress of the Council's attempt to improve the law regulating the practice of pharmacy is being watched with considerable interest by pharmacists in the United States. A similar endeavour is also being made there, and we have been furnished with a copy of a Bill, which it is proposed to have enacted the State of New York by the present Legislature.

Two grades of qualification for the practice of pharmacy are established by this Bill. First, that of pharmacist, the examination for which is to be conducted with a view to ascertain the fitness of the individual to act independently as principal or in sole charge of a pharmacy where physicians' prescriptions are dispensed, and drugs, medicines or poisons are sold. Second, that of assistant pharmacist, the examination for which is to be conducted with a view to ascertain the fitness of the individual to compound and dispense physicians' prescriptions, and to be entrusted, under the direction of a licensed pharmacist, with the handling, care and sale of poisons.

The licence to practise as a pharmacist, or as an assistant pharmacist, is to be granted by a Board of Pharmacy, upon application and compliance with certain requirements, to persons who possess the following kinds of qualifications:—

1st. Such persons as may be carrying on the business of dispensing medicine on their own account at the passing of the Act.

2nd. Graduates of pharmacy or of medicine who have had at least four years' experience in stores where physicians' prescriptions are dispensed, and have obtained a diploma from legally constituted college of pharmacy or college of medicine, or a foreign institution of equal rank and requirements.

3rd. Persons holding the certificate of registration as a pharmacist of any Board of Pharmacy, legally created under the laws of the State of New York, prior to the passing of the Act now referred to.

4th. Persons who, having had at least four years' practical experience in stores where physicians' prescriptions are dispensed, shall pass a satisfactory examination for the grade of pharmacist.

The licences thus granted are to be valid only for one year, and every licensed pharmacist desiring to continue his business is to give written notice of his desire to do so before the expiration of the licence he is practising under, and, upon payment of a small fee, it will be renewed for another year.

The licence to act as an assistant pharmacist is to be granted by the Board to persons holding a certificate of registration as assistant pharmacist or corresponding grade from any previously existing legal Board of Pharmacy in the State; also to persons actually engaged within the State in the business of dispensing medicines and poisons at the passing of the Act and having at least two years' practical experience in dispensing as above, upon passing an examination before the Board; and lastly, to persons having four years' practical experience of dispensing, upon their passing a satisfactory examination.

The licences under which a pharmacist or an assistant pharmacist practises are to be conspicuously displayed in the pharmacy or store where they carry on business.

Any licensed pharmacist failing properly to renew his licence will be liable to prosecution, and on conviction to a fine of two pounds for each day he has so continued his business, besides the costs of prosecution.

At the very outset we recognize in this Draft Bill a thoroughness of purpose that speaks well for the state of opinion among American pharmacists in regard to what is desirable for ameliorating the future of pharmacy. According to the provisions of the 1st section it is to be unlawful for any unlicensed person to open or carry on any pharmacy or store for the purpose of retailing, compounding, or dispensing drugs, medicines or poisons, or to practise pharmacy, either as principal or agent. It is also to be unlawful for any unlicensed person to be employed by the proprietor of a pharmacy or store, or in any public hospital, asylum or dispensary, for retailing, compounding or dispensing drugs, medicines or poisons.

Any unlicensed person carrying on a pharmacy or store, either as principal or agent, is to be held guilty of a misdemeanour and upon conviction be punishable by a fine not exceeding ten pounds and the costs of prosecution for the first offence and for subsequent offences by imprisonment or a fine of twenty pounds, or both, with costs.

In like manner any unlicensed persons employed for retailing, compounding or dispensing drugs, etc., in a pharmacy or store, as well as the employers of such unlicensed person, are each to be liable upon conviction to a fine of ten pounds and costs, and for repetition of the offence to imprisonment or a fine of twenty pounds, or both, and costs.

The employment of apprentices or junior assistants, in pharmacies is permitted only for the purpose of their being instructed in the practice of pharmacy, and it is provided that they shall not be allowed to prepare and dispense physicians' prescriptions, or to sell or furnish medicines or poisons, except in the presence of a licensed pharmacist or assistant pharmacist, and under his personal supervision and responsibility.

As regards the sale of poisons it is provided that it shall be unlawful to sell, retail, or furnish any scheduled poison without a label containing the name of the article and the word 'POISON' distinctly shown, with the name and place of business of the seller. The sale of a special group of poisons is also to be registered in the same manner as in this country, and the Register is to be preserved for at least five years and to be always open for investigation by the proper authorities. No poison of this class is to be delivered without the seller satisfying himself that the purchaser is aware of its poisonous character and that it is to be used for a legitimate purpose. Certain of the scheduled poisons are to be kept in a separate compartment exclusively devoted to them and inaccessible to the public. Wholesale dealers are to have every box, bottle, etc., of certain scheduled poisons labelled with the word 'POISON,' but they are not to be required to register the sale of such articles in recognized wholesale quantities. The penalty for failure to comply with these requirements is to be a fine of five pounds and costs for the first offence and for any further offences twenty pounds and costs.

The adulteration of drugs is pretty thoroughly dealt with in one section of the Bill, and the Board of Pharmacy is empowered to investigate cases reported to it as well as to notify to the public prosecutor such cases as require prosecution. It is probable, however, that in view of a much more detailed law being passed in regard to adulteration of food and drugs, this section of the Pharmacy Act will be struck out.

Another subject referred to by our correspondent is Pharmacopœia revision. This work is described as progressing satisfactorily in the States, and with the advantage of a spirit of harmony between the medical and pharmaceutical members of the Committee. To the former is conceded under all circumstances any decision on therapeutical subjects, as well as the remedial merits and demerits of new and old drugs, while the pharmacists mainly confine themselves to working out the text in accordance with the rules agreed upon. This natural division of labour is based upon a tacit mutual understanding by which the proper dues are rendered to each profession.

Our correspondent further adds that, in his opinion, and in that of many others in the United States, the pharmaceutical profession in Great Britain should have an officially recognized representation on the next Committee of Revision. No Pharmacopœia, he adds, was ever satisfactorily constructed without the aid of specialists, and there is no reason why these specialists should not also be endowed with the privilege of sitting as members of the Committee. Moreover, co-ordination of the two professions in this matter will not only render the Pharmacopœia more perfect and uniform, but will also bring about a better understanding between the two professions.

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

February 16, 1881.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Ekin, Gale, T. E. Greenish, Linford, Martindale, Plowman and Taylor.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Six candidates were examined. *Two* failed. The following *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Barnett, John Arthur	Salisbury.
Chapman, William Henry	Birmingham.
Dodd, William Ralph	Market Drayton.
Ekins, Charles	Lincoln.

MINOR EXAMINATION.

Twenty-one candidates were examined. *Twelve* failed. The following *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Beck, Albert Neve	St. Leonards.
Blamey, Edward Parr	Hayle.
Bowker, Ellis	Radcliffe.
Burt, Cyril Cecil Barrow	London.
Chapman, Ingram William	Crowle.
Dickinson, John George	Lancaster.
Dixon, Walter Henry	Aberdare.
Dobson, Fred Ainsworth	Great Driffield.
Wylde, Samuel Roe	Macclesfield.

MODIFIED EXAMINATION.

Two candidates were examined. *One* failed. The undermentioned passed, and was declared qualified to be registered as a Chemist and Druggist:—

Dax, Henry John	London.

February 17, 1881.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Ekin, Gale, T. E. Greenish, Linford, Martindale, Plowman and Taylor.

Dr. Greenhow was also present.

MAJOR EXAMINATION.

Six candidates were examined. *Three* failed. The following *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Haden, Walter Edward	Lichfield.
Selleck, William Robert	Bovey Tracey.
Wimshurst, Frederick	Southborough.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Thirteen* failed. The following *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Greenwood, Samuel	Sheffield.
Griffiths, John Samuel	Newnham.
Groves, Richard Henry	Blandford.
Heading, Herbert Henry	Ely.
Hobson, Thomas Coultas	Doncaster.
Hodgson, Alfred	York.
Holmes, Francis	Lutterworth.
Jones, Daniel Williams	Erwood.
Lewis, Thomas	Newport, Mon.
Martin, Anson Edwin	Birmingham.

February 18, 1881.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Ekin, Gale, T. E. Greenish, Linford, Martindale, Plowman and Taylor.

Dr. Greenhow was also present.

MINOR EXAMINATION.

Twenty-four candidates were examined. *Twelve* failed. The following *twelve* passed, and were declared qualified to be registered as Chemists and Druggists:—

Meadowcroft, James	Bury.
Merrell, Arthur James	London.
Millhouse, Henry How	Sleaford.
Ninnis, Thomas Martin	Truro.
Norfolk, Henry	Stockton-on-Tees.
Pemberton, Joseph	Pimlico.
Perkins, Thomas Frampton	Clifton.
Prosser, James Alfred	Birmingham.
Sheffield, Arthur John	Beverley.
Skinner, Robert	Liverpool.
Watts, Francis Wapshare	Banbury.
Wright, Robert	Buxton.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's Examination:—

Certificates of the University of Cambridge.

Broadbent, John Beaumont	Honley.
Taylor, Thomas Ernest	London.
Westmoreland, William Henry	Salisbury.

Certificates of the College of Preceptors.

Fisher, Isaac	Liverpool.
Powell, Thomas	Brecon.
Sharples, Edward	Blackburn.

Certificate of the University of Oxford.

Hart, Frank	Bolton.

NORTH BRITISH BRANCH.

The fourth meeting of the 27th session was held on the 17th inst., in the rooms of the Society, 119A, George Street, Mr. J. B. Stephenson, President of the Branch, in the chair.

The minutes of the previous meeting were read and confirmed.

The Honorary Secretary announced the following donations:—

To the Museum.—A box of specimens from the Society in London. (The most important of these would have been laid before the meeting, but Dr. Macadam's specimens and apparatus took up all the available space.) They will be noticed at a future meeting.

To the Library.—(1) 'Silverlock's Medical Reference Book,' presented by the publisher; (2) 'The Pharmaceutical Register of the Pharmacy Board of Victoria,' for 1880, from the Board.

Dr. Stevenson Macadam, F.R.S.E., Lecturer on Chemistry, Edinburgh, read a paper on—

RECENT ADVANCES IN THE PRODUCTION OF ARTIFICIAL COLOURING MATTERS, INCLUDING ARTIFICIAL INDIGO.

BY DR. STEVENSON MACADAM, F.R.S.E.,

Lecturer in Chemistry.

Dr. Macadam stated that within the last twenty-five years the colours derived from coal tar had been gradually supplanting all the natural or ordinary colours in the dyeing and printing of cloth. At first the processes for the preparation of the artificial colouring matters were confined to the benzol or aniline series, but afterwards included the carbolic acid and naphthalene series. In 1869, however, the colouring matter of madder was prepared artificially from another of the coal tar substances called anthracene, and so successful has been the manufacture and the application of this artificial colour to dyeing and calico printing that madder and its derivative, garancine, have been almost entirely thrown out of the market and replaced by the artificial colouring matter alizarine and its derivatives. Within the last year another important step has been taken, and indigo has now been manufactured by artificial means from one of the coal tar compounds, and it is merely a question of time when ordinary natural indigo will be supplanted by the artificial indigo.

The artificial indigo and a large number of other artificial colouring matters were exhibited, and numerous experiments made in dyeing to demonstrate that the artificial colouring matters were identical with the natural colouring agents.

Mr. Nesbit, Vice-President, proposed a vote of thanks to Dr. Macadam for his interesting lecture. Mr. J. R. Young seconded, and it was most cordially responded to by the meeting.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

(ASSISTANTS' SECTION).

The fourth meeting of this session was held in the Manager's Library, Anderson's College, 204, George Street, on Wednesday, February 16, at nine o'clock p.m., Mr. Walter Paris presiding.

The minutes of last meeting having been read and confirmed, Mr. David Lees then read a paper entitled "Dreamland." He began by referring to the sleeping condition in general, and the physiological changes brought about in body and mind during that state. He elucidated the causes of dreams, as stated by the most recent investigators, and contended that dreams were simple and complete delusions, and had no connection in any case with the affairs of every day life, so far at least as acting a prophetic part was concerned.

After some remarks from members, to which Mr. Lees replied,

The President called on Mr. Lees to next introduce the discussion upon the proposed enforced curriculum. This measure he strongly protested against as being an unprincipled interference with the liberty of the aspirant to pharmaceutical honours.

The members unanimously agreed that this curriculum was quite unnecessary and at the present time uncalled for.

There being no more business, the President asked for a hearty vote of thanks to Mr. Lees, which was accorded. The meeting then closed.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday February 17, Dr. Roscoe, President, in the chair.

After the minutes of the previous meeting had been read and confirmed, the President announced that the following changes had been proposed in the Council, etc., for the ensuing year:—Retiring members, N. S. Maskelyne and R. Angus Smith, from the list of Vice-Presidents; C. W. Heaton, W. A. Tilden, J. L. W. Thudichum and C. Graham, from the Council. New members proposed:—A. Crum Brown and J. Emerson Reynolds, as Vice-Presidents; C. Schorlemmer, G. H. Makins, C. M. Tidy and F. T. Brown, as ordinary members of Council. The following gentlemen were then elected as auditors:—F. J. M. Page, J. M. Thomson and R. C. Woodcock.

The following certificates were read for the first time: J. F. Braga, H. Borras, T. C. Day, E. T. G. Gill, P. B. Mills, F. Tiemann, G. Valentine, A. Walker.

During the evening a ballot for the election of Fellows was held, and the scrutators, Drs. Hugo Müller and Stevenson, declared the following gentlemen as duly

elected:—B. Akroyd, M. M. Bird, W. E. Benton, H. Baker, M. Benjamin, H. P. Cooper, W. H. Coffin, J. J. Eastick, H. W. Fenner, M. P. Gossett, S. Harvey, J. W. James, T. H. Judson, A. J. King, W. E. Kay, C. A. MacMunn, W. G. McMillan. W. J. Stavert, T. Takamatsu, P. Vieth, G. J. Wishart, R. W. Walker.

The President then called upon Mr. M. W. Williams to read a paper—

On the Estimation of Organic Carbon and Nitrogen in Water Analysis simultaneously with the Estimation of Nitric Acid.—Of all the processes in use for estimating the organic matter in water the safest and most thoroughly scientific in principle is perhaps that of Frankland and Armstrong. To this process, as at present worked, there are, however, some objections. The time required to evaporate the water is over twenty-four hours. The water is kept for a long time in contact with sulphurous acid, a portion of which may at any time be oxidized to sulphuric acid. There is no test by which to make certain that the nitric acid has been completely destroyed. A correction of some magnitude, calculated by an empirical method has to be introduced, to allow for the dissociation of ammonic sulphite. Moreover, nitrous acid, which is produced by the reduction of the nitrates by the sulphurous acid, attacks ammonia and amidated bodies in acid solution, evolving their nitrogen in the free state, and it is uncertain how far the nitrogen of the ammonia and of the organic matter in a water undergoing evaporation may be attacked in this way. The author proposes to avoid altogether the use of sulphurous acid, and to shorten very considerably the time required for a water analysis. The process consists essentially in converting the nitrates into ammonia by the copper-zinc couple, as described by the author at the previous meeting, distilling off the ammonia with the addition of a little sodium carbonate, and evaporating the residue in the retort to dryness for the combustion. The process may be briefly described as follows:—The zinc foil is carefully cleansed from grease, etc., by boiling with dilute caustic alkali and its surface freed from oxide by washing with acidulated water; it is then immersed in 3 per cent. copper sulphate solution, as described in the previous paper. The copper-zinc couple is carefully washed, placed in a wide-mouthed stoppered bottle and the water poured on and allowed to digest at the proper temperature until the reduction of the nitric acid is complete. About 1200-1300 c.c. of water are used. As nitrous acid is present in the liquid as long as any nitric acid remains, 100 c.c. of the water are withdrawn, and if a yellow coloration appears in half-an-hour after adding metaphenylen-diamine and sulphuric acid, a longer digestion is needed. If no coloration appears the reduction is complete. The remainder of the water is poured off from the copper-zinc couple into a tall cylinder and decanted from any particles of copper and zinc. A litre is distilled in a glass retort until the distillate is free from ammonia, one or two drops of a strong solution of sodium carbonate being added. The ammoniacal distillate is neslerized, and, after deducting the quantity of ammonia originally present in the water, gives the quantity of nitric acid present. The water in the retort is further distilled to a low bulk, 200 c.c. Any carbonate of lime deposited is brought into solution by the addition of a little sulphurous acid. The water is then rinsed out into a smooth hemispherical basin, and evaporated to dryness on the water-bath. The residue thus obtained is free from all compounds of nitrogen, except the organic matters contained in the water. The combustion of the residue is carried out as prescribed by Frankland and Armstrong. The author has employed the process with many waters having nitrates from 5 to 0·5 parts NO_3 in 100,000; the results agree with those obtained by the sulphurous acid method. The author claims for the process that it is free from the sources of error which accompany the use of sulphurous acid for destroying the nitrates, and that it is more rapid.

Mr. W. Thorp asked what precautions were taken to prevent the introduction of organic matter with the copper-zinc couple.

Mr. Williams said that it was very easy to exclude the possibility of such introduction if care was taken in making the copper-zinc couple.

Captain Abney then gave some account of some recent researches which he had carried out in conjunction with Colonel Festing—

On the Influence of the Molecular Grouping in Organic Bodies on their Absorption in the Supra Red Region of the Spectrum.—The authors have photographed the absorption spectra of numerous inorganic and organic solutions. The electric light was used. The portion of the spectrum photographed was beyond the red, which is, of course, under ordinary circumstances, quite invisible. The focussing of this portion was attended with some difficulty, as nothing could be seen, successive trials had to be made until the photographs came out sharply defined. Three prisms were used, and the thickness of the layer of liquid was about 6 inches. Many of the photographs were thrown on the screen. Many of the organic radicals have in this ultra red portion of the spectrum characteristic bands or groups of bands which run more or less through all their compounds, so that after some experience it is possible to say, from its spectrum, whether or not a chemical compound contains a certain organic radical. The change produced in the absorption spectrum of a substance by the addition of oxygen, hydrogen, etc., was pointed out. It is a curious fact that some of the well marked absorption bands of the benzene nucleus (857), of alcohol (900) and of water and chloroform (824) agree with some lines of the solar spectrum. The absorption spectrum of hydrogen seems to be one of lines. The investigation seems likely to throw much light on the internal structure of organic substances.

The President said the subject was one of great interest, and as the investigation was still in its infancy he must congratulate the authors on the results they had already obtained. As Dr. Russell and Mr. Lapraik had a paper on a somewhat similar subject he would call on Dr. Russell* to give his communication before entering on any discussion.

Dr. Russell then communicated some results obtained by Mr. Lapraik and himself on—

Absorption Bands in the Visible Spectrum produced by Certain Colourless Liquids.—The authors have carefully drawn the absorption spectra of these liquids in long tubes (8 to 12 feet) in the visible part of the spectrum. The liquids examined included water, ammonia in solution in water, ether and alcohol, methylamine, etc. The bands in the spectra of ammonia and methylamine seem to be almost identical.

Dr. Armstrong pointed out how remarkably some of the photographs of Captain Abney confirmed the views held by chemists as to the constitutional formulæ of organic bodies. These results afforded a proof that a chemical symbol represented not merely the behaviour of a substance but gave a real picture of its internal structure. The spectrum of turpentine was exceedingly interesting. He should like to ask whether in the spectra of different radicals the bands were harmonies.

Captain Abney, in reply, said that some of the bands nearly occupied the places of harmonies but not quite. He should like to thank Dr. Hodgkinson on behalf of Colonel Festing and himself for his valuable assistance in procuring the various liquids with which they had experimented.

On the Action of Hydrochloric Acid on Ethylene Alcohol. By C. Schorlemmer.—By heating glycol with an excess of fuming hydrochloric acid in a sealed tube to 100°, the author has converted this substance into ethylene dichloride and has thus disproved the conclusion that the two hydroxyl groups had different functions.

On an Attempt to Accelerate the Process of Determining the Soluble Salts in a Soil. By E. W. Prevost.—The author added calcium sulphate and barium carbonate to the soil, to expedite filtration, but in neither case were satisfactory results obtained.

The Society then adjourned to March 3, when the following papers will be read:—"On the Action of Bacteria on Various Gases," by F. Hatton; "On the Oxidation of Organic Matter in Water," by C. M. Tidy.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, February 10, Mr. D. Hooper, Vice-President, in the chair.

Mr. R. H. Parker made a Report on Materia Medica, dealing with the subject of "Eclectic Remedies." The author exhaustively treated of the botanical origin and microscopical characteristics, as well as the chemical and physical properties of the majority of the resinoid and other substances known as eclectic remedies.

The paper was copiously illustrated by a number of specimens, both of the preparations themselves and of the plants from which they are obtained.

A discussion followed, in which the Chairman, Messrs. Branson, Davies, Elborne, Fowler and James took part.

A vote of thanks having been passed to Mr. Parker, the meeting adjourned.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association held on Wednesday, February 9, the President, Mr. F. W. Branson, in the chair, a lecture on "Induction of Currents and some Practical Applications thereof" (illustrated by experiments) was delivered by Mr. J. Stapleton. The lecture will be printed in a future number of this Journal.

After the lecture, several interesting experiments were shown with the induction coil, viz., the rotation of the coil discharge round a magnetic pole in a vacuous glass globe; the illumination of a spangle tube, about 3 feet long, and afterwards an aurora tube. Attempts to charge a series of leyden jars in cascade, and a leyden battery from the coil discharge, were made, but on account of the excessive dampness of the atmosphere, were scarcely as successful as could have been desired. An illumination of very fine vacuum tubes, kindly lent for the occasion by Messrs. Cetti and Co., was much admired.

On the proposal of Mr. J. R. James, seconded by Mr. D. Hooper, a hearty vote of thanks was accorded to Mr. Stapleton for his interesting lecture.

At a meeting of the above Association, held on Wednesday, February 16, Mr. G. F. Snow, Vice-President, in the chair,

The following communications were read:—

The Quantitative Analysis of Tinfoil.—By Mr. R. H. Parker.—The author, having sketched the history of the metal tin and alluded to its different commercial qualities, and the application of it and its compounds to the arts and manufactures, proceeded to refer to the various kinds of tinfoil found in the market and the best method of estimating the amount of tin and lead present in a given sample. The lead was estimated gravimetrically, as sulphate or chromate, and the tin volumetrically by dissolving it in ferric chloride and titrating the resulting solution with $\frac{N}{10}$ permanganate of potash. The results of numerous estimations were given, which showed that the volumetric results were too high, even when corrected by a blank analysis, so that in order to obtain correct results, the permanganate solution should be standardized by pure tin or by tinfoil, the percentage of lead in which has been previously determined.

Resorcin.—By Mr. F. W. Branson.—The chemical affinities and preparations of this recently proposed antiseptic were explained. A method was given for the conversion of phenol into resorcin, and its use on a large scale in the manufacture of a dyeing material of a delicate tint, was pointed out, as were also the preparation and properties of its isomers, pyrocatechin and hydroquinone.

Parliamentary and Law Proceedings.

Prosecution under the 17th Section of the Pharmacy Act.

At the Petty Sessions, Winchester, on Friday, February 18, before E. D. Godwin, Esq. (Mayor), Chairman, and a full Bench, Mr. James Cooper, of 10 and 11, High Street, Winchester, general dealer, was charged that he did on Tuesday, February 15, sell to George Revill Templeman, Assistant Secretary of the Chemists and Druggists' Trade Association of Great Britain, certain poison, to wit, strychnine, in a certain packet, the cover of which packet did not set forth the name and address of the seller of the same, and that the said sale was effected, the purchaser being unknown to the seller and not introduced to the seller, and that the date of the sale, the name and address of the purchaser, and the name and quantity of the article sold, not being entered by the seller in a book kept by him for that purpose, in contravention of the statute in such cases made and provided.

Mr. Glaisyer, solicitor, Birmingham, prosecuted on behalf of the Chemists and Druggists' Trade Association of Great Britain, and Mr. White, solicitor, Winchester, appeared for the defendant.

Mr. Glaisyer said the summons in this case was issued under the 17th section of the Pharmacy Act, 1868, which enacts, "It shall be unlawful to sell any poison, either by wholesale or by retail, unless the box, bottle, vessel, wrapper or cover in which poison is contained be distinctly labelled with the name of the article and the word poison, and with the name and address of the seller of the poison, and it shall be unlawful to sell any poison of those which are in the first part of the schedule (A) to this Act, or may hereafter be added thereto under section 2 of this Act, to any person unknown to the seller, unless introduced by some person known to the seller, and on every sale of any such article, the seller shall, before delivery, cause to be made an entry in a book to be kept for that purpose, stating in the form set forth in schedule (F) to this Act, the date of the sale, the name and address of the purchaser, the name and quantity of the article sold, and the purpose for which it is stated by the purchaser to be required, to which entry the signature of the purchaser and of the person, if any, who introduced him, shall be affixed." Mr. Templeman, the Assistant Secretary of the Chemists and Druggists' Trade Association of Great Britain, had purchased a packet of vermin killer, analysed the same, and found it to contain strychnine, which was one of the poisons mentioned in schedule (A).

George Revill Templeman, called, sworn, and examined by Mr. Glaisyer, said that on February 15 he came to Winchester, and called at a shop in High Street, where he purchased a packet of vermin killer. It was not labelled with the name and address of the seller. He was not known to Mr. Cooper, and was not introduced by anyone, neither was the sale entered in a book kept for that purpose. He analysed the packet and found it to contain strychnine. Mr. Cooper was not qualified to sell poisons, his name not being on the Register of Chemists and Druggists.

Mr. White, for the defence, referred to the opinion of Mr. Justice Lush, expressed in the case of Berry *v.* Henderson, to the effect that the section under consideration alluded to poisons in their simple state and did not appear to contemplate their being mixed with other ingredients.

A report of the case referred to was handed to the chair.

Mr. White, resuming, stated that the defendant was a general dealer in that city, who had lately commenced the sale of patent medicines, and in supplying Battle's vermin killer he thought he was conferring a boon on the public, as it was used by almost every householder, and that the defendant, being a person licensed to sell patent medicines, was not aware that he was infringing the Act. If the Bench thought it was a case in which a fine should be inflicted, he trusted they would make it as small as possible, as the defendant had received no previous intimation that he was doing wrong, and the defendant would take care that the Chemists and Druggists' Trade Association would not find it necessary to again send one of their officials from Birmingham to take out another summons against him.

Chairman of the Bench: I suppose Mr. Cooper sold the vermin killer at a profit.

Mr. White: Yes; but not so much as the chemist's.

Chairman of the Bench: The Bench are of opinion the case of Berry *v.* Henderson does not apply to the present case, and that as the defendant illegally sold this article, they have no alternative but to fine him 20*s.* and costs.

A Coroner upon the Sale of Vermin Killer.

On Tuesday last Mr. Bedford held a lengthened inquest at the Sessions House, Westminster, into the cause of death of Mrs. Mary Alnek, aged 60, a widow. The evidence showed that the deceased had latterly been in straitened circumstances and had been advised to see the relieving officer. She did so, and he told her that he had "no home to offer her but the workhouse, an order for which he was ready to give her." On the previous Friday night she went to bed in her own room, and the next morning she was found dead.

Dr. Price, of 28, Great Smith Street, Westminster, who was called to see deceased, and who made a *post-mortem* examination, said he had no doubt that the deceased had committed suicide by swallowing the contents of two packets of Battle's vermin killer.

The Coroner said he was sorry to hear that so deadly a poison could be obtained by any person who chose to pay for it, and that such sales should bear some restrictions.

The jury endorsed the remarks of the Coroner, and, having thanked Dr. Price for an analysis he had made of the poison, returned a verdict of suicide whilst of unsound mind.—*Standard.*

Poisoning by Prussic Acid.

An inquest was held at Durham, on Wednesday, February 16, before Mr. Coroner Graham, relative to the death of Robert Laidman Hawksley, commercial traveller, aged thirty-three years.

The evidence of deceased's brother, Mr. William Hawksley, showed that he and deceased, having returned from Newcastle by the mail on Tuesday night, proceeded to the office in Old Elvet, where they both took their seats in their accustomed places, and commenced to do some writing. In the course of the evening witness went to his tea, leaving his brother Robert at the desk. Upon witness returning to the office he found Robert still writing, and upon his making some passing remark as to his remaining at the desk so closely, Robert said, "Oh, yes; I am making my will." A few minutes after that Robert rose from his seat, threw the pieces of foolscap paper on which he had been writing into the fire, and sat down in a chair, which was so situated as to place witness's back towards him. Immediately after that witness heard his brother breathing heavily, and on turning round he said, "Laidman, my lad, what's the metter?" Deceased replied, "All right, William, I am going to sleep." Witness then went to him and perceived a strong smell of prussic acid, and on turning his eye towards the mantelpiece he saw a small blue-looking bottle, which had the stopper out and was empty, the label having been scraped off. Dr. Jepson and Dr. Barrow were called in, and having failed to administer an emetic, they applied the stomach pump, but while they were so engaged the deceased expired. Witness stated that for some time his brother had been of intemperate habits, and had often when in fits of intemperance declared that he wished himself out of this world, but as such remarks as those were common with persons excited with liquor, he did not attach any importance to it, not having the slightest idea that his brother would ever do such an act as that he had done.

A chemist, named William Patterson, carrying on business in Old Elvet, stated that at about six o'clock on Monday, Mr Laidman Hawksley came into his shop and requested to be supplied with a quantity of prussic acid for the purpose of destroying a dog. Witness told him he would much rather that the dog was brought to him, so that he could administer the poison himself, but Mr. Hawksley replied that the dog was out in the country, and that he intended on the morrow to go out to him and give him the poison. Deceased then left the shop, taking with him an unopened ounce bottle of prussic acid, he having previously signed his name as the purchaser of the same in the book kept by the chemist in accordance with the Act.

The jury, after consulting a few moments, found a verdict—"That deceased committed suicide by taking prussic acid whilst in a state of temporary insanity."

Obituary.

JOHN ABRAHAM.

We regret to have to record the death on Sunday last, the 20th inst., of Mr. John Abraham, Pharmaceutical Chemist, of Liverpool, who was formerly a Member of the Council of the Pharmaceutical Society, and for several years filled the post of Local Secretary.

Mr. John Abraham was the founder, and for nearly forty years the head of the well known firm of Clay and Abraham, druggists, of Bold Street and Castle Street, Liverpool. He was born in 1813, in the city of Carlisle, where his father, Mr. Thomas Abraham, was for some years a well-known contributor to the local press. The family name was originally spelt Aburgham, which was gradually changed by mutations of orthography, common to many names, till at length it assumed the present form. The Abrahams were maternally descended from the Fells, of Swarthmoor Hall, in the north of Lancashire, and they became connected with the Society of Friends through the marriage of Mr. George Fox, the founder of that society, with the widow of Judge Fell. Mr. John Abraham very early became a politician of advanced Liberal views, and as such he took a prominent interest in the proceedings of the Anti Corn-Law Agitation. He became connected in various capacities with many of the leading institutions of the city. For a great many years he took a deep interest in the affairs of the Female Penitentiary, of which institution he was Honorary Secretary for twenty-five years, and co-President with the late Mr. William Crosfield at the time of his death. He was associated with the late Sir William Brown in the formation of the Gallery of Inventions and Science. Of the Naturalists' Field Club he was a member from the date of its formation in 1861, and he continued to be its Treasurer from 1862 till recently, when he was succeeded in that office by his son, Mr. T. F. Abraham. Of the Polytechnic Society he was also a member, and its Treasurer for about fifteen years. In May, 1867, he was elected a member of the Council of the Pharmaceutical Society, and he retained his seat at the Council table four years. He was also a member of the Liverpool Chemists' Association, of which he was President in the years 1855-6-7, and 1868 and 1870. Mr.

Abraham was for some years President of the Liverpool Registered Chemists' Association, and he was also first President of the Liverpool Chemists' Early Closing Association.

In the year 1856, when steps were taken to have some certain means for adjusting the compasses of iron vessels, a committee was formed, of which Mr. Abraham was a member, and the result of its proceedings was the marking along the dock walls of the degrees and minutes which are used to the present time. He was also a member of the two original private Microscopical Societies, one of which has now become public, holding its meetings at the Royal Institution. At the time of the great outbreak of cholera in Liverpool, Mr. Abraham was a member of the select vestry, and during that time he was most indefatigable in his exertions to stem the progress of the devestations of the epidemic, being Chairman of the Special Committee appointed for that purpose. It may be also mentioned that among the social improvements which he advocated years ago was the establishing of a local farthing postage for letters, etc., long before the halfpenny stamp was utilized as at present.

Mr. Abraham died at seven o'clock on Sunday evening, at his residence, Riverham, Grassendale, of an illness which was only noticed to have assumed a serious aspect a little more than a week ago.

Notice has also been received of the death of:—

On the 19th of January, 1881, Mr. Thomas Gibson, Chemist and Druggist, North Shields. Aged 75 years.

On the 12th of February, 1881, Mr. Robert Oliver Rees, Chemist and Druggist, Dolgelly. Aged 62 years.

On the 21st of February, 1881, Mr. Arthur Lloyd, Pharmaceutical Chemist, Camden Square, London. Aged 61 years. Mr. Lloyd had been a Member of the Pharmaceutical Society since 1845.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[500]. Syrup. gummi arabic (Beasley) is quite correct though I have known the syr. gummi rubr. used in a similar prescription (vide "Dispensing Memoranda" [276], vol. ix., p. 869, and answer to the same in "The Month," p. 878).

EDWARD H. STOREY.

42, *Castle Street East, Oxford Street, W.*

[500]. "Mucilago" was correct in not using syr. gummi rub.

MINOR.

[501]. In reply to "Discipulus" the quinæ sulph. should be powdered and a "shake" label attached. A little mucilage would ensure the proper dose being administered.

MINOR.

[504]. "Inquirer" might easily have satisfied himself that the "strong solution of ammonia" is correct in "tinct. opii ammon." by turning to his B.P., though I confess I should not care about taking the full dose.

EDWARD H. STOREY.

42, *Castle Street East, Oxford Street, W.*

[504]. "Inquirer" should examine his B.P., where he cannot fail to see that liq. ammon. fort. is intended to be used.

MINOR.

[505]. "Dalex" should have powdered the quinæ sulph. and triturated with the syrup, which is sufficient to cause it to shake up fairly well. In this manner I believe there would be no great amount of decomposition; but to add acid. sulph. dil. ʒss. must throw out a great part of the salicylic acid, and is a rather grave error to make. "Dalex" might say what he charged for the ℥vj. mixture.

MINOR.

[506]. "Apprentice" will find both ammon. valer. and sol. ammon. valer. quoted in most wholesale price lists. The sol. ammon. valer. (25 per cent., I believe) is often used in some of the midland towns.

MINOR.

[507]. A. B. C. would like to know how the following prescription can be dispensed so as to present (when freshly made) an opaque, yellowish-green mixture, with very little sediment, and what should be the correct appearance:—

℞	Fer. Am. Cit.	ʒss.
	Quinæ Sulph.	gr. xij.
	Suc. Limon. Recent.	℥iss.
	Spt. Chlorof.	ʒj.
	Aq.	ad ℥vj.

M.

[508]. FOR SORE THROAT OR COLD OR COUGH.—

℞	Tinct. Iod.	ʒij.
	Kali Iod.	ʒij.

Four or five drops to be taken in half a wineglass of cold water every night and morning.

Can anyone tell me how it is to be dissolved?

E. C. P.

[509].

℞	Sodæ Sulph.	ʒj.
	Ammoniæ Carbon.	grs. xvj.
	Sp. Chloroformi	ʒj.
	Aquæ	ad ℥viij.

M.

In dispensing the above, a few days ago, I rubbed the two salts together in a mortar with a small quantity of water. I had occasion to leave it for a minute or two, and on returning found a kind of opaque, jelly-like mixture in the mortar. Will anyone kindly say what decomposition (if any) took place, and if the *modus operandi* was a correct one?

W. G. T.

[510]. I had the undermentioned prescription presented to me; what was I justified in using for liq. cinch. cord, Battley's or the ext. cinch. flav. liq., B.P.?

℞	Potass. Chlor.	ʒj.
	Sp. Ammon. Arom	ʒij.
	Sp. Æther. Chlor.	ʒj.
	Liq. Cinch. Cord.	ʒss.
	Aquæ	ad ℥vj.

1/6. 4ter horis.

MINOR.

[511]. I have received the following prescription, and should like to know if it ought to be quite miscible. If not, how should it be sent out? I put on it a "shake the bottle":—

℞	Tr. Ferri	ʒj.
	Chloroformi	ʒss.
	Gum. Camphoræ	grs.. v.
	Sp. Vini Rect.	℥ss.
	Ol. Menth. Pip.	♏ij.
	Aq.	ad ℥vj.

M. sd. ℥ss quater in die.

W. P

[512]. Will some of your numerous readers kindly inform me the best excipient for making Bland's pills?—

℞ Potas. Bicarb.,
Ferri Sulph. Exsiccat. . . . āā gr. iiss.
Ft. pil.

I have tried gum acacia, tragacanth, p. saponis, etc., but cannot get a good result, the pills being large, and easily broken.

F. J. O.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

BRANCH PHARMACIES.

Sir,—The necessity of restrictions for conducting branch pharmacies has been put forward by only a few of your correspondents, this apparent apathy being due, I have no doubt, to the interest of the trade having been concentrated upon the "widow's clause." But since this interest is showing signs of abatement, and the Council has finally determined to retain the "widow's clause," I would ask your readers to consider the relation which branch pharmacies hold to the spirit of the pharmacy laws.

These laws were formed under the supposition that "it is expedient for the safety of the public" that the trading in pharmacy should be conducted by persons certified to be qualified to do so. The whole spirit of these laws clearly indicates that a pharmacy ought to be superintended by a qualified person. Yet we find in practice that a qualified person may possess (if he have the means) an unlimited number of pharmacies, and that these are not immediately conducted by him. Moreover, these branches from the centre pharmacy in which the qualified person conducts personally, need not be directly under his supervision, for they can be established in any part of Great Britain, and when I add that these branches are generally conducted by unqualified persons, it will become apparent to what extent the spirit of the pharmacy laws is violated. I could quote cases in proof of my statements, but I think that the trade is fully cognizant of the extent of our internal weakness. It is the more grievous in considering this matter to know that our Council has taken no steps in the new amendments to remedy the evil. Yet I am inclined to think that this silence is less due to unconcern than to the difficulty in forming a clause which would regulate the conducting of branches.

I cannot imagine how it can be expected that the somewhat repressive measures should become law, while we quietly pass over such a source of unsafety to the public as we have in branch pharmacies. I would suggest to the Council that before it be too late they should insert a clause to this effect:—

"It is expedient for the safety of the public that when a qualified person, within the meaning of this Act, is owner of more than one shop, and keeps such shops open for the purpose of retailing, dispensing or compounding poisons, he shall at each shop wherein he does not personally conduct the business, employ and keep in attendance a person qualified within the meaning of this Act."

Such a clause, while ensuring the safety of the public, also ensures to the druggist or pharmacist a perfect freedom in trading, and, moreover, did such a clause exist, we would inaugurate a great incentive to many young men of the trade to work for their proper qualification. If unqualification be a misery, branch shops are undoubtedly greatly palliative of it, for at present many unqualified assistants obtain as good salaries in conducting branch shops, as qualified persons would in the same circumstances.

I hope the trade will not pass over this matter so quietly as it is at present likely to be.

Dundee. P. MACEWAN.

Sir,—I supposed that after the Council had completed the draught of a Pharmacy Act Amendment Bill there would be no room for further suggestions, but as letters continue to appear in your columns, I venture to make one or two observations which occur to me. I am surprised that no one appears to have noted the opinion expressed during recent litigation by high judicial authorities, that for some at least of the purposes of the Act the seller of a poison means the person who actually effects the sale. Now I fear that this point is likely to attract the attention of members of Parliament, if we ask for new restrictions, except as regards stamped medicines containing a scheduled poison, and it is not unlikely that they may attempt to prohibit poisons ever being sold by an assistant or apprentice who is not legally qualified; which would inflict a very serious injury on many proprietors of small businesses. I therefore very much doubt the wisdom of asking anything, except that where a scheduled poison forms an ingredient in a stamped medicine, the name and quantity of the poison should be stated on the inside label and the word poison affixed both inside and out, of course repealing the clause of 1868 which exempts such from its operation; also we might ask for the extention of exemption from service on juries to all chemists on the register. If, however, we must have a more comprehensive Bill, it appears to me essential to its passing, that there should be a clause prohibiting any chemist from keeping a second shop unless it is within—say a mile—of his principal shop, and is under the care of a qualified assistant, or unless he is acting as the trustee of a widow. There is much force in the arguments of those who support the 5th clause, or rather there would be if they were only consistent, and advocated also such a restriction as proposed above of the practice of keeping branch shops. Of course the vested interests of those already owning such would have to be reserved, though they should be required to employ a qualified assistant in each.

Kettering. A COUNTRY CHEMIST.

THE PROPOSED PHARMACY ACTS AMENDMENT BILL.

Sir,—Mr. Gibbons's letter in last week's Journal contains "three points" which, he considers, require "the serious attention of the framers of the proposed Act; for if," he continues, "the views expressed by many are embodied, I am afraid we may look in vain for an amended Pharmacy Bill." With your kind permission, Mr. Editor, I should like to say a few words upon the "three points." First, "the widow's interest." He asks, "What is the difference between a widow and a body corporate carrying on a chemist's business by proxy?" To my mind the difference is this, that the widow inherited the business from her husband, and he inherited it by virtue of belonging to the Society founded by Act of Parliament, which right he acquired by much expense and labour; and the body corporate, if he means the stores, have assumed his rights and privileges, independently of the Society, without expense or study. Now to common sense this is an injustice. But let us not try to commit another injury in order to remedy one already existing. A widow has a right to her husband's property, and no combination of chemists will, I am sure, prevail upon the good sense of Parliament to take away that right.

Mr. Gibbons's second point is "plurality of shops," and he says, "If a clause is not inserted in the proposed Bill, dealing firmly with this abuse, I will not give much for our chance of a reformed Bill." As in the first point, so in the second, self appears on the surface; yet he says, "What protection have the public," unless in the case of a firm, when "each partner takes special charge of one particular shop," as though it were for the public good? If it be for the public good that the master only should take "special charge," what is the use of qualified assistants at all? My opinion is that they are better for "the safety of the public" than the majority of the present masters. But if the master only is to take the "special charge," I would add some such clause as the following:—"For the greater safety of the public, be it enacted that, on and after ———, no chemist shall leave his shop under any consideration, whether to attend a meeting of his own society, municipal or otherwise, or to do any business whatever, except for a period of fifteen minutes at any one time, under a penalty of £20 for every such offence." Clergymen have more than one charge, solicitors have more than one office, and "doctors" more than one surgery, in different parts of the same town.

With the third point I perfectly agree. But I do think that no one but a chemist or a "doctor" should be allowed to put up a "patent medicine" and send it into the market.

I also am of opinion, that words might be arranged in such a form as to prohibit anyone selling drugs and chemicals, when sold as medicines, but those who have been educated for the purpose.

Geo. P. Pond.

Sir,—If ever a steam engine was brought to kill a mouse, the Pharmacy Acts have been framed to crush the legally qualified chemist, and like a steam roller smooth the path over his mangled body to the oilman, the grocer, and the stores. The profits on the sale of scheduled poisons are barely worth the paper on which they are registered, and I, for one, would gladly give up the gains of the past seven years to be freed from the responsibility of seven years to come.

Being called upon by law to qualify and register at a cost of mental toil and pecuniary sacrifice, we naturally ask with the Artful Dodger, "Where are our privileges?" The privilege of being hauled up at a coroner's inquest, and placed in the eye of the public in a semi-criminal position (although, if possessing the Major qualification, dismissed from jury service), are surely scant recompense for the onerous and responsible duties of our office.

And yet, forsooth, some of your correspondents affirm that "legislation in favour of the druggist is not to be looked for or wished for." Why meddle with the Pharmacy Act at all then?

We have good reason to know how much the public care for us, so long as the stores are available, and yet I believe, judging from the language quoted, they care more for us than we do for one another. There are two difficulties ahead of us; one is the dispensing of medical men, and the other the patent medicine question, and we cannot dispose of the former until our hands are clean of the latter, and I believe our motto will have to be "the whole hog or none."

We must either discountenance, and if needs be, give up the sale of nostrums, or apply for powers to be the only vendors of them preparatory to a thorough investigation of their detriment to the public health, and no man who knows the end of inferior drugs, however averse he may be to protection, will deny that it would be a great boon to the public, if examined and registered druggists were the only dealers in medicine in any form, rural districts having persons licensed for their sale. Let our leaders, when a fitting opportunity occurs, ask for and claim this as a right, and then they will kill more than two birds with one stone.

Scarborough. Alfred Jones.

The Relations of Pharmacy and Medicine.

Sir,—I certainly agree with some of your correspondents that an endeavour to promote a reciprocal feeling between the medical profession and ourselves is far more desirable and "compatible" than wailing over the dying embers of the fading profits on proprietary articles. But it would be suicidal and unwise to forget in our zeal for employment, that more work means more assistance, and this, of course, implies more expenditure, to say nothing of the too frequently accompanying disagreeables. Ergo, I cannot see with your respected correspondent, B.S.J., that 1*s.* 2*d.* is an "ample" charge for dispensing a bottle of medicine containing thirty-two doses, and from a Latin prescription. Perhaps B. S. J. does not have any assistants to pay and board. If he has, methinks he has unintentionally forgotten such minor (?) matters as rent, taxes, time, bottles, corks, labels, paper and sealing wax; or it may be that in his sphere of labour (I take my own lot to be little short of slavery) errand boys or porters are so plentiful and obliging that they will run hither and thither all day long for the honour of bearing the conventional "basket."

That B. S. J. is correct in his idea about the extravagant charges made by some houses, I think few will deny; but there is a wide difference between exorbitant and remunerative charges. Let us by all means charge reasonably and fairly for our work; but on no account let us forget that time, skilled labour, education and responsibility, have also a just claim for reward.

Epsilon.

London International Medical and Sanitary Exhibition.

Sir,—We have much pleasure in announcing that arrangements have been completed for holding the International Medical and Sanitary Exhibition initiated by the Executive Committee of the Parkes Museum of Hygiene.

This exhibition will be held on the occasion of the meeting of the International Medical Congress of 1881, and will be open from July 16 to August 13.

The exhibition will comprise everything that is of service for the prevention, detection, cure and alleviation of disease, and will be divided into three sections.

Medical Section:—Surgical instruments and apparatus; appliances of the ward and sickroom; drugs, disinfectants, medical dietetic articles and mineral waters; electrical instruments and appliances; microscopes and optical apparatus; apparatus of other kinds used in the investigation of disease; appliances used for the treatment of sick and wounded during war—street ambulances, etc.; appliances used in teaching medicine; books, diagrams, models, etc.

Sanitary Section:—Domestic and hospital architecture; planning, construction, decorative materials; ventilation, lighting, and warming; water closets, sinks, baths, etc.; sewerage and drainage; water supply and filtration; health resorts and sanitaria; books, diagrams, models, etc.

Miscellaneous Section:—Applications of hygienic principles to food and dietaries, clothing, etc.; school furniture and other articles more or less connected with the general purpose of the exhibition.

The Exhibition will be held at South Kensington, space having been granted for it by the Royal Commissioners for the Exhibition of 1851. Applications for space from Great Britain and Ireland and the Continent of Europe must be made not later than Thursday, March 31, 1881; but applications from India, the Colonies and America will be received up to April 16, 1881.

Certificates of merit will be awarded to exhibitors. New inventions exhibited will be protected under a certificate from the Board of Trade. Exhibitors will be charged for space, and it is hoped that the exhibition, in this and other ways, will be made to pay its expenses. An undertaking of this magnitude, however, is not without risk, and although upwards of £800 has been subscribed as a guarantee fund, we hope the Committee will receive such additional contributions as will enable them to thoroughly carry out their work. A list of the guarantors will be published in the catalogue.

Forms of applications for space, and all particulars, may be had of the Secretary of the Exhibition Committee, Parkes Museum of Hygiene, University College, London. Office hours 10 to 4, Saturday, 10 to 2.

John Eric Erichsen, F.R.S.,
(President of the Royal College of Surgeons),
Chairman of the Exhibition Committee.
Mark H. Judge,
(Curator of the Parkes Museum of Hygiene),
Secretary of the Exhibition Committee.

Parkes Museum of Hygiene,
University College, Gower Street, February, 22, 188

Spiritus Ammoniæ Aromaticus.

Sir,—Referring to a recent correspondence in the Journal concerning the production of sp. ammon. arom. by direct mixture without distillation, I have succeeded in adding the S.V.R., etc., to the solution of ammon. sq. carb. and liq. ammon., without precipitating the ammonia, by placing the solution in a narrow mouthed jar in a water-bath at a temperature of from 100 to 110° and adding the spirit gradually with brisk stirring, and found that, at that temperature, very little of the ammonia and practically none of the S.V.R. was volatilized.

The spirit as thus made is scarcely to be distinguished from the B.P. article prepared by distillation and will possess the decided advantage of being always alike.

The jar of solution of ammonia should be allowed to stand in the water-bath for about five minutes before commencing to add the spirit, in which the flavouring ingredients should be dissolved.

Clare, Suffolk. Thos. Stokoe.

Alumen, B.P.

Sir,—A short time ago I had occasion to examine a parcel of what was sent as pulv. alum. sulph., B.P. (to make sure that it was ammonia alum), but in the course of examination it was found that potash alum had been sent instead of the B.P. article. This was placed aside, and a second quantity ordered from another well-known London firm, which on being subjected to examination also turned out to be potash alum. This being the case, inquiry was made from the source of the latest supply, and the information forwarded in reply was of such a character that I think it is only right the matter should be brought before the notice of pharmacists in general. Not having the reply at hand I am unable to give an extract from it, but the gentleman who wrote it is a chemist of the highest standing, and I am confident he would not have made the assertion had he not good grounds for so doing. As far as my recollections go he states, "that they had only one small jar of alumen, B.P., in crystals on their premises, and that it was not procurable in London; owing to the enormous consumption of potash alum in the arts and manufactures ammonia alum had become obsolete." No doubt the consumption of potash alum in the various dye works alone is enormous, and the demand for ammonia alum insignificant in comparison to that for potash alum, so I presume the manufacturers have discontinued making the official preparation, the resumption of which can only be secured by pharmacists insisting on having (at least for dispensing puposes) supplied to them the B.P. preparation. Therapeutically considered, potash alum may be quite as efficacious and good as the ammonia alum, but that does not exonerate chemists from substituting a non-official for an official preparation, and as long as the ammonia alum remains the only official one, it alone should be used when prescribed by medical men, substitution in this case being the ally of adulteration.

During the week I obtained from various establishments samples of their B.P. alum; on analysis every one was found to be potash alum. I think that there is no need to go further to prove how completely ammonia alum has become deleted from the list of official preparations; therefore, I trust this notice will be in some measure the means of creating a demand for the B.P. preparation, which alone should occupy the place in the dispensing department, if chemists were a little more particular in the examination of their chemicals as well as drugs. I have no doubt this deletion would never have taken place, but I am afraid there is too much reliance placed in what is sent from wholesale houses, and I think it ought to be the incumbent duty of every chemist to see that his chemicals answer the B.P. test before being used for dispensing purposes.

31, *London Street, Norwich.* W. WATSON WILL.

SALE OF COUGH LOZENGES.

Sir,—We have had a correspondence with the Commissioners of Inland Revenue, with reference to the sale of "cough lozenges," and we beg to submit it to you for publication in the Journal, as it may be interesting, and settle a much disputed question.

J. B. SHILLCOCK and SON.

"Bromley, Kent, *January* 22, 1881.

"To the Commissioners of Stamps, Somerset House.

"Gentlemen,—We have been advised by the Secretary of the Pharmaceutical Society to submit to you a sample of cough lozenges and label, to ask if they can be sold without being subjected to the stamp duty; they are sold in bulk and in boxes at 6*d.* and 1*s.* each; we are anxious not to do anything contrary to the Act. An early reply will oblige

"Yours obediently,
"J. B. SHILLOCK and SON,
"*Pharmaceutical Chemists.*"

"Inland Revenue, Somerset House, W.C.,
"*January* 31, 1881.

"Gentlemen,—The Board of Inland Revenue having had before them your letter of the 22nd inst., have directed me to acquaint you that 'Shillcock's cough lozenges' are liable to stamp duty.

"I am, gentlemen,
"Your obedient servant,
"F. L. ROBINSON."

"To the Secretary, Inland Revenue, Somerset House,
"*February* 1, 1881.

"Sir,—We have the honour to acknowledge the receipt of your letter 'R 590 stamps,' with reference to our application of the 22nd ult., respecting the liability of our cough lozenges to the stamp duty. What we wanted to know, was, whether they could be sold in boxes and bulk without being stamped with a patent medicine stamp; the boxes we will stamp, but what we want especially to know, is, may they be retailed in large or small quantities, stamped as they are, viz., 'Shillcock's cough lozenges?' if not, could they be sold retail, stamped 'cough lozenges, Shillcock, Bromley;' or must they be stamped simply 'cough lozenges' to be exempt? We are sorry to be obliged to trouble you further, but it is important for us to know what we can and what we cannot do. The favour of an early reply will oblige

"Your obedient servants,
"J. B. SHILLCOCK and SON.

"P.S.—We may mention that no descriptive bill is enclosed with the boxes."

"Inland Revenue, Somerset House,
"*February* 7, 1881.

"Gentlemen,—With reference to your letter of the 1st inst., I am directed by the Board of Inland Revenue to acquaint you that the lozenges therein mentioned are rendered liable to stamp duty by their being described as 'Shillcock's cough lozenges.' I enclose for your information and guidance extracts from the Acts of Parliament imposing and regulating the duty on medicines.

"I am, gentlemen,
"Your obedient servant,
"F. L. ROBINSON."

"To the Commissioners of Inland Revenue, Somerset House,
"*February* 9, 1881.

"Gentlemen,—We have the honour to acknowledge the receipt of your letter of the 7th inst., 'R 802 stamps,' in answer to ours of the 1st inst.; informing us that the lozenges mentioned are rendered liable to stamp duty by their being described as 'Shillcock's cough lozenges.' That conclusively decides the first of our questions; but the others are not noticed, viz., could they be sold retail stamped 'cough lozenges, Shillcock, Bromley?' or must they be stamped simply 'cough lozenges' to be exempt? We regret the necessity of again trespassing upon you, but the questions are so critical, that it is of the utmost importance that they should be thoroughly defined, in order to protect the trade and prevent infringements of the Act. We shall be glad to be informed upon the last two questions distinctly. We do not wish to trouble you further as to putting them up in boxes, because in future we shall not sell any without a stamp; but what we want to know is, whether we are excluded from selling them retail, under all the descriptions on the lozenges above enumerated. We enclose a cough lozenge described as such; can that be legally sold by retail? if not, we venture to say, there is scarcely a chemist in the kingdom who has not for years been subjecting himself to a penalty, because such lozenges are universally sold by retail. This correspondence most likely will be circulated in the *Pharmaceutical Journal*, as it applies to all who retail such cough lozenges, and it is therefore desirable that the question should be definitely and authoritatively settled. The favour of a reply at your earliest convenience will oblige.

"We are, gentlemen,
"Your obedient servants,
"J. B. SHILLCOCK and SON."

"Inland Revenue, Somerset House,
"*February* 15, 1881.

"Gentlemen,—In reply to your further letter of the 9th inst., respecting the liability to stamp duty of the cough lozenges referred to, I have to acquaint you that the words 'cough lozenges,' or 'cough lozenges, Shillcock, Bromley,' if not accompanied by any recommendation, would not be regarded by the Board as requiring the use of stamps.

"I am, gentlemen,
"Your obedient servant,
"FREDK. B. GARNETT."

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Henderson, Blaine, Nunhouse, Gibb, Cathcart, Burnham, Nichols, Owles, Radford, Sarniensis, Chemicus, Islander, Epsilon, *Pharmacist*, Sigma, Robertus, Quæsitor, H. C. H.

JAFFERABÁD ALOES.*

BY E. M. HOLMES, F.L.S.

About a year ago a specimen of a drug known in the Bombay market as Jafferabad aloes, was presented to the Museum of the Society by Dr. Dymock. In a letter received from him in July last, he states concerning it:—

> "I shall try and send some small plants of the Jafferabad aloe in a tin box. I want to have it compared with Dr. Balfour's aloe from Socotra, as the character of the drug yielded by it is similar to that of Socotrine aloes in not giving a red colour with nitric acid. Jafferabad belongs to the African family who were admirals to the Mogul, and they may have introduced the plant. Difference of climate might account for the difference of the two drugs."

The difference here alluded to will be best understood by those who are familiar with the appearance of Socotrine aloes, if the appearance of the Jafferabad drug be here briefly described.

The specimen received from Dr. Dymock is a circular flattened cake, 7½ inches in diameter, and ¾ of an inch in thickness. Externally it is of a black colour, and having a lustre not unlike that of pitch, to which at first sight the aloes bears some resemblance. The fracture is black and glassy, and very slightly porous, as if heat had been used in its preparation. The powder, when two pieces are rubbed together, is of a pale brown hue. When the glassy broken surface is breathed on, it becomes, after a time, of a brownish hue, and under the lens looks like aventurine, apparently owing to an immense number of minute cracks, causing the partial separation of minute translucent laminæ. The odour is a characteristic one, having some resemblance to that of Socotrine, but less fragrant, as if it contained a trace of Barbadoes aloes and sandal wood. The taste of the decoction is not so pleasant as that of the Socotrine aloes; but the amount of matter insoluble in water seems to be equal in amount to that of the Socotrine aloes.

When submitted to the action of nitric and sulphuric acids no change takes place with the first named reagent, but when the vapour of nitric acid is passed over the mixture of Jafferabad aloes and oil of vitriol a slight greenish tinge is developed. This hue is, however, quite different from the distinct blue colour developed by Natal aloes when similarly treated.

Dr. Dymock has cultivated the Jafferabad aloes plant in his garden, and it flowered at the end of last September. A few of the blossoms which he sent me have been submitted to Mr. J. G. Baker, of Kew, who has recently paid considerable attention to this group of plants, and he considers, so far as it is possible to determine from the flowers alone, that they belong to *Aloe Abyssinica*. Dr. Dymock collected some of the aloes from the Jafferabad plant in his garden, and found it to give the same reaction as Socotrine aloes, and as he obtained the same results as with the aloes imported from Jafferabad there can be little doubt that the species of aloe cultivated in his garden is the source of the drug bearing that name.

A specimen of Mocha aloes in irregular masses, which was obtained in the London drug market last year, gives exactly the same faint greenish colour when mixed with strong sulphuric acid and the vapour of nitric acid is blown over it. The powder is more of a reddish-brown hue, like that of catechu, and the odour slightly different. The surface has the pitch-like appearance of the Jafferabad aloes, but it seems to have been prepared with less care, which might account for the slight difference in odour, and as according to Dr. Pereira, 'Materia Medica,' vol. 1, p. 192 (4th ed.), it is imported from Muscat, lower down the Persian Gulf, it seems probable that it may be yielded by the same species of aloes. I hope to receive specimens of the Jafferabad aloe from Dr. Dymock shortly, when the identity of the species can doubtless be set at rest.

My excuse for bringing forward incomplete information at the present time must be that it seemed desirable, while the drugs from Socotra, kindly presented by Professor Balfour, were under discussion, to mention an aloes which seemed so nearly related to the Socotrine variety.

[*The discussion on this paper is printed at p.* 746.]

NOTE ON SOME ARTIFICIALLY COLOURED ROSE LEAVES.*

BY T. EDWARD GREENISH.

In the autumn of last year my attention was directed to the very brilliant colour of a sample of rose leaves which had just been received in the ordinary course of business, and the colour of the infusion made from them confirmed my suspicions that some method had been adopted for intensifying the natural colour of the leaves, or that they had been artificially coloured. The subject was put aside for a more convenient opportunity for investigation, when an observation which occurred in "The Month," that some rose leaves had appeared in the market artificially coloured with rosaniline, again directed my attention to the sample, and I subjected it to an examination, with the view of ascertaining what substance had been used to intensify the natural colour, or if it had been coloured artificially.

The detection of rosaniline in red wine has engaged the attention of many scientific men on the Continent, where that subject has assumed great importance, and various methods have been devised for detecting its presence. A very good one, which in its details possesses some interest, is given in the *Journal of the Berlin Chemical Society*, 13, 2263. The process is mainly grounded on the fixing of the colours by means of wool.

To carry out the process, a tincture of the petals in proof spirit was prepared of a strength of about 1 in 8. The deep crimson colour of this tincture contrasted strongly with that made from natural rose petals, which yielded but a slight colour.

Two ounces of this tincture were made alkaline by ammonia, a few threads of fine white wool were added and the whole boiled until the spirit and ammonia were dissipated. The wool was taken out, washed and heated gently in a test tube with a small quantity of a 10 per cent. solution of caustic potash; the resulting brown solution was cooled, and diluted with half its volume of alcohol. A quantity of ether equal in volume to the mixture was added and the whole well shaken. The ether rose to the surface, was removed, and, on the addition of acetic acid, the pink colour of acetate of rosaniline was at once produced and instantly discharged by the action of nascent hydrogen.

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* Read at the Evening Meeting of the Pharmaceutical Society, March 2, 1881.

* Read at the Evening Meeting of the Pharmaceutical Society, March 2, 1881.

A variation in the above process consists in evaporating the spirit from the tincture, rendering it alkaline with ammonia when cool, and shaking with ether; on saturating wool with the ethereal solution and allowing it to dry, a pink colour more or less intense is produced.

To test the presence of rosaniline in the infusion made according to the Pharmacopœia, 20 ounces were treated by the first named process, and gave ample evidence of the presence of the dye.

Natural undyed rose petals treated by either process afford no such reactions.

Benzole and chloroform are without action on the petals, either natural or dyed, but the latter yield their colour to amylic alcohol.

The first named method, originally applied to red wine, seems most satisfactory with a proof-spirit tincture of the roses in question, and the presence of rosaniline in the petals of this sample is placed beyond a doubt. Its occurrence cannot be considered accidental, and it is difficult to avoid the conclusion that the coloration was effected with a fraudulent intention. The arsenic usually present in rosaniline, although minute and perhaps varying in quantity, renders it incumbent on the pharmacist to reject such a sample as the one which was the subject of this investigation.

[*The discussion on this paper is printed at p.* 748.]

EXTRACTION OF COLCHICIA FROM THE SEED.*

BY LEMUEL I. MORRIS.

The powdering or grinding of colchicum seed has always been a source of much labour and annoyance to the pharmacist, and to overcome the difficulty, the purchasing of seed already ground has often been resorted to, a practice which does not commend itself to the profession, for the reasons that the powder is more expensive and can be very easily adulterated.

Dannenberg (*Phar. Zeit.*, October 30, 1880) has recently, in answer to an article by Dr. Molz (*Deutsch. Amer. Phar. Zeit.*), shown that he obtained results contradicting the conclusions of the latter, who stated that colchicum seed, when more than a year old, was nearly worthless, and that colchicia could be extracted only by a strong alcoholic or acidulated menstruum, while he (Dannenberg) obtained the alkaloid reaction after boiling the seed, which was not less than five years old, for only a few moments in pure water. These different statements have led to some discussions on the subject and a desire to further investigate the matter.

To Dr. Hübler (*Arch. der Pharm.*, 1865), it seems, belongs the credit of making the first statement that colchicia could be wholly extracted without powdering the seeds, by digesting them for some time in a hot 90 per cent. alcoholic menstruum. When afterwards powdered, and treated like the whole seed, it was found that the alkaloid had been entirely removed, and that very little if any soluble matter was extracted by the menstruum from such powdered seed.

Mr. Rosenwasser, in 1877 (*Amer. Jour. Phar.*), after some experiments, found that only one-third of the colchicia was removed by macerating the whole seed, in officinal menstrua, for some time. Had he employed a hot menstruum, he would have obtained different results.

Some of the whole seeds were obtained from a cabinet specimen of Professor Maisch's, which has been in his possession for over ten years. Of this sample, 50 grams were macerated in cold dilute alcohol (sp. gr. ·941) for three days; a portion of the tincture was then evaporated to dryness, the residue treated with alcohol, again evaporated to dryness, treated with water, and filtered. The filtered liquid was tested with Mayer's test, after the addition of a few drops of nitric acid, when a yellow precipitate was immediately produced. The seeds were then well drained, and treated again with a fresh portion of the menstruum, when an additional amount of alkaloid was obtained. On treating them in a like manner for the third time, no more alkaloid was obtained.

They were then digested in dilute alcohol, with a moderate heat, for three hours, and on applying the usual tests a considerable amount of colchicia was found to be present. After well draining, they were again subjected to the action of heat and dilute alcohol, but no alkaloid was found present on testing the filtered liquid.

The seeds were now well drained, powdered and macerated in cold dilute alcohol for three days, when on testing a portion of the menstruum none of the alkaloid was found present, and the result was not altered by digesting in the same menstruum, with a moderate heat, for three hours, although a considerable amount of soluble matter was extracted. The tincture obtained from the cold maceration was evaporated to the consistence of an extract, and weighed 4·806 grams = 9·61 per cent. It was treated with alcohol until all the soluble matter was dissolved, the alcoholic solution was evaporated to dryness, the residue treated with water, the aqueous solution filtered, and the alkaloid precipitated by Mayer's test; the precipitate, carefully washed and dried, weighed ·093 gram = ·18 per cent.

The decoction obtained from digesting the seeds with hot dilute alcohol was then evaporated to the consistence of an extract, and weighed 2·0006 grams = 4·01 per cent. The extract was treated in a similar manner as the preceding, and the colchicia precipitate was found to weigh ·161 gram = 0·32 per cent., showing that nearly two-thirds of the active principle was extracted by the hot, and only one-third by the cold menstruum, the latter being the proportion also obtained by Mr. Rosenwasser. In all cases, the extracts and precipitates containing the alkaloid gave the characteristic colchicia reaction with sulphuric acid and potassium nitrate.

Some of the whole seeds were then boiled in pure water; on testing the filtered liquid, colchicia was found present. The seeds were then powdered, again boiled in water, when, on testing the filtered liquid, the alkaloid reaction was not obtained, showing that the active principle was entirely dissolved from the whole seed by boiling water.

Statements have been advanced at various times to the effect that colchicia was precipitated along with the sediment that deposits from liquid colchicum preparations. The precipitated deposit was obtained from ten gallons of fluid extract of the seed, which had stood for six months. This sediment was carefully dried, washed with water containing about one-fifth its volume of alcohol until the washings passed tasteless, and then treated in the following manner: One half of the washed residue was boiled with water acidulated with acetic acid, filtered, evaporated to dryness, treated with alcohol and water in the usual way, when, on adding the alkaloid test not a trace of colchicia could be detected.

The balance of the residue was boiled in strong alcohol, filtered, the filtrate treated in the usual way; again no traces of colchicia could be observed.

The results of the different experiments lead to the following conclusions:—1. That it is a waste of time and useless operation to powder colchicum seed, as the active principle can be wholly extracted by digesting them in the ordinary menstrua for a few hours, at a temperature of about 80° C. 2. That alcohol stronger than dilute [illegible] gr. ·941) is unnecessary for any of the liquid preparations [illegible] colchicum seed, since the whole of the alkaloid can be extracted with that menstruum, or even with water. 3. That the active principle is so soluble in the menstrua directed in the different U. S. officinal preparations, that it is impossible for it to be precipitated from such solutions, either as colchicia or in the modified condition of colchicëin.

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* Read before the Philadelphia College of Pharmacy, December 21, 1880. Reprinted from the *American Journal of Pharmacy*, January, 1881.

The Pharmaceutical Journal.

SATURDAY, MARCH 5, 1881.

THE "LANCET" ON COUNTER PRESCRIBING.

The probability that the subject of medical reform will be referred to a Royal Commission for inquiry offers some prospect that attention may be directed to certain points affecting at once the interests of the public, of medical practitioners, and of pharmacists, and that measures may be suggested for removing some of those grounds for complaint on one side or the other which have long demonstrated the necessity of better regulation of the various functions to be performed in connection with the healing art.

That the Medical Bill, introduced by Mr. Hardcastle, could not have proved suitable for effecting such reform as is necessary, either in regard to the constitution of the General Medical Council, the improvement of medical education or the prevention of improper forms of medical practice, is tolerably evident from the very general expression of disapproval which it has called forth from most of the medical journals, as well as from the writer of the article in the *Times* to which we referred a fortnight since. The correspondence that has appeared in reference to the Bill, and the comments of the *British Medical Journal* upon the letters of "A Registered Medical Practitioner," further show the absence of unanimity amongst medical men as to what is desirable from their point of view.

As regards the penal clause of Mr. Hardcastle's Bill, the *Medical Times and Gazette* concurs with the writer of the article in the *Times* in thinking that it will easily be seen that a Bill containing such a clause is not very likely to become an Act of Parliament; but the *Lancet* has taken its appearance in Parliament as an inducement to return to that mode of dealing with the subject of "counter practice" which we have on former occasions felt bound to declare unworthy of the position that journal holds and of the influence it exercises in virtue of its traditional repute. In an article, entitled "The Wrongs of Counter Practice," commencing with a disclaimer of any wish to quarrel with druggists, it is asserted that they cannot be acquitted by the *Lancet* of inflicting grievous wrong upon the medical profession and the public. Assuming to speak on behalf of the medical profession, the *Lancet* makes no apology for placing their grievance foremost, because that is considered to be the greatest, inasmuch as the legitimate fees of the practitioner are intercepted by the druggist's practice of supplying medicines for coughs, indigestion, bilious attacks, sore throats, etc.

Counter practice is denounced by the *Lancet* as a system of irregular privateering, mainly because it prevents medical men from getting fees, and for this reason the druggist who responds to the request of the public is characterized as a quack not one whit less offensive to the public interests than the unqualified practitioner who holds himself out as a doctor.

It would appear that, from the *Lancet's* point of view, all mankind are to be divided into two classes, viz., legally qualified practitioners and quacks; but among the latter it is only druggists that are the object of its condemnation, although for consistency's sake it might have ventured to be equally severe on those who doctor themselves or are content to make use of patent medicines. Certainly we have here evidence enough of the spirit of trades unionism, which the *Times* speaks of as being scarcely veiled in the Medical Bill of Mr. Hardcastle. It is true that detriment to the public is urged by the *Lancet* as another reason for its condemnation of "counter practice" by druggists; but it is urged only as a secondary consideration, and the statements made as to the injury inflicted upon the public are of such a nature as would scarcely bear examination. The real grievance is that "counter practice" by the druggist enables a sick person "to do without the doctor."

This is not, we venture to think, the spirit in which a medical journal should deal with the subject of "counter practice." Even if that practice be regarded as an evil in all its relations, we cannot hope that its discontinuance will be promoted by such disingenuous attacks upon druggists as it has become the habit of the *Lancet* to indulge in. Our readers will give us credit for having always sought to maintain that counter practice is undesirable, both as regards the real interests of pharmacy and the establishment of good mutual relations between druggists the medical profession. But we cannot shut our eyes to the fact that other circumstances have to be taken into account before druggists can be justly condemned for "counter practice" after the fashion of the *Lancet*. There is no ground for the opinion that medical men alone possess a prescriptive and exclusive right to administer medicine; nor is it true, as the *Lancet* states, that the knowledge of drugs and their uses possessed by druggists is picked up in the exercise of their business as dispensers. We disclaim altogether any attempt to justify or uphold the treatment of disease by druggists, and we venture to assert that such practice on their part is very rarely, if ever, attempted. But it by no means follows that the druggist, possessing by education a special knowledge of drugs and their uses, which is free to anyone to acquire, should be prohibited from supplying remedies for simple ailments when requested, or that he should be characterized as a quack for rendering such service and making his knowledge useful.

There are, no doubt, instances in which ailments, apparently simple, may be the initial stages of grave disease, but that is no valid reason why the suffering individual should be precluded from asking the druggist to supply him with a remedy for diarrhœa, for a sore throat or a cold. It would be monstrous to compel persons under such circumstances to consult a medical man and pay him a fee, when they believe they can obtain relief for a few pence from the druggist. And, moreover, as regards such cases as those referred to by the *Lancet*, it must be remembered that persons applying to druggists for medicine are often advised to seek the aid of a medical man.

Another point referred to by the *Lancet* is the practice of repeating physicians' prescriptions. This is described as a "form of counter practice really too bad to characterize," and it is asserted that the system of copying and entering prescriptions has little purpose except for this subsequent use and for even altering the prescriptions so as to make them answer for ailments other than those for which they were prescribed. We cannot but designate these statements as particularly disingenuous and unfounded. The *Lancet* ought to know that the popular opinion in this country is that when a prescription is obtained from a medical man to whom a fee is paid the prescription becomes the property of the patient, and that it is a common belief he has the right to do what he chooses with it, either in the way of repetition of its use for himself or by recommending it to a friend. We do not mean to say that such a proceeding is always wise, or that it is in general desirable; but however that may be, it is no business of the dispensing druggist to step in and enforce observance of a rule contrary to public opinion. However desirable limitation of the use of prescriptions may be, it is the province of the prescriber, and not that of the dispenser, to impose that limitation. If it be true, as the *Lancet* asserts, that "to perpetuate a prescription is to incur a risk of injuring the patient, and in any case to wrong the practitioner," the removal of the risk and of the wrong is wholly in the hands of the prescriber.

With strange inconsistency, as regards the interests of the public, and even those of medical men, it is contended by the *Lancet* that the supply of patent medicines is unobjectionable as compared with the supply of simple remedies by the druggist, because they are supplied as sealed packages, and though they may be misused by the public it would seem that the consequences are not to be deemed of much account. This argument is far from being in accord with the opinions of medical men as to the unrestricted sale of patent medicines containing potent drugs, and we confess being utterly surprised to find such a doctrine put forward in the *Lancet*.

The suppression of counter practice, however, is the idea that has taken possession of our contemporary, and it is declared that no measure of medical reform will be satisfactory which does not provide for this. Though the *Lancet* has no wish to quarrel with the fraternity of dispensers, that is the *sine quâ non*, and the Pharmaceutical Society is called upon to deal with this question before it comes under the consideration of the Legislature. A request so reasonable and urgent, says the *Lancet*, must certainly be held to call for compliance.

By a sort of coincidence we may point out that this subject has been dealt with by the Council of the Pharmaceutical Society at its last meeting, and for information as to the views of druggists we would refer our contemporary to the report of what took place when Mr. RADLEY moved his resolution in reference to the penal clause of Mr. HARDCASTLE's Bill. We reciprocate the desire of the *Lancet* that there should be no quarrel between dispensing druggists and the medical profession, but at the same time we venture to suggest that if such an undesirable contingency is to be avoided the question of "counter practice" must be dealt with in a manner very different from that proposed by the *Lancet*, and conjointly with the equally important question of medical dispensing.

THE MEDICAL REGISTER.

WE are indebted to the courtesy of Mr. MILLER, the Registrar of the General Medical Council, for an early copy of this year's 'Medical Register,' which has on this occasion been brought out much earlier than heretofore, and presents also some noteworthy improvements upon previous editions. Besides improvement of the typographical arrangement we understand that the whole work has been subjected to a most careful and laborious revision for the purpose of securing as far as possible accuracy of entries. The several Medical Acts up to the present date are arranged and indexed at the beginning of the volume, and on page 68 there is a table showing the exact numbers of persons registered in the local registers for England, Scotland and Ireland, pursuant to the 25th secsection of the Medical Act. From this it appears that the total number of persons registered in the three countries from the beginning of registration, in 1858, up to the present time (January 1, 1881) is 35,367, of whom there remain now on the Medical Register for this year 22,936. Of this latter number 69·4 per cent. belong to England, 15 per cent. to Scotland and 15·6 per cent. to Ireland.

BRAND'S ESSENCE OF BEEF.

A PROTRACTED litigation in reference to this preparation has been going on for some time between two firms who claimed to have the right to sell it, and an appeal from an order of Vice-Chancellor MALINS against Mr. H. W. BRAND for breach of an injunction to restrain him from selling this and other articles was heard before the Court of Appeal last Wednesday. The Master of the Rolls decided that Mr. BRAND, as the original inventor of the essence of beef, had a right to sell it as BRAND'S Essence of Beef, and that as his circulars and advertisements were not within the purview of the injunction the case must be decided in his favour. Lord Justice COTTON delivered judgment to the same effect and Lord Justice LUSH concurred in the decision.

ANNUAL DINNERS AND THE BENEVOLENT FUND.

THE chemists and druggists of Ipswich dined together on the 11th ult., and on the 26th they entertained the assistants and apprentices employed in the town at dinner. One pleasant feature of this meeting would very well bear imitation at similar social gatherings. Among the toasts given was that of "The Benevolent Fund of the Pharmaceutical Society," and after it had been duly honoured in the usual way, subscriptions to the Fund to the amount of thirty-one shillings were collected and have since been forwarded to the Secretary.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, March 2, 1881.

MR. THOMAS GREENISH, PRESIDENT,

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present—Messrs. Atkins, Bottle, Butt, Churchill, Frazer, Gostling, Hampson, Hills, Radley, Richardson, Robbins, Sandford, Savage, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

The PRESIDENT said he wished to say a word respecting the letter from the Pharmaceutical Society of Ireland, for which purpose he would move that the Council should go into committee.

The Council accordingly went into committee.

On resuming, it was resolved unanimously—

> "That this Council, having received a copy of suggestions for the amendment of the Irish Pharmacy Act, refer the same to the Pharmacy Act Amendment Committee for consideration and report."

The following, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Barnett, John Arthur.
Burrell, Thomas.
Chapman, William Henry.
Dodd, William Ralph.
Ekins, Charles.
Gifford, Richard Lord.
Haden, Walter Edward.
Selleck, William Robert.
Wimshurst, Frederick.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Barnett, John Arthur	Salisbury.
Chapman, William Henry	Birmingham.
Haden, Walter Edward	Lichfield.
Selleck, William Robert	London.
Wimshurst, Frederick	Brenchley.

Chemists and Druggists.

The following registered chemists and druggists, who were in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Heald, Alfred John	Burnham, Bucks.
Trinder, Edwin	Solihull.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Forgue, William	Falkirk.
Hardcastle, Stephen Barnabas	Brighton.
Kemp, Harry	Manchester.
Martin, Anson Edwin	Birmingham.
Newman, Alfred Pointon	Crewe.
Parker, Thomas	Preston.
Place, Thomas	York.
Rutter, John	London.
Smith, William	East Dereham.
Tatam, Samuel Blackmore C.	Plymouth.

Modified.

Wilkinson, Robert	Penge.

ASSOCIATES.

The following having passed the Minor examination, and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Ashton, Henry	Lynn.
Blamey, Edward Parr	Hayle.
Bowker, Ellis	Radcliffe.
Bowman, George Fell	London.
Cracknell, Herbert	London.
Dickinson, John George	Lancaster.
Dixon, Walter Henry	Aberdare.
Grant, Thomas Mackay	Edinburgh.
Griffiths, John Samuel	Newnham.
Groves, Richard Henry	Blandford.
Heading, Herbert Henry	Ely.
Hodgson, Alfred	York.
Lewis, Thomas	Newport, Mon.
McGlashan, James	Edinburgh.
Meadowcroft, James	Bury.
Merrell, Arthur James	London.
Millhouse, Henry How	Sleaford.
Ninnis, Thomas Martin	Truro.
Pemberton, Joseph	Battersea.
Perkins, Thomas Frampton	Clifton.
Rowland, Edward Edisbury	Liverpool.
Richardson, George	Lancaster.
Sheffield, Arthur John	Beverley.
Skinner, Robert	Liverpool.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Benest, Herbert William	Jersey.
Broadbent, John Beaumont	Honley.
Briggs, George	Leeds.
Castle, John William	Durham.
Evans, William	Cardigan.
Foulston, George Robert	Hull.
Gantlett, Henry	Wolverhampton.
Hart, Frank	Bolton.
Langley, Frank C.	Ashford.
Marshall, Sam	Hyde.
Millhouse, Edward	Grantham.
Sharples, Edward	Blackburn.
Thomas, Benjamin	New Inn.
Thomas, Edward	Garstang.
Watson, Albert James	London.
Westmoreland, William Henry	Salisbury.
Whitwell, Alfred	York.
Wilcock, John	Lancaster.
Woodhouse, Leonard Arthur	York.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

REPORTS OF COMMITTEES.

FINANCE.

The report of this Committee was received and adopted, and sundry accounts were ordered to be paid.

Mr. SYMES asked how many Calendars and Registers were sold during the year.

The SECRETARY said very few, except about 1200 copies of the Register, which were taken by the Government.

HOUSE.

This Committee had taken into consideration the painting of the premises, and recommended that the outside be washed and painted with three coats, and that the window frames be polished or varnished. The Committee also suggested that in future the exterior of the building should receive one coat of paint every second year.

Mr. **Williams** said the Committee could, of course, make a recommendation such as the above, but it must really lie with future Councils to carry it out or not, as they might see fit.

Mr. **Sandford** said he would paint the wood work certainly every second year, but he did not like to see the walls always freshly painted.

Mr. **Hampson** supported the report of the Committee.

Mr. **Richardson** thought it would be well to call in an artist, to advise the Committee what colour should be used.

Mr. **Radley** referred to the question of wood pavement in Great Russell Street, and asked if this would not be a favourable opportunity to press the matter, as the paving was being renewed in Bloomsbury Square.

After some further conversation, the report and recommendations of the Committee were agreed to.

The **Secretary** said he had received a letter from the Phœnix Fire Office, stating that the two stoves recently put in the Laboratory would not prejudice the insurance policy.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£20 to a registered chemist and druggist, aged 58.

£20 to the widow of a late member, having two young children dependent upon her.

£15 to the widow of a chemist and druggist, having four children dependent upon her.

£10 to a registered chemist and druggist, aged 61.

£10 to the widow of a pharmaceutical member, who has had three previous grants.

£15 to the widow of a registered chemist and druggist, having five children dependent on her; also

£35 to be expended by the Secretary at his discretion, in order to secure the election of one of the children to the British Orphan Asylum.

£5 to one of the unsuccessful candidates at the late election of annuitants.

Several other cases were deferred for further information, and the Secretary stated that he had already eleven more cases, which would probably be brought before the Committee at its next meeting.

The Committee had considered the resolution passed at the last Council meeting, with regard to the memorial tablets, and had unanimously agreed to the following recommendations:—

"1. That all legacies be inscribed on the tablet."

"2. That the names of donors of twenty guineas and upwards in one sum be also inscribed thereon."

"3. That a donation of forty guineas and upwards made by a firm shall entitle the name of the firm or co-partnership to be also inscribed thereon."

"4. That all subsequent donations in excess of the minimum be added to the original amount, and also inscribed thereon."

Mr. **Frazer** said he did not approve of the resolutions with regard to the tablets; in fact, he did not approve of the tablets at all, but he would not divide the Council upon the subject.

The report and recommendations were then agreed to.

The **Secretary** reported that he had that morning received a letter from Ipswich, with a remittance of 31*s*. for the Benevolent Fund, collected at a dinner given by the chemists of that town to their assistants and apprentices, on the 26th ult. He wished the assistants in other towns would follow the good example of their brethren in Ipswich.

Mr. **Churchill** mentioned that he knew a case in Birmingham in which the Council some time ago assisted a mother and daughter. That assistance enabled them to tide over a temporary difficulty. The daughter was now married, and they were in fairly comfortable circumstances.

LIBRARY, MUSEUM AND LABORATORY.

Librarian's Report.

The Librarian's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
January	Day	312	17	3	12
	Evening	109	11	0	5

Circulation of books.	Town.	Country.	Total.
January	162	145	307

Carriage paid . . £2 5*s*. 6*d*.

The undermentioned donations to the Library had been received:—

Bernardin (M.), Visite à l'Exposition de Vienne, 1874.
—— Classification de 160 Huiles et Graisses Végétales, 2e édition, 1874.
—— Classification de 40 Savons Végétaux, 1875.
—— L'Afrique Centrale, Etude sur ses Produits Commerciaux, 1877.
—— Classification de 350 Matières Tannantes, 1880.
Maison de Melle, Notice sur les Collections Scientifiques et sur le Musée Commercial-industriel, 1871.
From Mons. **Bernardin.**
Flückiger (F.A.), Notizen über das Canangaöl oder Ilang-Ilang-Oel, 1881. From the **Author.**
Pearson (J. J.), and W. H. Pollard, Observations on the plant Ophelia chirata, the true or Dukkanee chiretta, with remarks on the abuse of Phosphorus as a Remedial Agent, 1880.
From Messrs. **Symes** and Co., Simla.

The Committee recommended that the usual letter of thanks be sent to the respective donors.

The Committee also recommended the purchase of the undermentioned works for the Library:—

Attfield (J.), Chemistry, 9th ed., 1881. 2 copies.
Beverovicius (J.), Idea Medicinæ Veterum, 1637.
[Sendivogius (M.),] Novum Lumen Chymicum, cui Accessit Tractatus de Sulphure, 1644. Together.
Bouchardat, Manuel de Matière Médicale, de Thérapeutique et de Pharmacie, 2me éd., 1846.
Bromfield (W. A.), Flora Vectensis, 1856.
Cahours et Riche, Chimie des Demoiselles, [1868].
Crollii Basilica Chymica, etc., 1643.
Davy (H.), Elements of Agricultural Chemistry, new ed., by J. Shier, 1846.
Dover (T.), Ancient Physician's Legacy, 4th ed., 1733.
Turner (D.), Ancient Physician's Legacy Survey'd, 1733.
Fuller (T.), Pharmacopœia Domestica, 1723.
Pharmacopœia Guyensis, 1826.
Jahr (G. H. G.), Nouveau Manuel de Médicine Homœopathique, Matière Médicale, *etc.*, 7me éd., 1862. 4 tomes in 2.
Magendie, Formulary, 1828.
Morelli (P.) Methodus Præscribendi Formulas Remediorum, cum Adjuncto Materiæ Medicæ Systemate, 1659.
Nesbit (J. C.), On Agricultural Chemistry and Peruvian Guano, 3rd ed., [1856].
Reveil (O)., Formulaire, 2me éd., 1865.
Pharmacopœia Londinensis, editio altera, 1817.
Pharmacopœia Londinensis, by N. Culpeper, 1669.
Pharmacopœia of the Royal College of Physicians of London, translated by T. Healde, 9th ed., 1805.
Thomson (A. T.), Conspectus of Pharmacopœias, 9th ed., [1828].
Thomson (S.), Health Resorts of Britain, 1860.
Frank (B.), Die Krankheiten der Pflanzen, 1881. 2 parts.
Hallier (E.), Untersuchungen über Diatomeen insbesondere über ihre Bewegungen und ihre Vegetative Fortpflanzung, 1880.

Pierre (L.), Flore Forestière de la Cochinchine. 20 to 25 parts.

Van Tieghem (P.), Traité de Botanique. 8 parts.

Curator's Report.

The Curator's report had been received, and included the following particulars:—

Attendance.	Total.	Highest.	Lowest.	Average
Morning .	269	26	5	11
Evening .	73	7	1	3

The following donations to the Museum had been reported, and the Committee recommended that the usual letter of thanks be sent to the respective donors:—

Seeds of *Lucuma mammosum.*
From Mr. J. C. Sawer.

Seeds of *Ocotea Puchury minor.*
From Messrs Wright, Layman and Umney.

Specimens of Russian linseed.
From Mr J. Baynes, Junr.

Specimens of *Mikania Guaco* and Para Tonquin beans. From Messrs. Symes and Co.

Specimen of Barosma Camphor.
From Messrs. Herrings and Co.

Specimen of the Bark of *Pilocarpus Selloanus.*
From Mr. W. B. Cranwell.

Specimen of Opium prepared for Smoking.
From Mr. A. Bottle.

The following applications had been received:—

For loan of specimens to illustrate paper on 'Eclectic Remedies,' from Mr. R. H. Parker, to be read before the Students' Association.

From Mr. C. E. Stuart, for specimens of Quebracho Barks, genuine and false, and a specimen of the plant, to illustrate a paper to be read before the Chemists' Assistants' Association.

The Curator had been instructed to lend such specimens as were required.

An application had been received from the Leicester Chemists' Assistants' Association for additional specimens of materia medica.

The Committee had directed that specimens of those of which there were duplicates should be sent.

Letters of thanks for duplicate specimens had been received from the following:—

North British Branch.
Royal Botanical Gardens, Regent's Park.
Kew Museum.
Professor Bernardin.

The Committee recommended that the Curator be authorized to procure or purchase, with the sanction of the President, rare or unusual specimens of drugs which might be considered desirable for the Museum. Also that specimen microscopes for the use of the students be obtained, on approval, from Messrs. Baker, Collins and Swift, respectively. The Committee also recommended that an exhibition of pharmaceutical apparatus, etc., be held at the Annual Meeting in May.

The Professors had attended, and reported favourably of their respective classes.

The President said the Curator sometimes saw rare drugs in the City, which could be had at the time; but if not obtained then, might not come on the market again for many months. Sometimes he could obtain them without purchase, but at other times he required to lay out a small sum upon them, and the recommendation of the Committee was that he should be authorized to do so.

The report and recommendations were received and adopted.

The Annual Report.

The preparation of the annual report was referred to the Library, Museum and Laboratory Committee.

Pharmacy Act Amendment.

The President suggested that the Council should go into committee on this matter to consider some correspondence with the Privy Council. The Council might then decide as to the publication of it.

On resuming, the minutes of the Committee were read, including the following correspondence with the Privy Council, which had been referred to by the President:—

"Council Office,
"11 *February*, 1881.

"Sir,—I am directed by the Lord President of the Council to transmit to you the accompanying copy of a letter from Mr. Oldman, one of the Coroners for the County of Lincoln, containing a resolution of the Jury at an inquest held at the 'Brocklerby Ox,' on the body of a woman whose death had been accelerated by taking chloral hydrate, setting forth that some restrictions should be placed by the Legislature on the sale of that drug.

"I am to request that you will move the Pharmaceutical Society to favour his lordship with their remarks upon these communications.

"I am also to request that you will be so good as to inform his lordship whether the Society have carried out their intention, as expressed in your letter of 8th July last, of framing certain amendments to be embodied in a Bill restricting the sale of patent or proprietary medicines.

"I am, sir,
"Your obedient servant,
(Signed) 'C. L. Peel.

"The Secretary,
"Pharmaceutical Society,
"17, Bloomsbury Square."

"Gainsborough,
"*January* 29, 1881.

"Sir,—I have the honour herewith to forward for your information the depositions of witnesses taken at an inquest held by me at Broughton, in this county, on the 21st instant, on the body of Mary Ward, together with a copy of the inquisition as found by the inquest jury.

"I beg further to state that the jury unanimously agreed to the following:—

> "'That some restriction should be placed by the Legislature upon the sale of such a drug as chloral hydrate, which is becoming so commonly to be taken as a sedative by all classes of society, and the indiscriminate and unrestricted use of which is highly dangerous to health and often to life.'

And I was requested by them to bring the matter under your notice.

"I have the honour to be, sir,
"Your most obedient servant,
(Signed) "Thos. H. Oldman,
"*County Coroner.*

"To the Right Honorouble
"Sir W. Vernon Harcourt,
"H.M. Secretary of State."

"17, Bloomsbury Square,
"London, W.C.,
"*February* 16, 1881.

"C. L. Peel, Esq.,
"Privy Council Office, S.W.

"Sir,—I have the honour to acknowledge the due receipt of your letter of the 11th inst., enclosing a letter from Mr. Oldman, and to inform you that it will be laid before and considered by the Council at its next meeting, which will take place on the 2nd proximo.

"Meanwhile I may respectfully point your attention to the obvious error apparent on Mr. Oldham's letter and the verdict on which it is founded.

"By an Order in Council on the 13th December, 1877, confirming a resolution of the Council of this Society, 'chloral hydrate and its preparations' became deemed poisons in the second part of the Schedule A, and consequently chloral hydrate is subject to the restriction placed by the Legislature upon sales of poisons.

"I have further the honour to ask you to inform the Lord President that the Council of this Society have in the interval between their letter of the 8th July, 1880, and the present time, carried out their intention of passing certain amendments to be embodied in a Bill restricting the sale of patent or proprietary medicines containing poisons, and that those amendments appear by the prepared printed Bill, whereof four copies are herewith.

"The amendments of the Pharmacy Acts referred to in the last clause of letter of the 8th July, 1880, are likewise embodied in the enclosed Bill.

"The enclosed Bill is the result of long deliberation, and of efforts made by the Council of the Society to ascertain the general opinion of chemists and druggists on the matters under consideration, and was finally approved at the meeting of Council on the 2nd inst., when a Committee was appointed to transmit the same to his lordship, and was charged with all such further communications on the subject of it as his lordship should deem desirable.

"I am directed to assure his lordship that virtual unanimity on the subject of the enclosed Bill prevails in this Society and amongst chemists and druggists generally, and to express a trust that his lordship will approve all the provisions of the Bill, and will submit the same to the consideration of Parliament.

"I am further directed to assure his lordship that the Committee of the Council of this Society will attend his lordship's pleasure by way of deputation or by preparing papers of reasons or otherwise as he may suggest.

"I have the honour to be, sir,
"Your obedient servant,
(Signed) "Elias Bremridge,
"*Secretary.*"

Mr. Hampson moved:—

"That the discussion on the above be taken in committee."

Mr. Richardson seconded.

Mr. Frazer opposed the motion, but on being put to the vote, the motion was carried, and the Council accordingly went into committee.

On resuming, the report and recommendations of the Committee were received and adopted.

Pharmacy Act Amendment Bill.

The following letter from the Council of the Chemists and Druggists' Trade Association was read:—

"Chemists and Druggists' Trade Association
of Great Britain,
"23, Burlington Chambers,
"New Street, Birmingham,
"*February* 28, 1881.

"Secretary and Registrar,
"Pharmaceutical Society of Great Britain,
"17, Bloomsbury Square, London, W.C.

"Dear sir,—I beg to inform you that the annexed resolution was unanimously passed by the Executive at their meeting held on the 25th inst. I shall be much obliged if you will place the same before your Committee at their next meeting.

"I am, dear sir,
"Yours faithfully,
"W. F. Haydon,
"*Secretary.*

"Resolved:—'That this Executive having considered the provisions of the Bill to further regulate the sale of poisons and to alter and amend the Pharmacy Act, 1852, and the Acts amending the same, placed before them by the wish of the Pharmaceutical Council, agree to its clauses, and hereby express their desire of co-operating with the said Council, with a view of carrying the Bill into law.'

Communications were also read from Dover, approving of the Bill, and from fourteen chemists at Burnley, protesting against clause 5 (now clause 4) of the proposed Bill.

Mr. Richardson, asked if it would not be well for the local secretaries to be communicated with, with a view to calling meetings in their respective districts to consider the Bill. If there was a wide-spread objction to the clause in question, it would be better to alter it before the Bill was introduced.

Mr. Frazer expressed his regret that the discussion on the Bill last month had not been public, in order that the constituents of the members of Council might know the grounds upon which the Bill had been approved, which might have disarmed a large amount of opposition. Another thing he regretted was that it was not generally known that the question of requiring a qualified man to be placed in branch shops had been discussed.

Mr. Hampson rose to order.

Mr. Frazer said that the matter had been discussed and the decision arrived at that it was not wise under the circumstances to insert such a clause.

The President said it was hardly in order for Mr. Frazer to state in open Council that which had been discussed in committee.

Mr. Frazer again expressed his regret that the discussion took place in committee.

Communications from the Privy Council.

The Council then proceeded to consider the communication from the Privy Council, printed above, and also the following letter, which had been received since:—

"Privy Council Office,
"Whitehall, 24 *February*, 1881.

"Sir,—I am directed by the Lord President of the Council to transmit to you, to be laid before the Pharmaceutical Society for any remarks they may have to offer thereupon, the accompanying copy of a letter which has been received at the Home Office from Mr. G. E. Rogers suggesting certain restrictions on the sale of poisons and corrosive liquids.

"I am, sir,
"Your obedient servant,
(Signed) "C. L. Peel.

"The Secretary,
"Pharmaceutical Society,
"17, Bloomsbury Square."

"9, Bank Street,
"Newton Abbot, Devon,
"*February* 14, 1881.

"To the Right Honourable
"Sir W. V. Harcourt.

Sale of Poisons.

"Sir,—Your reply to the question of Mr. Chaplin as to the intention of the Government to bring in a Bill to check the indiscriminate sale of poisons, encourages me to bring before your notice what I, as a chemist and druggist of twenty-five years' experience, consider would be the best check on the improper use of purchased poisons.

"I would have that all poisons in the schedules to the Act of 1868, together with corrosive liquids, be brought under the Sale of Arsenic Act of 1852. That the vendor, in addition to making an entry in his register, shall make a duplicate of the same copy, and forward it to the nearest police station.

"For such duplicate forwarded a minimum charge of 2*d.*, together with postal charges, shall be made by the vendor, and shall be paid to him by the overseers of the parish or other rate-making authority.

"I would most respectfully point out to you that at the most important pharmacies poisons and corrosive liquids are not so frequently asked for as in small ones.

"I am, right hon. sir,
"Your obedient servant,
(Signed) "Geo. E. Rogers."

"17, Bloomsbury Square, London, W.C.,
"*February* 25, 1881.

"Charles L. Peel, Esq.,
"Privy Office Council, Whitehall, S.W.

"Sir,—I have the honour to acknowledge the receipt of yours of yesterday's date, enclosing copy of a letter from Mr. Geo. E. Rogers, of Newton Abbot, in which he suggests certain restrictions as to the sale of poisons under the Pharmacy Act, 1868, as also the sale of 'corrosive liquids.'

"The Council of this Society will meet on Wednesday next, when I will submit the matter for their consideration. I have the honour to be, sir,
"Your obedient servant,
(Signed) "Elias Bremridge.
"*Secretary and Registrar.*"

Mr. Symes said he could not agree with the statement that the use of chloral hydrate was increasing. His experience went to show that it was not used nearly so much as it used to be.

Mr. Williams said he could confirm Mr. Symes's statement; according to his experience the use of chloral hydrate was certainly diminishing.

Several members of the Council expressed the same opinion.

Mr. Symes thought the Council could not do better than endorse the letter already sent by the Secretary.

In reply to a question whether Mr. Rogers was on the Register,

The Secretary said that he did not find the name on the Register at Newton Abbot, but there was the same name on the Register with a Birmingham address.

Mr. Churchill said he believed the entry just mentioned referred to the same person, who was formally a hospital dispenser.

Mr. Savage suggested that it was not necessary to go into the individual character of the gentleman making the suggestions, the nature of which was quite sufficient to show that he had not had practical experience of the working of the Pharmacy Act. The proposal was so monstrous that the Council had better express its opinion upon it at once.

Mr. Williams said it was possible that the sale of chloral hydrate was increasing under the patent medicine stamp.

The Vice-President suggested that the Council could hardly agree on a letter at the moment, and that it be left to the President and Secretary to draw up a reply.

Mr. Atkins said he did not think the facts would bear out the idea which Mr. Williams had thrown out, that the sale of chloral hydrate went on to any great extent under the patent medicine stamp. He believed the sale of the patent medicines containing this drug was decreasing.

Ultimately it was resolved—

> "That the Secretary's reply to the Privy Council's communication of the 11th ult. be approved by this Council, and that it be referred to the President and Vice-President to frame a suitable reply to the Privy Council's communications of February 11 and 24."

Poisoning Horses.

The following memorial was laid before the Council:—

"To the Council of the
"Pharmaceutical Society of Great Britain.

"The Memorial of the Lincolnshire Association for the Prevention of the Administration of Poisonous Drugs, etc., to Horses.

"Showeth.—That notwithstanding the passing of the 'Drugging of Animals Act, 1876,' and of other laws of a similar kind, very considerable injury and loss is continually sustained by farmers and others in the county of Lincoln in consequence of the secret administration of poisons, in one form or other, to horses under the care of farm servants and grooms.

"That the existing laws for the prevention of the drugging of animals do not appear to be sufficient to check the evil complained of, and that further action is urgently necessary.

"That the following articles are amongst those which farm servants and grooms procure and give to horses without their masters' consent and against their often repeated wishes and orders, and very frequently with fatal effect, notwithstanding the repeated infliction by justices of the utmost penalties of the law to prevent it, viz:—hellebore, buttyr of antimony, oil of vitriol, spirits of salts, nitric acid and salts of copper.

"Your memorialists therefore very earnestly urge the Council to declare by resolution that the articles abovementioned ought to be deemed poisons within the meaning of the 'Pharmacy Act, 1868,' and, as speedily as practicable to take all such steps as may be necessary to submit the same for the approval of the Privy Council. And your memorialists, etc.

(Signed on behalf of the Association)
"Theo. Trotter, *Chairman.*
"St. Benedict's Square, Lincoln,
"*13th Februyary*, 1881."

The Secretary drew attention to a report of a question put in the House of Commons by Mr. Chaplin respecting a case of horse poisoning at Ruskington, in Lincolnshire, where it was proved that a considerable quantity of arsenic had been supplied by a chemist and entered in the book as "to be given to horses;" and the reply of the Home Secretary that in his opinion the true remedy would be the amendment of the Arsenic Act, and that if Mr. Chaplin would introduce a Bill for that purpose he would assist him.

Mr. Hampson moved—

> "That the memorial from the Lincolnshire Association for the Prevention of the Administration of Poisonous Drugs, etc., to Horses be referred to the Pharmacy Act Amendment Committee."

Mr. Symes seconded the motion.

Mr. Butt said he had received a letter from Mr. Chaplin saying there was no chance of any Bill being brought into the House of Commons for a long time. Therefore there was no hurry about it.

The President thought there was a little hurry about it, because it was quite possible that if a deputation waited on the Privy Council in reference to the Pharmacy Act Amendment Bill some questions might be asked about this subject.

The resolution was then put and carried unanimously, and Mr. Gostling's name was added to the Committee.

Mr. Sandford suggested that it was desirable the Committee should meet as early as possible, so that if the deputation from the Council had an interview with the Lord President the whole of the matters under consideration might be mentioned.

It was therefore decided that the Committee should meet on Thursday the 10th inst., at 12 o'clock.

The Annual Meeting.

It was resolved unanimously that the Annual General Meeting be held on Wednesday, May 18th, next.

The Conversazione.

It was also resolved that the Conversazione be held on the evening of May 18th, and the President and Vice-President, with Messrs. Robbins, Sandford, Butt and Williams, were appointed a Committee to make arrangements. The Secretary was directed to write to the authorities at South Kensington for permission to make use of the Museum as usual.

Mr. Symes suggested that it might be as well to have the Conversazione in August on the occasion of the International Pharmaceutical Congress.

Mr. Williams said there would be, possibly, a conversazione held at that time, but it would be under the direction of the Medical Congress, and if the Conversazione of the Society was put off until then they might clash.

Reports of Committees—*continued.*

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, stating the progress of cases which had been placed in his hands.

Several other cases of alleged infringement had been brought before the Committee, in some of which action was recommended.

The Committee had also received an application from the Aberdeen Society of Chemists and Druggists asking for an annual grant of £20 for "providing suitable premises for laboratory, museum and library, and where classes can be conducted." The Committee recommended that a reply be sent stating that the Council could not comply with the request, but would be prepared to consider any future application for assistance if it were shown that a single grant would be of use in supplementing local effort to improve pharmaceutical education.

The Council went into committee to consider the details of the report, and on resuming, it was unanimously adopted.

Report of Examinations.

February, 1881.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major, (16th)	6	4	2
„ (17th)	6	3	3
	— 12	— 7	— 5
Minor, (16th)	21	9	12
„ (17th)	23	10	13
„ (18th)	24	12	12
	— 68	—31	—37
Modified, (16th) . . .	2	1	1
	82	39	43

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed.
Major (23rd)	2	2	0
Minor, (23rd)	8	4	4
„ (24th)	10	7	3
	—18	—11	— 7
Modified, (24th) . . .	1	0	1
	21	13	8

Preliminary Examination.

8 Certificates had been received in lieu of Society's examination:—

3 College of Preceptors.
3 University of Cambridge.
1 University of Oxford.
1 University of Glasgow.

Regulations for Examinations.

The Vice-President proposed certain alterations in the Regulations in accordance with the recommendation of both the Examining Boards. The words in the existing regulations, which said that in lieu of the Society's Preliminary examination the certificate would be received of any legally constituted examining body previously approved by the Council, seemed to require explanation, and candidates sometimes wanted to know which bodies these were. A list had been carefully drawn up and approved by the English Board, and he read a letter from the Chairman of the Board in Scotland officially approving of the list, as well as of the other alteration proposed, which was to insert the word "spelling," so as to read "In awarding marks, *spelling* and the quality of handwriting are taken into account." He would therefore move—

> "That the Board of Examiners for England and Wales, and the Board of Examiners for Scotland be authorized to accept in lieu of the Preliminary examination of this Society either of the certificates named in the following list, provided that in every case Latin, Arithmetic and English are included in the subjects of the examination on account of which the certificate was granted:"—

University of Oxford.

(1) Junior local examinations.
(2) Senior local examinations.
(3) Responsions.
(4) Moderations.
(5) Examination for a degree in arts.

University of Cambridge.

(6) Junior local examinations.
(7) Senior local examinations.
(8) Higher local examinations.
(9) Previous examination.
(10) Examination for a degree in arts.

University of Durham.

(11) Junior local examinations.
(12) Senior local examinations.
(13) Registration examination for medical students.
(14) Examination for students at the end of their first year.
(15) Examination for a degree in arts or science.

University of London.

(16) Matriculation examination.
(17) Preliminary scientific (M.B.) examination.
(18) Examination for a degree in arts or science.

University of Edinburgh.

(19) Local examinations (ordinary certificate).
(20) Local examinations (honours certificate).
(21) Preliminary examination for graduation in science or medicine and surgery.
(22) Examination for a degree in arts or science.

University of Aberdeen.

(23) Local examinations (honours certificate).
(24) Preliminary examination for graduation in medicine or surgery.
(25) Examination for a degree in arts.

University of Glasgow.

(26) Local examinations (senior certificate).
(27) Preliminary examination for graduation in medicine or surgery.
(28) Examination for a degree in arts.

University of St. Andrew's.

(29) Local examination (honours certificate).
(30) Preliminary examination for graduation in medicine or surgery.
(31) Examination for a degree in arts.

University of Dublin.

(32) Public entrance examination.
(33) Examination for a degree in arts.

Queen's University in Ireland.

(34) Local examination for men and women.
(35) Entrance or matriculation examination.
(36) Previous examination for B.A. degree.
(37) Examination for a degree in arts.

Oxford and Cambridge Schools' Examination Board.

(38) Certificate.

Royal College of Surgeons of England.

(39) Preliminary examination for the membership.
(40) Preliminary examination for the fellowship.

Apothecaries' Society of London.

(41) Examination in arts.

Royal Colleges of Physicians and Surgeons of Edinburgh.

(42) Preliminary examination in general education, conducted by a board appointed by these two Colleges combined.

Faculty of Physicians and Surgeons of Glasgow.

(43) Preliminary examination on general education.

Royal College of Surgeons in Ireland.

(44) Preliminary examination.

Apothecaries' Hall of Ireland.

(45) Preliminary examination in general education.

College of Preceptors.

(46) Examination for a first class certificate.

(47) Examination for a second class certificate.

Incorporated Law Society.

(48) Preliminary examination in general knowledge.

Secondly he would move—

> "That the list of certificates set forth in the preceding resolution be published in the 'Regulations for Examinations.'"

And finally he would move—

> "That the regulations for the Preliminary examination be altered [as above indicated] so as to include 'spelling.'"

Mr. GOSTLING suggested the retention of the words "or any other legally qualified examining body." The Victoria University would soon be incorporated, and there might be other bodies whose certificate would be entitled to be received.

The VICE-PRESIDENT thought it would be better to add hereafter the names of any bodies which were thought desirable. The object was to define the list and not leave it vague and indefinite as at present.

Mr. SYMES thought the subject should be referred to the Committee which had been appointed to consider the whole subject of education and examinations and await its report, so as to avoid any mistakes.

Mr. ATKINS said he was not sure, however carefully the list had been prepared, that omissions might not occur in it. For instance, Trinity College, London, held Preliminary examinations on all scientific matters, and he thought it would be better to add qualifying words, such as Mr. Gostling suggested, rather than find some body left out which had a fair claim to admission.

Mr. ROBBINS said he had seen the prospectus of an educational establishment, at Brighton, which stated that the examinations held there were accepted in lieu of the Preliminary examinations of the Pharmaceutical Society. According to the present list, that would be shut out.

Mr. SAVAGE said in all probability the examination referred to was held by the College of Preceptors, which was included.

Mr. HAMPSON remarked that by passing this list, the Council was not precluded from adding to it hereafter.

The VICE-PRESIDENT said he had just been reminded by the Assistant Secretary that this list had been founded on the regulations of the General Medical Council. It was intended to be quite comprehensive, and it was better to have a definite list, subject only to future modification by the Council if necessary.

The three resolutions were then agreed to unanimously.

MEDICAL ACTS AMENDMENT BILL.

Mr. RADLEY then moved the following resolution of which he had given notice:—

> "That as the 'Medical Act (1858) Amendment Bill' now before Parliament, in the 6th clause of its 26th section proposes to repeal the Apothecaries Act of 1815, and instead of the protecting clause to chemists and druggists therein contained, it imposes a fine not exceeding £20 on anyone who for gain engages in the medical treatment of diseases; this Council, regarding not only the immemorial rights and usages of the trade but also the convenience and advantage of the public at large, feel bound vigorously to oppose the clause referred to so as to prevent its becoming law."

He said the Bill referred to had been introduced and read a first time, and he, having been engaged in three different campaigns on this very question, felt more strongly upon it perhaps than some other members. On the general object of the Bill he had no remark to make, but the 6th sub-section of the 26th clause was this:—"In lieu of the penal clauses of the Apothecaries Act of 1815, by this Act repealed, it is enacted, 'Any person not registered under this Act, who for gain engages in the medical treatment of diseases, shall for each offence be liable on summary conviction to a fine not exceeding £20.' This section shall not interfere with the rights, privileges or titles conferred on persons by registration under the Dentists Act of 1878, nor with the rights, privileges or titles conferred on persons by registration under the Pharmacy Act of 1852 or the Pharmacy Act of 1868." At first sight it might be supposed that this exemption was intended to cover the whole question so far as chemists were concerned, but he believed that anyone relying on it would be under a great delusion. The Pharmacy Act was principally an educational one, combined with regulations for the sale of poisons, and was the result of an association of chemists and druggists in defence of their rights in counter practice,—or giving medicine within certain limits to persons who applied for it,—not as medical men but as chemists and druggists. Legally speaking, perhaps there was no Act of Parliament by which that right was conferred, but it had been the immemorial usage of the trade, and that of itself carried a right. It was an important matter to the trade, and still more so to the general public, and he was quite sure that if the public were asked to sign petitions, thousands and perhaps hundreds of thousands of signatures could readily be obtained. In 1815 an Act was brought forward to take away this right, but it was successfully combated, and a clause was inserted which was understood to save the rights of chemists, and it was so regarded by the prosecutors themselves, as would be seen by reference to the 'Historical Sketch of Pharmacy.' Again in 1839 he remembered Mr. Warburton's bill being introduced, which contained a clause restricting the business of chemists to the compounding of medicines; that was successfully resisted, and it was followed, in 1841, by Mr. Hawes's Bill referred to at p. 87 of the 'Historical Sketch,' which also contained a restrictive clause on chemists and druggists. The defence was then taken up strongly by the trade, some of the most honoured names taking part in it, a resolution being moved by Mr. Bell and seconded by Mr. Keating, "that the provisions of the Bill deeply injure the interests and lessen the usefulness of chemists and druggists, as well as affect the comforts and resources of the poorer classes of society, whilst the immediate and pressing wants of individuals would create a liability to invasion which would be a source of unceasing vexation." Petitions were presented against the Bill, and it was withdrawn. Some years later Sir James Graham introduced a Bill, in the first place throwing the practice of medicine open; but after a short time the apothecaries and medical men succeeded in getting him to introduce a clause again restricting the operations of chemists. That was in 1845, and that again was successfully resisted by the chemists of the time. This attack was now being renewed, and he trusted the Council and the trade at large would be alive to the importance of the matter, and not allow their rights to be interfered with. If the Bill was likely to go forward he trusted the opposition of the trade would be successful, but the sooner the Council spoke out the better. He did not in the slightest degree advocate interference with medical men, as far as their titles and privileges were concerned, but merely that chemists and druggists should be allowed to continue to exercise their calling as they had done hitherto. If ever there was a time when there was less danger than at another of any misuse of this privilege, it was the present when the proper education of all pharmacists had been secured, and being more educated they would naturally be more careful and more alive to the responsibility of their position. The penalties which attended any instance of malpractice were surely sufficient to protect the public and prevent any abuse of the privilege. He did not think any chemist was entitled to leave his counter to give advice; but he strongly advocated a defence of the ancient rights of the trade, and he trusted the Council would support him. It was known how medical men invaded the province of chemists, but they had never advocated any reprisals, either in the way of restrictions on unqualified assistants or in any other way. This Bill would have no effect on the thousands of clergymen, nurses, homœopaths, and others who gave advice, and it was exceedingly individious that an attack should be made upon pharmacists for simply administering medicines in cases of necessity.

Mr. **Sandford** seconded the motion because he thought the clause referred to was likely to do much mischief. There was more in it even than Mr. Radley had mentioned, for a little way earlier in the Bill it was provided that no man should call his house a dispensary, provident dispensary, surgical dispensary or medical hall or use any other medical or surgical description, and persons who did so should be liable to a penalty of £20. This would shut out names by which many chemists' places of business were known. As to exemption, it said that the section should not interfere with the rights, titles or privileges conferred by the Pharmacy Act; but the right to do the things which were here forbidden was not conferred by the Pharmacy Act; it was a right by common usage, reserved in the Act of 1815, which was proposed to be repealed, so that if the Bill passed in its present form it would involve a greater hardship than the old one. Everyone knew that he was not an advocate for chemists prescribing, but there were cases in which even the most scrupulous were applied to and were obliged to give certain things which, according to a strict interpretation of the law, might be held to be a treatment of disease. The line was so fine, that it was practically impossible to draw it in all cases. The Bill therefore required to be narrowly watched. The *Times* had had an article deriding the Bill, but in the *Lancet* of last Saturday there was an article in which this kind of provision was advocated. The Council was indebted to Mr. Radley for bringing the matter forward, but he (Mr. Sandford) did not think there was any chance of the Bill going through, for he understood that all the Medical Acts were to be sent to a Royal Commision.

Mr. **Hampson**, referring to the proceedings in Parliament on the previous evening, said that Mr. Mundella, in answer to a question from Mr. Errington, had stated that the Government had arrived at the conclusion that a Royal Commission would be the best means of investigating and reporting on the Medical Acts. The Bill, therefore would not be proceeded with.

The **Secretary** said the Bill was put down for second reading on June 29.

Mr. **Hampson** said he was strongly tempted to support the motion, but he had rather mixed feelings on the subject. He would defend chemists' rights; but in their own Bill they were asking for certain privileges with regard to dispensing medicines, and he thought that medical men, on the other hand, were fully entitled to the right of prescribing within a certain limit; if that limit could be defined, the rights of the trade ought to be conserved, viz., for simple ailments, as they did at present. He knew there were some who went beyond that, but he had always deprecated such a practice as being essentially immoral and dangerous. He wished something like a just reciprocity could be arrived at by which pharmacists should obtain the dispensing of the country, which was their inherent right. If the work were equitably divided, and pharmacists had the pharmacy of the country in their hands, he had no objection to medical men having everything in the way of medical treatment. But when medical men demanded that a man should be fined £20 for giving a remedy for a simple cold, he must protest against it. He wished the position of pharmacists was better defined; they had only a Poison Act, which gave them more trouble than it was worth. He thought when the Royal Commission met there would be an opportunity of stating the case, and he had no doubt the Council would act vigorously in that direction. Before sitting down he should like to allude to another matter, which might be brought before the Royal Commission, namely, the Pharmacopœia. He had been looking forward for years to such an opportunity; the Medical Council had been addressed on the subject, but gave no answer, and he thought that the Pharmaceutical Council should claim to have a legal share in the preparation of the Pharmacopœia.

Mr. **Frazer** said he would oppose as much as anyone any interference with himself or anyone else in the conduct of his business, as he had done hitherto, but he read the Bill differently to Mr. Radley. He thought sufficient attention had not been given to the words "for gain." He might be asked if he would recommend something, and the person might go somewhere else and get it. His idea was that you might give any amount of advice if you did not charge for it, and he thought, therefore, the clause was really in the interest of pharmacists, for he was sure no one present would think of prescribing for a fee. As Mr. Radley had mentioned, clergymen and others were constantly prescribing. The phrase to which Mr. Sandford had drawn attention was no doubt objectionable, but there seemed no chance of the Bill passing, as was shown by the comment of the *Times* upon it.

Mr. **Symes** could not support chemists holding themselves out to prescribe in any way, but he must support Mr. Radley's motion. With regard to the clause mentioned by Mr. Sandford, he thought it was objectionable for chemists to adopt any title which conveyed the idea that advice was given, and therefore he should like to see that clause passed. A chemist could only prescribe legitimately when requested to do so for some simple complaint; but by using these titles he lured the public into a trap. On the other hand, he could not agree with Mr. Frazer that this 6th clause was intended for the protection of chemists. It was well known that persons, even of high position, magistrates, and even judges, would come into a shop and ask that something should be given them, and the act of prescribing could not be separated from that of selling, and when a charge was made for an article he feared it would be held that the transaction was one "for gain." If Mr. Hampson had not mentioned the subject of the Pharmacopœia he should have done so himself; he had been very anxious to introduce it into the Pharmacy Bill, but gave way rather than provoke opposition. This, however, was an opportunity which should be taken advantage of. It was the right of the pharmacist to have a hand in the framing of the Pharmacopœia, not merely to do so on sufferance, and he trusted that if any committee were appointed to watch this Bill, it would take an opportunity of endeavouring to introduce a clause giving them the right they ought to possess.

Mr. **Savage** said there were two or three points of importance in this matter. In the first place, the Council ought to know what really was meant, which at present did not seem at all clear. As to the medical hall and other titles, he took it that the law would not be retrospective, because there were some very high class establishments known by that name, and he did not see why they should be deprived of it. He could not agree with Mr. Frazer that the words "for gain" would be a protection; but he thought it should be ascertained from the framers of the Bill what was the real intention.

Mr. **Gostling** fully sympathized with the observations of Mr. Radley and Mr. Sandford, for he felt when he received a copy of the Bill that it might seriously affect the position of pharmacists, and be a great disadvantage to the public; but seeing that the rights and privileges conferred by the Pharmacy Acts were saved, he thought it would to a certain extent prohibit the Council from opposing it. He wrote, however, to Mr. [illegible], the member for South Norfolk, placing the matter before [illegible] much in the same way as Mr. Radley had stated it, a he had a letter from him stating that the promoters the Bill had agreed to abandon it, and to have the whole subject referred to a Royal Commission before any legislation on the subject was attempted. That being so, he thought it was hardly necessary to take any further steps in the matter, especially as a similar statement had been made as to the intention of the Government.

The President hoped Mr. Radley was aware that this Bill had not escaped attention. The Secretary had sent him a copy of it, and had drawn his attention to certain clauses; but after reading the article in the *Times*, and various other remarks on the Bill, he had arrived at the conclusion that it would be referred to a Royal Commission. Therefore, although all these Bills should be watched, he did not think this one need excite any immediate alarm. The *Times* said no such Bill could ever pass a British Parliament. He himself should be glad to see these matters referred to a Royal Commission, for though pharmacists might lose a little, he thought, on the whole, they would gain considerably.

The Vice-President thought the practical outcome of the discussion might take the form of a recommendation that after the announcement of Mr. Mundella that the subject of medical reform should be referred to a Royal Commission, application should be made by the President, at the proper time, to be heard before that Commission. It appeared to him that that was the most fortunate direction in which affairs would appear to be naturally drifting in the interests of pharmacists. The only satisfying result of all the efforts of the Council would lie in the direction of its being generally recognized, both by the profession and by leading thinkers amongst the public, that pharmacy was an essential part of the medical art. The best thing pharmacists could do would be to try to work harmoniously with other practitioners in that art.

Mr. Williams suggested that this should come as an amendment; not that he opposed what Mr. Radley said; in fact, at the last meeting of the Pharmacy Act Amendment Committee the Bill was informally considered and he believed the general impression was that the clause in question had been intentionally drawn to take away whatever so-called privileges the chemist might be supposed to enjoy under the Apothecaries Act. Still he thought the Council could not do much good by discussing the matter, and he should prefer it being referred to the Committee to watch and report to the Council at its monthly meetings. That would give the Council the opportunity to apply for a hearing before the Royal Commission.

The Vice-President remarked that what would have held good as an argument on the previous night would hardly hold good after the Bill had been practically withdrawn by its promoters, and the announcement of the Vice-President of the Council to the same effect.

Mr. Williams did not understand it had gone quite so far as a withdrawal.

Mr. Atkins did not think that stage had yet been reached, though in all probability it shortly would be. He had been corresponding with their late member, who took a deal of interest in all these matters, and he conveyed to him the impression that Mr. Hardcastle's Bill had not the ghost of a chance of passing, but that it would be referred to a Royal Commission. Then he thought would be the time for the Council to put a spoke in the wheel, and he believed that its opinion would be asked. He would not enter into the question of counter practice, but with regard to the use of such terms as medical hall, it was absurd to say that that was held out in any sense as a bait for counter practice. Throughout the West of England, many of the oldest and most respectable houses, in which no prescribing whatever took place, used these titles and had done so for seventy or eighty years.

Mr. Radley said after what had been advanced, he would withdraw his original proposition and substitute the following:—

"That the consideration of the Medical Act (1858) Amendment Bill, now before Parliament, be referred to the Pharmacy Act Amendment Committee, and that the Committee be requested to watch its progress, especially with regard to the provisions contained in the 6th sub-section of the 26th section, which this Council considers inimical to the recognized business of chemists, and to take such steps as they may consider of pressing necessity, and to report to the Council at its monthly meetings."

This resolution was unanimously agreed to.

The Vice-President then moved—

"That in the event of the subject of medical reform being referred to a Royal Commission, steps be taken by this Council to secure the hearing of able pharmaceutical evidence."

Mr. Atkins seconded the motion, which was agreed to.

The President reported that letters of thanks had been received from Mason's College, Birmingham, and also from the Hull Pharmaceutical Society, for the Society's Journal and Calendar which had been forwarded.

The Late Mr. Abraham.

Mr. Sandford said that many members of the Council must have seen with regret the announcement of the death of Mr. Abraham, who had been for some time a member of that Board, and who had always held a high position in pharmacy. He begged, therefore, to move the following resolution:—

"That an expression of sympathy be offered to Mrs. Abraham and her family, assuring her of the great respect in which the memory of the late Mr. John Abraham is held by this Council, and their regret at the loss sustained by his death."

Mr. Hills seconded the motion, which was supported by Mr. Savage, and carried unanimously.

International Congress.

Mr. Hampson asked if anything had been done for the reception of members of the International Pharmaceutical Congress when it met in August next.

The President said that invitations had been forwarded to presidents of all known pharmaceutical societies and other persons interested in pharmacy, from some of whom favourable replies had already been received. Sufficient time had not, however, elapsed to form an opinion as to how many would be likely to attend the Congress. He would take this opportunity of saying that several months ago, when the International Medical Congress was attracting some attention, he thought it would be very desirable that the President for the time being of the Pharmaceutical Society should be on the section of materia medica and pharmacology as a Vice-President. He, therefore, placed himself in communication with the executive, but was informed that there was a hard and fast line, that none but members of the medical profession could be members of the Congress. Probably, however, as a sort of compromise, he had received the following communication:—

"Royal College of Physicians,
"Pall Mall, London, S.W.,
"*February*, 9, 1881.

"*International Medical Congress, London*, 1881.

"Dear sir,—It has been decided by the Council of this section (Materia Medica and Pharmacology) to issue twenty invitations to pharmacists of distinction, at home and abroad, to attend the meetings of Section XV.

"It was the original desire of the Council to have invited all the members of the Pharmaceutical Congress to be held in London in the autumn of this year to consider themselves extraordinary members of our section. This was found, however, to be impracticable, and the issue of a fixed number of invitations to individual pharmacists was determined on instead.

"We venture to hope that you will give us your valuable aid in the matter by furnishing us with a list of the names of twenty pharmacists, British and foreign, to whom we may despatch letters of invitation.

"We are, dear sir,
"Very faithfully yours,
(Signed) "E. Buchanan Baxter.
(Signed) "Frederick T. Roberts.
"*Secretaries.*

"To the President of the
"Pharmaceutical Society of Great Britain."

On the suggestion of the President, the Council went into committee to discuss this letter, and on resuming it was decided to leave the matter in the hands of the President to reply.

Mr. Hampson gave notice that next month he should move that the Pharmaceutical Society contribute towards a fund for the entertainment of those who shall attend the International Congress in August.

PHARMACEUTICAL MEETING.

Wednesday, March 2, 1881.

MR. THOMAS GREENISH, PRESIDENT, IN THE CHAIR.

The fifth Evening Meeting of the Session was held on Wednesday last, the chair being taken at half-past eight. The minutes of the previous meeting having been read and confirmed, a paper was read entitled a—

Note on Jafferabad Aloes.

BY E. M. HOLMES, F.L.S.

The paper is printed on p. 733, and gave rise to the following discussion:—

The President said they were very much indebted to Mr. Holmes for the paper which he had just read. Mr. Baker, of Kew, who had paid very great attention to the subject, was present, and the meeting would be very glad to hear any remarks he might have to make.

Mr. Baker was ashamed to say that from the pharmaceutical point of view he really knew nothing about aloes, but he had lately paid a good deal of attention to the subject from the purely botanical point of view, and had lately written a monograph which had been published in the 'Proceedings of the Linnean Society.' His friend, Mr. Holmes, had asked him to come there that evening, and he had consented to do so with great pleasure, because on this question there were points where it was necessary for botanists and pharmacists to help each other. There were questions for the solution of which botanists would furnish some of the evidence, and pharmacists could furnish the other; it was, therefore, necessary and desirable that the botanists and pharmacists should meet together and talk these questions over, and help one another as far as they could to throw light upon these disputed points. From a botanical point of view a great deal had been lately done towards the elucidation of the aloe family. There was an exceedingly fine collection of aloes at Kew, and Mr. Peacock, of Hammersmith, had brought together all the aloes and other succulent plants he could get, and he had lately lent the pick of his collection, which was a very fine one, to the authorities at Kew Gardens. It was palpable to everyone that aloes could not be represented satisfactorily from dried specimens. There never had been such an opportunity before for working out the limitation of the species and genera as the last few years had presented, and he had taken advantage of the opportunity by making notes and working up the collection. The result of the work had been embodied in the monograph to which he had alluded, and he would take the opportunity to review briefly what the botanists knew, and to point out which of the kinds needed further light thrown upon them, as it would be very likely the pharmacists would be able to furnish the necessary information. There were about two hundred species of aloes known, and of those all but about twenty were natives of the Cape Colony, and in almost all of these, both the flowers and leaves were known and the characters might be regarded as satisfactorily worked out. The two hundred species were divided into two groups. In one group you have a brightly coloured flower, red and yellow, and in the other group the flower is white, streaked with green, and the body of the plant was very much smaller. None of the white-flowered group were of any value whatever for pharmaceutical purposes. A large number of them were known in cultivation, but they were small and they did not hold any appreciable quantity of the yellow juice. That group was divided into two genera. As they knew, in the flower of these monocotyledons the calyx and corolla were fused together into one, and the whole was called a perianth, and then the divisions at the top were called the limbs of the perianth. The two genera had a small, pale coloured flower with green stripes upon it. In the genus *Apicra*, including only six species, the limb was very short. In the genus *Haworthia* the divisions were unequal, the three top divisions arched over and the under divisions, which were also three in number, were reflexed. That genus included about fifty species. The other set, with the brilliantly coloured flower, the red, the yellow, and green, were divided into two genera. The genus *Gasteria*, including about fifty species, was exceedingly handsome; the limbs of the perianth were narrowed at the base, the top of the tube was constricted and curved regularly so as to give the lower portion of the tube a swollen appearance, and the segments of the limbs were very small and spreading. The species of *Gasteria* were all natives of the Cape Colony. Then as to the true aloes, of which there were about seventy-five species, fifty of them were natives of the Cape. In the true aloes there was a perfectly uniform and regular perianth. The tube was divided into segments and the stamens arose from beneath the ovary and did not extend much beyond the mouth of the perianth. The true aloes differed very much from one another in the length of the divisions of the perianth. Then came the sub-genus *Pachidodendron*, of which there were five species. There the stamens were declinate and extended considerably from the mouth of the tube, the tube was more or less curved. Then there was a section including a single species only, the sub-genus *Rhipidodendron*, in which the stamens were not exserted; the inner segments of the perianth were divided down to the very bottom, the three outer ones united about half way up. The officinal aloes belonged to the aloes in a restricted sense, some of them to the Pachidodendrons, one of them to the Rhipidodendrons. From Mr. Holmes' observations he understood that they might place the officinal specimens under five different heads. The first, the Barbadoes aloes, was taken at a very early date to the West Indian Islands, and it received its name because it was brought to England from Barbadoes, about the latter end of the fifteenth century. It was the *Aloe vera* of Linnæus, the *Aloe vulgaris* of Bauhin, and the *Aloe barbadensis* of Miller (which was a name that had lately been revived), and the *Aloe perfoliata*, which was a collective name including a number of different kinds,—all those names applied to the Bardadoes aloes of commerce, which was perfectly well known as a botanical species, and as a pharmaceutical product. In India they said they had two kinds of aloes. There was a plant called the *Aloe officinalis*, Forsk., which differed in its red flower and purplish tinted leaves from the Barbadoes aloe. He should like to know if it was possible, from a pharmaceutical point of view, to establish any differential character between these two plants. Passing to the Socotrine aloe, that was also said to be the product of the *Aloe socotrina*. Before leaving the *Aloe barbadensis*, he would mention that it presented the botanical characters of a comparatively short tube with segments, very much longer at the top, with stamens and style exserted. The flowers of *A. barbadensis* were usually yellow. Socotrine aloes came from the island of Socotra, and although that place had been long known, and stood in the very line of the main passage for ships to go to India, and aloes had been imported from it for a very long time, it was only quite recently that anything had been known about the flora and fauna of that island. The British Association last year thought this such an opprobrium in these days of discovery that they formed a committee, and appointed Professor Balfour to go to explore that island. Professor Balfour had been, and done his work very thoroughly, bringing about six hundred plants, a very large number of birds, and a fine collection of butterflies, of which several were new. He had also made valuable observations with reference to the geology of the island. He was now engaged in working up his plants, and would shortly present a full report, with descriptions, of the new things. All he need touch upon at present was the aloes that grow there. There was one which was very plentiful all over the island. Commodore Wickham Perry brought a specimen over, which was entirely different from the plant known as *Aloe socotrina*, and he (Mr. Baker) had therefore established it as a new species, and called it *Aloe Perryi*. Further specimens were brought by Mr. James Collins a year or more later, and from those two it was described. That was before Professor Balfour had gone, but he had since brought back fine specimens of the flower. From the materials brought back by Professor Balfour he had amended his description of the *Aloe Perryi*, and established with certainty the conclusion that the Socotra plant was an endemic species. There were two plants at Kew, growing side by side with the *Aloe vera*. The plants had the same thick leaves and the same character of prickles, but the perianth of *Aloe vera* had long segments, while the *Aloe Perryi* had short ones, and the stamens not exserted at all. They had specimens of *Aloe socotrina* sent from the Cape Colony. The name Socotrina was given, not in relation to the island, but simply because the plant yielded a yellow juice—succus citrinus. It had been fully settled that the *Aloe Perryi* was an endemic plant. It was confined to the island of Socotra, and although it agreed very closely with *Aloe vera* in general habits it differed in the character of its flower. The Cape or the Natal aloes had been attributed to a great variety of species. Sometimes it was stated that they came from the *Aloe arborescens*, sometimes from the *Aloe plicatilis*, and sometimes from the *Aloe ferox*. The *Aloe plicatilis*, which belonged to the Rhipidodendron section, possessed a large handsome flower, and was completely different from all the other aloes. It formed a tree, which was sometimes branched, and the leaves were arranged in two distinct rows, about half a dozen in a regular tier, growing one above the other. There were perfectly good characters in the general habit of the plant, both in its leaves and in its flowers. It was a most handsome species and the only one belonging to the sub-genus Rhipidodendron. It had stamens not exserted. The outer segments were united almost half way up, and the inner segments separated from one another down to the very bottom. *Aloe ferox* belonged to the section Pachidodendron, and had long divisions and long exserted stamens. He could not suppose that the *Aloe plicatilis* and the *Aloe arborescens* and the *Aloe ferox* could yield a similar product, and he wished pharmacists to point out from which of them it was that the product was obtained. If they could procure authentic specimens of the leaves and flowers of the plant from which the aloes was obtained, it would enable the point to be determined. They had got all they wanted to know about the Barbadoes aloes and the Socotrine aloes, and attention ought to be directed to this point, as it was not likely that those most dissimilar species should yield the same product. Mr. Holmes had only as yet obtained the flowers of the Jafferabad aloes, but when the leaves were procured there would be little difficulty in settling the species which yielded it. The *Aloe abyssinica* was one of the commonest of the aloes, and had a short tube which was the most general character of the whole genus. The Socotrine aloes had a long tube and short segments. It certainly was not the Socotrine aloes plant; but, so far as the flower went, it belonged to the type most common in the genus. The Abyssinian aloes had a flower with a short tube, long segments and non-exserted stamens. Dr. Balfour obtained a second species in Socotra, a small kind, which was not likely to be of much value from a medicinal point of view. They knew extremely little of the aloes of Arabia. Dr. Forskal, who wrote a flora of Egypt and Arabia, had described three aloes as growing in Arabia. Out of those three, one of them a variety of *Aloe vera*, was called in India the *Aloe indica*. There remained the other two which Forskal said came from Arabia, but since his time no aloes had been brought from there. The descriptions were imperfect, and nothing was known about them except that they were sure three aloes existed in Arabia, and specimens of them would be very valuable. The idea of Linnæus was to give exceedingly short descriptions restricted to about a dozen words. With regard to the Mocha aloes they knew nothing at all and must wait till specimens were obtained. They knew that the plant which botanists suppôsed yielded the Socotrine aloes was completely wrong. It was perfectly distinct. It was exceedingly like the Barbadoes plant in everything but the flower, but there was no doubt about its being a true and distinct species. All the evidence about the origin of the Cape and Natal aloes was in a state of confusion, but if specimens were obtained there would be no difficulty about determining their names, and the same remark would apply to the Mocha and the Jafferabad aloes.

Mr. SCHACHT would like to ask Mr. Baker if he intended to imply that the Socotrine aloes were derived from that species which he himself had identified as a new species.

Mr. BAKER replied in the affirmative.

Professor BENTLEY was afraid he could throw no light upon the matter which had been before them that evening. He should, however, certainly have risen, even if he had not been called upon, for the purpose of expressing his thanks to Mr. Baker for the very lucid explanation which he had given of the genus Aloe, and the sources of the different commercial varieties, so far as was known, and some of which he had mentioned were at present very little known. The subject of aloes was such an interesting one that they must all look forward with much interest to Professor Bailey Balfour's forthcoming description; but they were very glad to have these preliminary observations from Mr. Baker at the present time. Of course, as Mr. Baker said, the subject was both botanical and pharmaceutical, and it had always appeared to him to be a disgrace when we were sending out exploring expeditions to different parts of the world that the island of Socotra, which, as Mr. Baker mentioned, was in the very line of our steamers, should have been allowed to be practically unexplored, although both pharmacists and botanists must all have felt considerable interest in knowing what was the species of *Aloe* which yielded the Socotrine aloes. Everything up to the present time had been in doubt. As Mr. Baker pointed out, Commodore Wickham Perry brought over a specimen in 1878, which unfortunately died; but it was well known at the time, and his colleague, Dr. Trimen, and himself had pointed it out in 'Medicinal Plants' that it was a species totally different from *Aloe socotrina*. Specimens were also in their hands from Mr. Collins, a former curator of the Society's Museum. Those leaves which he obtained were also shorter than the so-called Socotrina, and it was clear that the so-called Socotrina was not the source of the Socotrine aloes of commerce. They looked forward with great interest to the examination of the plants which had now been described by Mr. Baker, and he supposed they would be afterwards figured by Professor Bailey Balfour, and then they would know that the species of Aloe which yielded Socotrine aloes was a new one, and now named by Mr. Baker, *Aloe Perryi*. That was a most valuable thing to be made known, as there would be no uncertainty in future with reference to the origin of Socotrine aloes. The plants were distributed all over England, and although they had not flowered, yet there was no doubt they would flower in the course of the present season, and they would then be thoroughly well recognized. He wished to express his thanks to Mr. Baker for giving that information, and it ought to be a lesson for those in power that matters so easily investigated at such little expense should have been left so long without being elucidated. With regard to Barbadoes aloes there could be no question. The *Aloe vulgaris* had been well established for a very long time. Mr. Baker had said, and his authority confirmed him and others in what they had written, that *Aloe vulgaris* was originally introduced into the island of Barbadoes from the Canary Islands. It was not, like the Socotrine aloes plant, endemic to the island; but the Barbadoes aloes plant was originally introduced. As to the Indian aloe and the *Aloe officinalis*, that was a question which could only be settled by botanists. Then with reference to the Cape aloes, of course everyone knew there had been a great doubt as to their origin. At the time of publishing the 'Medicinal Plants,' their attention was called to cultivated specimens of *Aloe spicata*, and they stated that it probably yielded none of the Cape aloes. The origin of Cape aloes was very little known. Various species had been named. *Aloe ferox* doubtless yielded aloes, but there were various other species stated to be the source of the Cape aloes. The question to be decided was that which Mr. Baker had suggested, and it could only be decided by those who were out at the Cape. Those who had friends at the Cape and could get specimens of the leaf and the flower of the several plants should do so, in order that the species might be thoroughly identified. If specimens were thus collected they could be compared with the commercial specimens, and in that way only could the question be settled. They were very much indebted to Mr. Holmes for his paper on the Jafferabad aloes. He presumed from what he had heard that Mr. Holmes suggested that it might be Mocha aloes, which was referred to the aloes of doubtful plants. It came from Socotra, and it was referred to the Socotrine aloe plant; but it was well known to be doubtful and it was very interesting now to consider what the origin of Mocha aloes was, whether from *Aloe abyssinica*, or from others. It was said by Flückiger and Hanbury that a portion of the aloes from the Red Sea came from the *Aloe abyssinica*; and therefore if Mr. Baker was right, it only confirmed that which was previously mentioned. He had great pleasure in rising on the present occasion, not because he was able to make any fresh observations of any value, but for the purpose of thanking Mr. Baker for the valuable information which he had that evening afforded them.

The CHAIRMAN said the meeting was much indebted to Mr. Holmes for having brought this subject forward. It had opened up a discussion on a very important class of drugs and had brought to that meeting Mr. Baker, who had evidently paid very great attention to the subject. It was a great privilege to have Mr. Baker with them that night and they were much indebted to him for the information he had given. At the same time it pointed out how much they were indebted to Professor Balfour for his investigation of the flora of the island of Socotra. That interesting island, yielding a drug of such importance as aloes, had remained without being investigated with regard to its botany for very many years. There was a fine opportunity for some of the advanced pharmacists to take up this subject, and Mr. Baker had very properly said that the pharmacists could work with the botanists and the botanists with the pharmacists, and thus be mutually serviceable to each other.

The thanks of the meeting were then accorded to Mr. Holmes and Mr. Baker.

Mr. HOLMES said there was in the Museum a specimen of Mocha aloes, presented by the late Dr. Leared, which bore a close resemblance in odour to Barbadoes aloes and that if this were obtained from the *Aloe officinalis* it would point to the same conclusion at which Mr. Baker had arrived, that *A. officinalis* was a variety of *A. vera*. Other specimens of Mocha aloes resembled the Jafferabad variety. The aloes from the north of India had, however, quite a distinct odour from any other he had met with. With regard to Jafferabad aloes, in odour, vitreous appearance, and the test with sulphuric and nitric acid, it more nearly approached the aloes from the Cape than any other, and he could, therefore, easily understand that the Jafferabad drug might be obtained from an aloe belonging to that section. With respect to the Natal and Cape aloes he had but little doubt that although these kinds might be prepared in various districts from different species, yet that the same species was probably used invariably in the same locality. Mr. Baker's remark that there were two species of aloe in Socotra might perhaps throw some light on the fact that two kinds of aloes came from Zanzibar, the one known as Socotra and the other as Zanzibar aloes. The latter was usually imported in monkey skins and had a peculiar odour and slightly different appearance to the Socotrine; whether the odour was due to the skin in which it was wrapped or to its being obtained from a different species of aloe, he could not say. The question whether difference of product indicated a difference of botanical species was a very interesting and problematical one. It was well known that the Chinese and Japanese peppermint plants closely resembled, in botanical characters, the *Mentha arvensis* of this country, and yet that the essential oil yielded by them was quite different; also that the orange tree afforded a different oil in the flower from that contained in the leaves. This difficulty also applied to an aloes that came into the London market, known as Curaçoa aloes, which differed in appearance and slightly in odour from the Barbadoes kind. He should be glad to learn from some of the members of wholesale firms, whom he noticed in the room, whether they considered the Curaçoa aloes as identical in composition with the Barbadoes kind. It might be that the odour depended upon the manner in which it was prepared.

Professor BENTLEY pointed out that Mr. Baker, in describing two species, had said one was very rare and the other extremely common. They could, therefore, not expect any commercial aloes to be derived from the first. Those who were familiar with Flückiger and Hanbury knew that they described Socotrine aloes and Barbadoes aloes as having somewhat the same character of odour. The question of odour was rather a difficult one, as persons appreciated odours so very differently. He should confess that so far as his sense of smell was concerned, he considered that Socotrine aloes possessed a far more agreeable odour than the ordinary Barbadoes aloes.

Mr. BAKER thought that Professor Bentley's supposition was a true one, as they could not suppose it at all likely that the species referred to would yield juice to make it an article of commerce.

The CHAIRMAN then announced that the paper by Mr. Holmes, on "Some Drugs from Socotra," had been withdrawn, as Professor Balfour was himself engaged in making a report of the drugs and other products brought back by him from the island of Socotra.

The next paper read was a—

NOTE ON SOME ARTIFICIALLY COLOURED ROSE LEAVES.

BY T. EDWARD GREENISH.

The paper is printed at p. 733, and gave rise to the following discussion:—

The CHAIRMAN said he should like to hear from some of the gentlemen present from wholesale houses if they had met with any samples of artificially coloured rose leaves in the market.

Mr. Gerrard would like to know whether Mr. Greenish considered that the petals were those of *Rosa gallica* which had been exhausted previously or of some other variety of rose which had been dyed.

Mr. Mead said that a sample of leaves that had come into his possession seemed to be unusually red. Having been favoured with a copy of Mr. Greenish's paper, he had applied the tests named, and could confirm what had been stated. The leaves gave evidence of rosaniline, and a decoction made from them was not so satisfactory as that made from natural leaves. From the odour of the decoction, he should say the leaves had not been exhausted before. They appeared to be leaves somewhat gone off colour, and brightened up by means of the dye.

Mr. Child stated that in the month of August last year, a sample of rose leaves very highly coloured was submitted to him for examination, and after looking at them he pronounced them to be artificially coloured. It first struck him that they might be coloured with rosaniline, but after applying various tests he failed to detect its presence. A short time previously he had a colouring matter submitted to him by a firm in the City, which yielded similar results to the colouring matter in the rose leaves. It had properties very similar to coleine, an article on which a paper had been read before the Chemical Society some time previously. On treating the rose leaves with ether and alcohol respectively, the ethereal solution became of a slight pink colour, and the alcoholic solution was of a much deeper colour. On acidifying the solutions with sulphuric acid they were scarcely heightened in colour, while in the solutions from true rose leaves it had become materially developed. When neutralized with potash the true rose leaves solutions assumed a greenish yellow colour, while those from the coloured rose leaves became distinctly yellow. On again adding sulphuric acid the solutions from the natural rose leaves resumed their pink colour, whilst those from the coloured leaves became the colour of a solution of bichromate of potash. He failed to detect the presence of rosaniline, and therefore attributed the colour to the dye he had referred to.

Professor Bentley would like to know if there were many of these artificially coloured rose petals in the market, or whether this was an exceptional specimen. He thought the appearance of those dyed petals was very different to that of the natural ones. He should like to know from Professor Attfield, another practical chemist, what the effect of the colouring matter would be when used in prescriptions. Probably the reason for colouring them was to keep them of a uniform colour.

The President said he should like some of the gentlemen connected with the wholesale houses to say whether in passing round the market they had met with any samples of a similar kind.

Mr. Umney was sorry to say that he could answer in the affirmative. They were of German origin, shipped from Hamburg to many wholesale druggists in London. He could mention three firms who had had them in large quantities, and some of them no doubt had found their way into various pharmacies in Great Britain. The fraud had been detected after a time, but in the first instance the trick was a successful one, and the Germans had the best of it. The harvest of rose leaves last year was a very bad one, and roses were very scarce. His own idea was that these were the leaves of *Rosa centifolia*, and that they had not only been dyed, but also dipped in perfume. He should say at least a 1000 pounds weight, perhaps 2000 or 3000 pounds weight, were sent over from Hamburg. They were offered openly in the London market.

Professor Bentley was also of opinion that the odour did not appear to be that of the ordinary red rose. He thought they had had some kind of artificial perfume as well as artificial colour.

Mr. Holmes had heard of two parcels of fourteen pounds each being returned by a retail chemist to a wholesale house, and as the leaves appeared to have entered the retail trade the subject was one deserving of attention. He had seen a list of tests given for the different aniline colours and one of them was said to give a blackish colour with sulphuric acid; and it occurred to him whether the adulteration had been detected by the infusion turning dark when made with the false rose leaves. He understood that the aniline dyes were now prepared without the use of arsenic acid, and he should like to know whether Mr. Greenish had looked for the presence of arsenic or not. He had been told that the wholesale price for the leaves was at present 4*s.* 6*d.* a pound, and probably the high price had induced the Germans to adulterate the drug.

The Chairman pointed out that the dye did not seem to have penetrated to the centre of the tissue of the leaf, but appeared to be quite on the surface.

Mr. T. E. Greenish, in reply, said he had not examined the rose leaves botanically and could not, therefore, say whether they were the petals of the *Rosa gallica* or the *Rosa centifolia*. He did not think they had been exhausted in any way. With regard to the colouring matter, ether had no action on these rose leaves, and caustic alkali, instead of producing the usual green colour, produced a deep brown and afterwards decolorized. The leaves were perfectly uniform in colour, whereas those of true rose leaves were much lighter towards the base of the petal. As to the quantity in the market he could form no idea. He could not find arsenic present in these although he treated them with the usual tests. In rosaniline the quantity of arsenic was said to vary from ½ to 6 per cent. The infusion was made in the usual way and was certainly darker than the ordinary infusion made from undyed leaves.

The Chairman, in proposing a vote of thanks to Mr. Greenish for his paper, said it was one of those practical subjects always acceptable in that room.

Mr. Postans then called attention to a specimen of oil obtained from aloes, and stated that it weighed only 2 drachms and was obtained from about 500 pounds weight of aloes. Messrs. W. and H. Smith, of Edinburgh, were the manufacturers and discoverers of this oil.

Mr. Holmes then called attention to the various donations to the Museum which were upon the table. The specimen of jaborandi bark differed somewhat from the other specimens in the Museum. Mr. Cranwell had told him that it was obtained from the *Pilocarpus Selloanus* and the other from the *Pilocarpus pennatifolius*. The *Pilocarpus Selloanus* came from Paraguay. There was a specimen of the stearoptene or camphor obtained from the oil of buchu, the physiological action of which was worthy of investigation. Mr. Sawer had presented a specimen of the seeds of the *Lucuma mammosum*, and as he was here he would be able to give an account of them.

Mr. Sawer said the seeds could be obtained in very large quantities, and yielded a large percentage of a fine fixed oil, which possessed a very delicate odour, and which would be a very suitable base for a perfumed soap. The seeds were derived from the West Indies, and it was a matter of price as to how far they would be used. Some small experiments had been made to ascertain the amount of oil to be obtained, and he should think the percentage would be about 25 per cent. of the gross weight. There was also a small percentage of an essential oil resembling bitter almonds in odour. That was about all that was known at present, but meanwhile the subject was being further investigated.

EXAMINATIONS IN EDINBURGH.

February 23 *and* 24, 1881.

Present—Messrs. Ainslie, Borland, Gilmour, Kinninmont, Nesbit, Stephenson and Young.

Professor Maclagan was present on the 23rd, on behalf of the Privy Council.

MAJOR EXAMINATION.

23rd.—*Two* candidates were examined, and were declared qualified to be registered as Pharmaceutical Chemists:—

Burrell, Thomas ....Montrose.
Gifford, Richard Lord ....Blackburn.

MINOR EXAMINATION.

23rd.—*Eight* candidates were examined. *Four* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bruce, Alexander Gibb ....Broughty Ferry.
Chisholm, Alexander ....Edinburgh.
Dawson, James.....................Bridge of Allan.
Henderson, Robert ....Old Meldrum.

24th.—*Ten* candidates were examined. *Three* failed. The following *seven* passed, and were declared qualified to be registered as Chemists and Druggists:—

McDonald, Robert ....Edinburgh.
McGlashan, James ....Edinburgh.
Morrison, William Norman ...Inverness.
Ranken, John ....Forfar.
Stephen, James, jun. ....Gamrie.
Stewart, Alexander Kennedy ...Kilmarnock.
Swindells, Thomas ....Manchester.

MODIFIED EXAMINATION.

24th.—*One* candidate was examined, but failed to pass.

PRELIMINARY EXAMINATION.

The undermentioned certificate was received in lieu of the Society's Examination:—

Certificate of the University of Glasgow.

Richardson, George Clements...Glasgow.

Provincial Transactions.

CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

MEETING OF THE EXECUTIVE COMMITTEE.

A meeting of the Executive Committee of this Association was held at the office of the Association, 23, Burlington Chambers, New Street, Birmingham, on Friday February 25, 1881, at 1 p.m. Mr. Thomas Barclay (Birmingham), President, in the chair. Mr. Robert Hampson (London), Vice-President.

Present:—Messrs. Andrews (London), Arblaster (Birmingham), Bell (Hull), Churchill (Birmingham), Davison (Glasgow), Harrison (Sunderland), Jervis (Sheffield), Johnson (Malvern), Kerr (Dundee), Mackenzie (Edinburgh), Walker (Coventry), Williams (Manchester) and the Solicitor of the Association.

The minutes of the previous meeting of the Executive were read and confirmed.

The Secretary said that the defence of the Stockport sweet spirit of nitre prosecutions, ordered by the Executive at their last meeting, resulted in a decision in favour of the defendant, £10 being allowed for costs.

The Report of the Law and Parliamentary Committee, with which was embodied the report of the Sub-Committee appointed by them to deal with urgent cases, was then read. The report stated in detail the steps taken in the defence of Mr. Whittle in the action that had been brought against him, under the Weights and Measures Act, for having in his possession certain glass measures, which the Marylebone inspector had examined and declared inaccurate, although they bore the verification mark of the York inspector. It added that no notice of appeal had yet been entered. It then recounted the communications with the Council of the Pharmaceutical Society with respect to the decision of the House of Lords in favour of the respondents in the appeal case of the Pharmaceutical Society *v.* The London and Provincial Supply Association Limited, and the draft of the proposed Bill to amend the Pharmacy Act. The Secretary had been instructed to prepare a circular to be forwarded to eminent pharmacists residing in the United States, the colonies and continental countries, with a list of questions attached, inquiring as to the state of the laws in their respective countries affecting the pharmacist and his business. This circular had been translated into French and German and issued under the President's direction. Numerous replies to it had been received and the valuable information thus obtained had been arranged in a tabulated form under the direction of the Secretary. The Committee had considered the matter of outstanding subscriptions, and, after deliberation, reported that it would be to the advantage of the Association if the names of all members whose subscriptions were two years in arrear were erased from the Register. Sundry other matters which have already been recorded in this Journal were also referred to.

The President said the Law and Parliamentary Committee accepted great responsibility in ordering the defence of Mr. Whittle, and he hoped the Executive would endorse their action. With regard to the Pharmacy Act Amendment Bill he said that the draft had been discussed without calling the Executive together, as they felt, from the state of the political atmosphere, that there was no immediate hurry in the matter and that in all probability little progress would be made with the Bill before the Executive met. They also desired to obtain the opinion of chemists resident in the country to enable the Executive, when called together, to propose any amendments that might be suggested. He was glad to find the Pharmaceutical Council had agreed to one or two important amendments suggested to them by the Law and Parliamentary Committee.

Mr. Bell said he thought it very little use to keep persons on the list of members whose subscriptions were two years in arrear.

Mr. Jervis said he knew a number of persons in his town who had not paid for some time, and who never would pay.

Mr. Andrews said he had reluctantly arrived at the same conclusion.

The Vice-President said, with regard to the Weights and Measures Act, he hoped the Law and Parliamentary Committee would direct their attention to what was contemplated by the institution of a "table of errors." Before doing so, however, it would be necessary to investigate the matter thoroughly. He thought that the Association should aim at obtaining the relief of chemists from the operation of the Weights and Measures Act. It was, in his opinion, a most unjustifiable interference with chemists and druggists.

It was moved by Mr. Andrews, seconded by Mr. Harrison, and unanimously resolved:—"That the report of the Law and Parliamentary Committee be adopted, and entered on the minutes."

The Vice-President said the expurgation of defaulters from their Register was an act which all similar societies had occasionally to put into force, and he would move:—"That it be an instruction to the Secretary to communicate with all members of the Association whose subscriptions are, or may hereafter become, two years in arrear, stating that unless the amount of arrears be received by him within ten days from the date of the said communication, their names will be erased from the Register of the Association, and they will consequently be debarred from all the privileges of membership."

The resolution was seconded by Mr. Harrison and carried unanimously.

The report of the Finance Committee was then read, and on the motion of Mr. Davison, seconded by Mr. Arblaster, it was adopted and entered on the minutes.

The report of the Sub-Committee appointed by the Executive to consider the rates charged by railway companies for the carriage on drugs was then read.

The Secretary said that for some time past the question of railway rates had received the attention of the local and other Chambers of Commerce. The Association of Chambers of Commerce of the United Kingdom appointed a deputation towards the close of last session, to wait upon the President of the Board of Trade, with a view of inducing the Government to bring in a Bill to extend the powers of the Railway Commission, to enable them to deal with excessive and differential rates. Mr. Chamberlain said that if the public required it, steps should be taken to enlarge the powers of the Commission, that the Government would receive and consider any evidence supplied to them on the subject, and that the matter should receive his attention during the recess. He was inclined to think it would be useless for the Association to approach the railway companies, asking for a reduction in the rates charged on the carriage of drugs, as some two years previously a deputation from the Birmingham Chamber of Commerce had an interview with the local managers of the railway companies at the Great Western Hotel, when the companies' representatives stated that they were trading bodies, and that one of their main objects was to make a reasonable dividend for their shareholders, that the rates they were entitled to charge for the carriage of goods were laid down by Act of Parliament, and that so long as they did not exceed those statutory rates they must be allowed to conduct their own business in their own way. A Select Committee was appointed by the House of Commons on February 16 last to inquire into the charges of railway companies for the conveyance of merchandise and parcels and into the working of the Railway Commission, and to report to the House as to any desirable amendment of the laws and practice of the said charges and the powers of the said Commission.

After some further discussion, it was moved by Mr. Bell, seconded by Mr. Davison, and unanimously resolved:—"That the report of the Sub-Committee, appointed by the Executive to consider the rates charged by the railway companies for carriage of drugs, be received, adopted and entered on the minutes."

It was moved by the Vice-President, seconded by Mr. Walker, and resolved:—"That the Sub-Committee previously appointed to consider the rates charged by railway companies for the carriage of drugs be reappointed, and that it be an instruction to them to collect such information as they may deem necessary, with a view of submitting the same to the Select Committee recently appointed by the House of Commons to consider railway rates."

The President said the next subject on the agenda paper was the consideration of the amended Bill "To further regulate the Sale of Poisons, and to alter and amend the Pharmacy Act, 1852, and the Acts amending the same," accepted by the Council of the Pharmaceutical Society at its meeting on February 2nd last.

Mr. Bell said before considering the Bill as printed, he should like to ask why the first clause of the draft Bill, as approved by the Law and Parliamentary Committee of the Association, had been cut out. It proposed to empower the Pharmaceutical Council to appoint any fit and proper person to conduct examinations in Scotland, whether resident in Scotland or elsewhere. He thought that embodied a very desirable amendment of the present Act. The examinations in England and Scotland should be as far as possible similar in all particulars, and as the Council had power to place Scotchmen on the English Board, he could not conceive why the power should be denied them of placing Englishmen on the Scotch Board. Perhaps one of the members of the Pharmaceutical Council who were present would enlighten him as to the cause of the erasure of the clause from the Bill.

The Vice-President said it was a matter of humiliation to many members of the Council that the clause had been removed from the Bill. The Scotch members of the Council were answerable for it, and it was evidence of a clannish feeling on their part much to be deplored.

Mr. Churchill said the London Board of Examiners might include as many Scotch gentlemen as the Council might appoint, and he certainly thought it strange that the members of the Council, resident in Scotland, should have thwarted the original scheme.

Mr. Andrews said if the Scotch Board of Examiners only examined Scotch candinates the matter would be placed on a different footing, but that was not so. It frequently happened that candidates who had failed to satisfy the English Board of Examiners as to their efficiency, subsequently presented themselves before the Scotch Board. He quite agreed with the remarks of Mr. Bell, and regretted very much the erasure of the clause.

Mr. Mackenzie said he was of opinion that the Scotch examiners could do very well without the presence of Englishmen on their Board.

The clauses of the Bill as approved by the Pharmaceutical Council were then considered *seriatim*.

Considerable discussion took place on clause 4, having reference to the limitation of the authority of executors and others to carry on the business of a deceased chemist. A resolution approving of the principle embodied in the clause was, on the motion of the President, seconded by the Vice-President, carried unanimously.

The President said he wished on behalf of the Association to express his thanks to the President of the Pharmaceutical Society for the ability with which he had conducted the launching of this Bill. A great deal of responsibility had rested on Mr. Greenish in the matter, and he thought the best thanks of the Association and of the trade were due to him.

It was moved by the President, seconded by Mr. Walker, and unanimously resolved:—"That this Executive, having considered the provisions of the Bill to further regulate the sale of poisons, and to alter and amend the Pharmacy Act, 1852, and the Acts amending the same, placed before them by the wish of the Pharmaceutical Council, agree to its clauses, and hereby express their desire of co-operating with the said Council with a view to carrying the Bill into law."

The Secretary then called attention to the Medical Act, 1858, Amendment Bill, introduced into the House of Commons by Mr. Hardcastle. Section 26, sub-section 3, proposed to enact that:—"If a person who is not for the time being registered in the Medical Register, for gain attaches to his residence or place of business, or otherwise uses such descriptions as provident dispensary, dispensary, medical or surgical dispensary or medical and surgical dispensary, consulting dispensary, medical hall, or any other medical or surgical description, such person shall for every such offence be liable, on summary conviction, to a fine not exceeding twenty pounds." He wished to direct the attention of the Executive to the words "dispensing" and "medical hall."

Mr. Churchill said he thought chemists should not use the words "medical hall."

The Secretary said that, although it might be desirable to discourage the use of those words by chemists in the conduct of their businesses, the Executive could not close their eyes to the fact that very many members of the trade had those words painted on their facia boards, and printed on their labels. In continuation, he said subsection 6 of the same section was as follows:—"In lieu of the penal clause of the Apothecaries Act of 1815, by this Act repealed, it is enacted:—Any person not registered under this Act, who for gain engages in the medical treatment of diseases, shall for each offence be liable, on summary conviction, to a fine not exceeding twenty pounds. This section shall not interfere with the rights, privileges or titles conferred on persons by registration under the Dentists Act of 1878, nor with the rights, privileges or titles conferred on persons by registration under the Pharmacy Act of 1868." The Bill was down for second reading in the House of Commons on June 29.

The President said he thought there was a probability of a Royal Commission being appointed to inquire into the working of the Medical Acts.

It was moved by Mr. Davison, seconded by Mr. Kerr, and unanimously resolved:—"That the Law and Parliamentary Committee be instructed to take such action as they deem desirable with reference to the Medical Act, 1858, Amendment Bill, together with any other Bills that may be introduced into the House of Commons."

It was moved by Mr. Bell, seconded by Mr. Mackenzie, and unanimously resolved:—"That the Fifth Annual General Meeting of the Members of the Association be held in London on Tuesday, May 17 next, and that the arrangements for the same be left in the hands of the London Committee."

The President said he regretted to announce the decease of their late colleague, Mr. John Abraham, of Liverpool. Mr. Abraham was well known to most of them and universally respected, and he had materially advanced the interests of the Association in it early stages. He (the President) begged to move:—"That the members of this Committee having heard with profound regret of the decease of their late esteemed colleague, Mr. John Abraham, of Liverpool, instruct the Secretary to convey to his family their sympathy with them in their sad bereavement."

The Vice-President, in seconding the resolution, said he was sure they all regretted the loss of Mr. Abraham.

Messrs. Andrews, Bell and Johnson supported the resolution, paying a high tribute to the deceased gentleman.

A communication was read from a member suggesting that a Benevolent Fund should be formed by the Association. After some discussion the Secretary was instructed to reply to the effect that the Committee did not see their way to entertain the suggestion at present.

Correspondence.

THE PHARMACY ACT AMENDMENT BILL.

Sir,—A considerable amount of discussion has already been devoted to the question as to the position to be accorded to widows under the new Pharmacy Act which is now being sought. But the arguments have not covered all the ground, as you will see by the propositions submitted in the following paragraphs. Although one or two of these may appear to approach the *reductio ad absurdam* they ought not on that account to be lost sight of.

From an outsider's point of view, there is no principle on which any spouse of a qualified person can be, as such, either during life or after death of the qualified person, deemed qualified.

There is no argument properly applicable to the female spouse of a male not applicable to the male spouse of a female, and therefore if exceptional legislation is to be, widow or widower should not be the word used, and the only one for use is spouse.

The proposed new qualification will not be "representative;" all "representatives" are, as such, embraced by the words executors, administrators or trustees now operative.

At present a dying spouse (male or female) can appoint executors, and may or may not appoint a surviving spouse to the office, and if no appointment be made a surviving spouse is by law recognized as having the first right to become administrator.

Thus the law confers on a chemist and druggist a right to bridge an interval by appointing executors and excluding a spouse; but should the proposal be passed, appointed executors may carry on as representatives and a surviving spouse may carry on, in competition or otherwise, by force of personal qualification under the statute.

And if personal qualification should, by the form of matrimony, be transmissible from spouse to spouse—for "they twain shall be one flesh"—it is not easy to see where the process should stop; a surviving spouse may re-marry and so on and on after the manner of the house that Jack built, and if matrimony could transmit the virtue of personal qualification from spouse to spouse, it is difficult to realize that the offspring of the happy union should be less meritorious than its parents.

And observe the injustice towards pharmaceutical chemists and chemists and druggists of the gentler sex, if the widows of males are to be, whilst the widowers of females are not to be deemed qualified.

Ladies are on the register, and if they be allowed to endow men who marry them with personal qualifications, does it not open a vista of usefulness to fair ones? Why should marriageable men weary themselves to prepare for and pass examinations; to pass examinations may come to be regarded as woman's mission, whilst man, by making a judicious choice and happy union, may attain the qualification desired, but otherwise beyond his abilities.

VIGILANS.

G. J.—By reference to the *Pharmaceutical Journal* of May 1st last you will find the information you require. Your inquiry furnishes an illustration of a fact that frequently comes under our notice, namely, that from omitting to read the Journal regularly many of those who should do so find themselves in need of information they might otherwise possess.

G. C.—With respect to testing for methylic alcohol see Prescott's 'Chemical Examination of Alcoholic Liquors.' You appear to have fallen into an error in speaking of amylic alcohol.

T. Fletcher.—No such paragraph has appeared in this Journal; therefore your appeal to our sense of fairness is hardly warranted.

S. E. C.—We should think not.

J. A. R. and *Alpha.*—Applications should be made to the Registrar of the Medical Council, 315, Oxford Street.

"*Islander.*"—The only reason why a dealer in wine is unable to hold a licence for the sale of methylated spirit is the provision in the first section of the Act 24 and 25 Vict. cap. 91, "That any person, *not* being a distiller or rectifier of spirits, or a dealer in or retailer of beer, spirits, wine or sweets, may take out an Excise licence authorizing him to receive and sell methylated spirit."

"*Quaesitor.*"—The Pharmaceutical Society of Victoria publishes a monthly journal as an "Australasian Supplement" to a London contemporary. The office is at Mutual Provident Buildings, Collins Street West, Melbourne.

Chemicus (Bristol) is referred to the rule respecting anonymous communications.

R. J. Young.—If the word "published" were inserted before "formula" the phrase might be used; but we do no think the use of either of the designations given at the end of your letter would be justifiable.

"*Spondalium.*"—(1) Flake white is basic carbonate of lead. (2) As to sp. ætheris chlor. see the present series of this Journal, vol. i., p. 68; vol. viii., p. 37; or vol. viii., p. 67 (in "The Month").

"*Chemicus.*"—The three ingredients mentioned are known preparations sent out by the makers whose names are attached. The formulæ have not been published.

J. Miller.—Directions for the preparation of "Chemical Food" will be found in vol. viii., p. 482 and several other places in the present series.

Sigma.—The text of the Dental Act may be found in vol. ix. (1878), p. 52.

E. M.—The solution, before the addition of the nitrate of silver should be made neutral by means of a little carbonate of soda.

H. C. H.—See a paper read before the Chemical Society recently, "On the Atmospheric Oxidation of Phosphorus," by C. T. Kingzett (*Journ. Chem. Soc.*, December 1880, p. 792; in abstract, *Pharm. Journ.*, *ante*, p. 399).

H. A. A.—The Act does not apply to Jersey, Guernsey or the Isle of Man.

"*Ignoramus.*"—The correction, if worth making, should have been made at the Evening Meeting and not in an anonymous letter.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Hill, Johnson, Baker, Snell, Nichol, Smith, Wilkinson, Kemp, Nicholson, Claypole, Beta, Nemo, Minor Mas, Ferrum, H. A. A., J. G. P. S., H. C. H. O., T. M.

PHARMACY IN SPAIN.

The following notes on the condition and practice of pharmacy in Spain, from the pen of Mr. L. E. Dotesio, of Bilbao, who was formerly a pupil in the School of Pharmacy, Bloomsbury Square, have been kindly placed at our disposal by Mr. S. R. Atkins, of Salisbury:—

"I have often thought of writing to the Journal upon Spanish pharmacy, etc., but through want of time have been unable to do so, and even now I fear I shall only be able to give you a very incomplete account.

"Theoretically, pharmacy in Spain is perfect, but in practice, of course, the weak points come out. The curriculum is lengthy, two years being required to become a licentiate in pharmacy, and one year more to obtain the title of doctor in pharmacy. No one can be a pharmacist who is not previously a bachelor in arts, and the curriculum is divided in five years' classics to become a B.A., five years in one of the three academies of pharmacy to become a licentiate in pharmacy, with rights to open a pharmacy in any part of Spain or Colonies, and one year more in practical analysis, etc., to become a doctor in pharmacy. Very few aspire to this latter title, which is an expensive one. I cannot say that the examinations are very searching, nor even, perhaps, very impartial, recommendations, influence, etc., having a great deal to do with everything in this country. There is certainly not enough practical work demanded, so that many young pharmacists find themselves crammed with theories, Pharmacopœia, etc., and yet are not able to dispense a prescription or make or spread a plaster. The consequence is that before opening their new pharmacies the sensible ones go in for at least six months' practice in some friendly pharmacy where good practice in dispensing is to be found.

"In our pharmacy we often have one or two for instruction, which we willingly allow, as afterwards they become good customers to our wholesale branch. The social status of pharmaceutists is that of a professional man, in every respect equal to the doctors. There are two on every Board of Health. The local secretaries are called sub-delegates, and are those who see to the diplomas, inspect pharmacies, and undertake all prosecutions, etc. On establishing himself, the new pharmacist sends his diploma to the sub-delegate of the district, with a request that he will inspect his pharmacy. The sub-delegate at once does so, seeing that the place is fitted with a still and other appliances, and all the official and officinal preparations ordered by the Academy of Pharmacy, and only after this visit does the establishment remain open to the public. The pharmacist is strictly forbidden to prescribe in any way; according to the strict letter of the law he should only dispense doctor's prescriptions, but this is not observed, the public being supplied with anything non-poisonous it chooses to ask for.

"As to prescribing, not a single case has come to my notice, and, I believe, it is not done by any pharmaceutist in Spain. Of course, to make up for this the doctors are forbidden to prepare medicines, and really never do dispense; in fact, would not know how to. There is an official tariff for charges to be made for prescriptions, but it is very old, and wants revising, all modern drugs being at an excessive price, so much so, that a reduction of nearly 50 per cent. is often made on it; therefore it merely serves as a limit beyond which the pharmacist cannot charge. On dispensing a prescription, the pharmacist is obliged to copy it, to stamp it with his name and address, and to put its number and price on it. Putting the price on works fairly well, it is an obligation for a new dispenser to respect the former dispenser's price, and although the public sometimes tears off or obliterates the price, or some black sheep amongst pharmacists sometimes charges a lower price than what he puts on the prescription, these are rare exceptions.

"A pharmaceutist can only have one pharmacy, and must reside there. At his death, his widow or children have a right to carry on the business under the managership of a licentiate in pharmacy until their death, when it must be sold. No other relations but a widow or children can carry on the business of a deceased pharmacist. No prescriptions can be dispensed in any shop which is not a pharmacy, duly owned by a pharmaceutist. All patent medicines and drugs can only be sold by pharmaceutists. Wholesale druggists are not allowed to retail anything medicinal to the public, and everything else they must sell in wholesale quantities. A pharmacy must either be owned by the pharmacist himself, or belong to the widow or children of one.

"Pharmacists here would get on very well were it not for their excessive number, caused principally by the innate pride of the Spaniards themselves, for the very last peasant, if he has three sons, will not rest satisfied until he has made them all professional men, one a doctor, another a chemist, and the third a priest. The country is suffering from an excess of professional men; lawyers, doctors and chemists are leading a semi-starving existence by thousands, whilst agriculture and commerce, two promising fields here, are almost completely neglected. My experience of chemists in England, France and Spain is all alike; there is no *esprit de corps* amongst them; they are divided, only too delighted if any misfortune happens to their brother chemists, forgetting in their selfish joy that the same fate may likely overcome them next.

"I have so far only met one example in which two chemists have thoroughly co-operated together to improve their position, and I therefore consider it well worthy of mention. In ——— we have two customers, chemists, who have made the following arrangement:—Finding that competition was ruinous, and that the good citizens of ——— were the only ones who profited by it, the two pharmacists determined to become firm friends, and work together. Not only now do they keep up their prices, etc., but they do without assistants, only one of the two shops being open at a time. We will call them A. and B. A.'s shop is open Sunday, Monday and Tuesday; B.'s shop then opens Thursday, Friday and Saturday, and so on. The night bell is attended to in the same way. A., whilst his shop is closed, is naturally at liberty, and finds time to attend to the laboratory work, B. doing the same when his closing time comes. At the end of each month they make up accounts, and if B. has received more money than A., he gives him half of the surplus. I need not add that they now live well, and enjoy life thoroughly."

STUDIES OF THE GENUS STRYCHNOS.

BY G. PLANCHON,

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(*Concluded from page* 695.)

VI. CURARE OF BRITISH GUIANA.*

As in the case of French Guiana, it is in the high ground which forms the separation between the basin of the Amazon and that of the Atlantic Ocean that the plants yielding the curare of British Guiana are found. The principal river of this district is the Essequibo, which takes its rise in the Acaras mountains, 60 kilometres north of the equator, and running nearly constantly north (between 58° and 59° longitude E. of Greenwich) falls into the Atlantic after a course of 990 kilometres. At 4° N. latitude it receives on its left the Rupuruni, which itself issues from a mountainous region east of the Essequibo, called "Conuku," "Conocou," or "Corocou." At the foot of this high ground, on the west, run numerous affluents, which unite to form the Parima and run towards the Amazon.

It is in this region that the Macusis, the tribe which more especially prepares the arrow poison in British Guiana, live. I have already indicated the composition, according to Robert Schomburgk, of this substance, which was the first well studied in reference to the determination of the species that constitute its basis. It now remains to say a few words concerning these plants.

The fundamental species is the *Strychnos toxifera*, the "urari" of the natives. It has been described by Bentham (*Hook. Journ. Bot.*, iii., 240), from specimens brought home by Schomburgk. I need not enlarge much upon this perfectly known species. I will recall only that it is a climber which is distinguished easily from other species of *Strychnos* by the numerous long patulous russet-coloured hairs that cover the young branches, the club-shaped spines and the dark green leaves. The leaves have the ordinary venation of the genus (three or five longitudinal nerves), and are membranaceous, ovate, oblong and shortly acuminate. The flowers have a hypocrateriform corolla, with a tube five times as long as the lobes of the limb, covered on the exterior with long hairs, and bearing at the base of its divisions a whitish woolly down. The fruit is as large as an apple; it is rounded, acuminate, bluish green, and contains the seeds in a bitter mucilaginous pulp.

I have seen in the Museum of Natural History a number of specimens of *Strychnos toxifera*, Benth., and have been able to study the anatomical structure of a young branch. Further, Mr. Holmes, Curator of the Museum of the Pharmaceutical Society of Great Britain, has kindly sent me some pieces of bark and a fragment of stem about 2·8 centimetres in diameter, which have enabled me to note the structure of those parts.

The Museum specimen of branch, which is quite young, presents no trace of the lacunæ so characteristic of species of *Strychnos*, and it might be thought that they are not to be found in this species. But the specimen of stem sent by Mr. Holmes leaves no doubt as to the existence of this character.

In this piece of stem the bark, which separates rather easily from the wood, has a thickness of 1·5 to 2 millimetres. On the exterior it is rough and irregularly furrowed longitudinally. On the interior surface it has a greyish colour and is delicately striated longitudinally. A transverse section presents as a conspicuous character a very considerable development of the pale or whitish middle zone, situated between two thin layers of reddish tint. In this respect it much resembles *Strychnos Gubleri*. The wood is greyish, marked by numerous conspicuous streaks of a little brighter tint than the ground of the tissue, or by very small openings running tangentially. The streaks and openings form moderately regular concentric layers.

Under the microscope the bark shows underneath the reddish suberous layer, formed of numerous tabular cells disposed in regular series, a very narrow parenchymatous zone, with cells extended transversely and containing frequently large crystals of oxalate of lime. The zone of stony cells alone occupies two thirds of the thickness of the bark; the underlying liber layer, rich in crystals, recalls by its appearance the second zone.

As to the wood, it presents the ordinary structure of the *Strychnos* wood. The medullary rays contain crystals in nearly all the cells. The lacunæ are there well developed, and in the greater part is found a tissue forming a sort of network with large meshes. In a longitudinal section very porous oblique partitions indicate well the origin of the characteristic lacunæ, which are due to the presence in the wood of reticulated vessels (*vaisseaux grillages*).*

The second species of *Strychnos* which enters into the composition of this curare, the "arimaru" of the natives, has been described by Bentham (*loc. cit.* 105) from Schomburgk's plants under the name of *Strychnos cogens*. It is a species still imperfectly known, concerning which I can give very few details. The plant is a climber, having coriaceous, ovate lanceolate acuminate leaves, rounded at the base, marked by five nerves, 4 to 5 inches long, 1½ to 2 inches broad, shining above, opaque underneath. The inflorescence is axillary, branching from the base, shorter than the leaves; the corolla is not known. The fruit is a globular berry, yellowish, and 6 to 8 lines in diameter.

The *Strychnos cogens* grows near the Pirara, which according to Robert Schomburgk's map of British Guiana, appended to the catalogue of the Exposition Universelle of 1867, forms a canal of communication between the streams which fall into the Rupuruni and thence into the Essequibo and those which reach the Amazon by the Parima.

The "yakki" of the natives is also a species of *Strychnos*, which Klotsch has described under the name of *Strychnos Schomburgkii*. It is described in Martius's 'Flora of Brazil' under the name of *Strychnos pedunculata*, Benth. It belongs to the division of the *Rouhamons*, and has been included in the 'Prodromus' of De Candolle under the name of *Rouhamon pedunculatum*, A. D.C. I have seen specimens of it in the herbarium of the Museum. Richard Schomburgk found it near the Pirara.

This plant is a climber furnished with tendrils rolled up like a crosier. The leaves are coriaceous, oval or oblong, obtusely acuminate, with three to five longitudinal nerves. The flowers are disposed in axillary cymes, with long peduncles, with four parts to the different verticels. The corolla is hypocrateriform, with a tube shorter than the lobes of the limb, and barbed at the throat.

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* *Journal de Pharmacie et de Chimie* [5], vol. ii., p. 105.

* The existence of these vessels, and consequently the explanation of the characteristic lacunæ of the genus *Strychnos*, has already been pointed out. It is to be found in fact in the 3rd part of the 'Handbuch der physiologischen Botanik' of Hoffmeister, partly re-edited by M. de Bary under the title 'Vergleichendo Anatomie der Vegetationsorgane'; these vessels are described and figured on p. 396, fig. 299.

As to the "volkarimo," the "tarireng," the "tararemér," the "mamica" and the "maramu," the juices of which are used to thicken the curare, I have no information to add to that which has already been given.

CULTIVATION OF RHUBARB IN FRANCE.

The cultivation of *Rheum undulatum* and *R. Rhaponticum* has for some time past been carried on profitably at Clamart, near Paris, and the products of both plants, as so cultivated, are confounded in commerce under the name of French rhubarb. Recently M. Gallais has been making some experiments in the cultivation of *Rheum officinale* at Ruffec, in the Charente department, and he has communicated his manner of proceeding and results to the Paris Société d'Acclimatation.*

In the selecting of a suitable spot for the experiment M. Gallais states that he was guided by the following considerations. The *Rheum officinale* grows in Asia between the 30th and 39th parallels of latitude, at an elevation of 4000 feet above the sea level. The isothermal line of 12·9° of temperature passes by Pekin, of which the latitude is 39° 54′ 13″ N. and above Milan rises to latitude 45° 54′, running to the west of Europe. By taking this isothermal line and adding half a degree of temperature for each degree of latitude towards the south, and deducting one degree of temperature for each 172 metres of elevation above the level of the sea, he arrived at the conclusion that in the natural habitat of the plant the average climatic temperature was 19° in summer and zero in winter. Ruffec, the place where M. Gallais' experiment has been carried on, is situated in latitude 46° 11″ N., longitude 2° 8′ 17″, has an average temperature of 17° C. in summer and 1·2° C. in winter, and is at an elevation of 96 metres above the sea-level.

According to the analyses of Fremy and Pelouze the rhubarb plant is rather rich in potash and sulphuric acid, less so in siliça, more or less rich in lime, and rich in phosphoric acid. The soil at Ruffec is calcareous, sandy, and very nitrogenous, being composed partly of sands proceeding from old degradations. These sands contain a considerable abundance of silicious and aluminous matters. The soil is very permeable, requiring during the summer months about 5 cubic metres of water per are.

M. Gallais commenced operations with a plant obtained from Dr. Giraudeau, which in its turn was derived from the original plant grown in the Botanical Garden of the Paris Medical School, from which the species *Rheum officinale* was described by Professor Planchon in 1872.†

The plant cultivated in the shade, with a northern exposure and in moist places, developed a luxuriant vegetation, both in the size of its root and the amplitude of the leaves. But the product under such conditions appears to have been of doubtful quality.

Whilst working upon the plant in the spring a very short stem was noticed, appearing like a ball covered with black scales, from which issued in the first days of March an enormous bud, resembling both in size and colour a hen's egg. This bud gradually developed and gave off leaves, which in the first year of the plantation attained a diameter of one metre.

In the month of June, desiring to develop a vigorous vegetation whilst preserving the medicinal principles, M. Gallais dressed each of the plants with 100 grams of Peruvian guano. Being freely watered, the root then grew considerably and formed upon every side axillary buds, which produced in their turn leaves that were smaller than those which issued from the parent stem. Such buds, in developing, give rise in the prolonged stalk to changes which upon section become apparent as the marblings that are held as characteristics in commerce and are the work of Nature only. The plant was left during the second year, with only such attention as was necessary, to gather strength and to allow its cellular structure to become more compact by the concentration of its particular juices.

The collection was made at the end of the second year; in the case of the plant growing spontaneously the Chinese are said not to make a collection until the end of the sixth year. The art of cultivating this plant for medicinal purposes, M. Gallais considers to lie not only in assisting the growth of the plant, but in favouring the development of the active principles, so that the plant may arrive in a couple of years at the stage which, when growing wild, it attains in six. The known characters of French rhubarb he attributes to the collection having been made before the plants have arrived at maturity. As to reproduction M. Gallais has obtained the best results with offshoots. At Ruffec the plant seeds with difficulty in the second year, and its cultivation from seeds is not always successful, especially in rainy and cold seasons.

Every second year, in July or August, according to the season and the growth of the plant, the roots or prolonged stems were collected, and from these stalks a considerable number of offsets or buds were separated with a knife. The offsets were then planted quincuncially in well-prepared soil, with a clear interval of a metre between each. As soon as the rainy and cold season set in these offsets commenced to develop and continued during the autumn, forming rounded roots, which have supported the severest cold of the district, reaching 13° below zero.

Last year M. Gallais possessed eighteen plants, which when pulled up, cleansed and dried, yielded 28 kilograms of product, described as being of good quality and samples of which were exhibited to the Society. The gathering and drying, however, are looked upon by M. Gallais as more important operations than even the cultivation.

In the month of August the leaves of the plant become completely dry and a period arrives when usually the soil surrounding the stem cracks and exposes the enormous roots. It is just at this time of apparent stagnation that M. Gallais pulls up the roots and "divides them most artistically into pieces to imitate those imported, whether from Tartary, Russia, or Persia." These pieces are cleansed carefully and thrown at once into clean water that has been acidulated by some vinegar or a few drops of sulphuric acid, in order to prevent their becoming blackened or taking a bad colour through exposure to the air. After a momentary immersion they are drained on hurdles and placed immediately in a stove at a temperature of 30° C. This operation has for its object to form a hard casing round the pieces, to compress the juice and to prevent mouldiness and consequent fermentation. After some days of continued drying the pieces are strung upon cords so as to form large chaplets and these are hung in a bake-house or kitchen chimney, or, when the quantity makes it worth while, in a stove. It is said that the Tartars attach small chaplets of rhubarb to the horns of their goats and sheep, and thus dry them by exposure to the sun's rays. M. Gallais thinks, however, that another account is more correct, which says that the rhubarb, cut into fragments and cleansed, is placed by the natives upon slowly heated stones and carefully turned from time to time, being afterwards strung to complete the drying process. He is inclined to believe, however, that a quicker drying would be preferable, and proposes to place some of his next yield in an oven immediately after the removal of the bread.

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* *Bulletin*, [3], vol vii., p. 667.

† See *Pharmaceutical Journal*, [3], vol. iv., p. 690.

Last year M. Gallais made the experiment of drying the root in the sun, but the result was not satisfactory. The thick pieces dried slowly and became completely decolorized instead of retaining their dirty yellow tint, whilst the cellular tissue underwent a considerable alteration due to a slight fermentation. M. Gallais considers that these alterations would be prevented by a rapid drying, and the juice being concentrated in the interior of the piece its aroma would be preserved, whilst the pieces would consequently acquire a commercial value in proportion to their thickness.

M. Gallais' operations have as yet been carried on upon a limited scale, but he makes an estimate, in which he values the product at six francs per kilogram, from which it would appear that the cultivation could be carried on profitably.

THE NITROPRUSSIDES OF THE ALKALOIDS.

BY DR. EDMUND W. DAVY, M.R.I.A.,

Professor of Forensic Medicine, Royal College of Surgeons, Ireland.

In a communication made to the Pharmaceutical Society of Ireland on the 1st ult., of which the following is an abstract, Dr. Davy remarked that the nitroprussides, which were first studied by Dr. Lyon Playfair, had not received, on the part of chemists, the attention that might have been expected from the interesting properties possessed by those compounds; for though it is now over thirty years since they were first investigated, still comparatively little has been added to our knowledge of those salts beyond what was ascertained by Dr. Playfair, who described very fully the principal characters of nitroprussic acid, and of some of its most important metallic salts. As he appeared not to have investigated the organic combinations of that acid, and scarcely any attention has subsequently been given to them, Dr. Davy undertook their investigation; and the vegetable alkaloids being, as a class, the most interesting and important organic bases that we are acquainted with, he naturally directed his attention to them in the first place, and the result has been that he has succeeded in preparing several undescribed salts of those bases, some of which he exhibited to the meeting, having first made some remarks on the nitroprussides of the alkaloids in general.

Dr. Davy stated that he has ascertained that nitroprussic acid, the composition of which is represented by the formula $H_2(NO)FeCy_5$, is capable of forming compounds with the different vegetable alkaloides or bases, which are, for the most part, very sparingly soluble in water; and when they are such, they may be readily obtained by treating any of their soluble salts with a solution of sodium nitroprusside, when the alkaloid will be precipitated in union with the nitroprussic acid, producing sometimes a very characteristic precipitate or deposit.

On being so formed, the salt will in some cases, as in those of strychnine and brucine, exhibit itself from the first as a more or less crystalline precipitate; but in many instances, if the precipitated nitroprusside is examined under the microscope, it will be found to be at first amorphous, or in the form of minute oil-like globules, which latter, on subsiding, or on agitation, adhere to the sides and bottom of the vessel containing the mixture, forming a sticky, resinous looking deposit; or the particles agglutinate together into little lumps or masses of a similar character. But these deposits, on standing for a variable period, assume, for the most part, a more or less crystalline condition. In some cases, however, as, for example, in those of veratrine and cinchonidine, there appeared to be no disposition on the part of the salts to acquire a crystalline form, even after the lapse of a considerable time. Some of the alkaloids, as those of morphine and nicotine, from their forming much more soluble salts with nitroprussic acid, their nitroprussides cannot be obtained by precipitation, as in the case of those alkaloids the nitroprussides of which are sparingly soluble salts. But these can be easily made either by directly dissolving the alkaloid in nitroprussic acid, or by treating solutions of their chlorides with silver nitroprusside, or their sulphates with a solution of barium nitroprusside; when, in the first case, the insoluble silver chloride, and in the second that of barium sulphate is formed, either of which can be easily separated by filtration from the soluble alkaloid nitroprusside produced, which on subsequent evaporation, if the salt is crystallizable, can be obtained in a crystalline form. But the use of the silver salt with the chloride of the alkaloid is to be preferred, as affording greater facilities for the preparation of the nitroprusside of the alkaloid in a pure condition.

Dr. Davy has ascertained that nitroprussic acid forms (as might have been expected from its being a bibasic acid) two classes of salts with the alkaloids, viz., neutral and acid salts. In the first there exist two molecules of the base and one of the acid, and in the second one molecule of each. And he has observed that some of the alkaloids, as for example, morphine, strychnine and brucine, seem to be capable of forming only neutral salts, whereas others, as those of quinine, cinchonine and nicotine, form both neutral and acid salts in combining with nitroprussic acid. He has also noticed that where the alkaloids form the two classes of salts just stated, that in some cases the neutral salt is the most readily crystallizable, and the acid one much less so, and *vice versâ*. Thus the quinine neutral salt crystallizes with great facility, whereas the acid one does so with difficulty; on the other hand, the nicotine acid salt readily assumes the crystalline form, whereas the neutral one appears to be non-crystallizable.

Dr. Davy then proceeded to describe at some detail the preparation and properties of the nitroprussides of the more important alkaloids, commencing with strychnine, it being one of the few organic nitroprussides to which some very slight attention on the part of chemists had already been given. From his having ascertained that some of those salts are very sparingly soluble in water,—thus the nitroprusside of brucine requiring about 736, that of strychnine 847, and that of quinine 2500 times their weight of water at the ordinary temperature in their solution, whilst that others, as those of morphine and of nicotine, are very soluble salts,—from this difference of solubility, together with the characteristic appearances he has pointed out, which some of those compounds present when examined under the microscope, he expressed a hope that his researches on the nitroprussides of the alkaloids may prove to be of some practical value, as adding to the distinctive characters of those bases, and thus furnishing additional means for their detection and separation under different circumstances.[*]

REPORT OF SOXHLET'S RESEARCHES ON THE QUANTITATIVE ESTIMATION OF THE SUGARS.[†]

BY C. H. HUTCHINSON, F.C.S.

(Concluded from page 722.)

The results of the experiments were as follows:—

Invert Sugar—Time required for reducing Fehling's reagent, two minutes. 50 c.c. of a solution containing 1 per cent. = 0·5 grm. of inverted sugar decompose—

101·2 c.c. of Fehling's solution, undiluted.
99·5 „ „ „ +1 vol. water.
98·2 „ „ „ +2 „
97·3 „ „ „ +3 „
97·0 „ „ „ +4 „

100 c.c. of a solution containing ½ per cent. = 0·5 gram inverted sugar decompose—

100·6 c.c. of Fehling's solution, undiluted.
97·1 „ „ „ +4 vols. water.

Using a constant quantity of Fehling's solution, a similar result was obtained, thus:—

Fehling's Solution.	1 per cent. Sugar Solution.
100 c.c. undiluted require . . .	49·4 c.c. = 0·4940 grm. inverted sugar.
100 c.c. + 1 vol. water require .	50·3 c.c. = 0·5030 grm. inverted sugar.
100 c.c. + 2 vol. water require .	50·9 c.c. = 0·5090 grm. inverted sugar.
100 c.c. + 3 vol. water require .	51·4 c.c. = 0·5140 grm. inverted sugar.
100 c.c. + 4 vol. water require .	51·5 c.c. = 0·5150 grm. inverted sugar.
	½ per cent. Sugar Solution.
100 c.c. undiluted require . . .	99·4 c.c. = 0·4970 grm. inverted sugar.
100 c.c. + 4 vols. water require .	102·9 c.c. = 05145 grm. inverted sugar.

From these experiments it follows that 1 equivalent of inverted sugar (180) in 1 per cent. solution reduces 10·1 equivalents of cupric oxide when undiluted Fehling's solution is used, and 9·7 equivalents when this is diluted with 4 volumes of water.

The following results were obtained by the gravimetric process, and show the effect caused by varying the proportions and concentration of the reacting substances. 0·5 gram inverted sugar in a 1 per cent. solution added to boiling Fehling's solution and maintained 5 minutes at boiling point.

c.c. Fehling's solution.	Diluted with vol. water.	Grm. Copper obtained.	Copper calculated for 100 pts. sugar.
97·5	4	0·8560	171·20
195·0	4	0·9170	183·40
100·0	1	0·8742	174·84
200·0	1	0·9408	188·16
102·0	0	0·8903	178·06
150·0	0	0·9317	186·34
200·0	0	0·9456	189·12
300·0	0	0·9643	192·86
400·0	0	0·9710	194·20
Lowe's Solution.			
150 (containing copper=333 Fehling).	0	1·0800	216·00
200 (containing copper = 444 Fehling).	0	1·1142	222·84

The remarks which Soxhlet appends to these experiments are thus classified:—

1. The reducing power of inverted sugar, for alkaline copper solution, is importantly influenced by the concentration of the solutions: a smaller quantity of sugar being required to decompose Fehling's solution in the undiluted state than when it is diluted with 1, 2, 3 or 4 volumes of water. It is immaterial whether the sugar solution be added to the cold or boiling copper reagent.

2. If inverted sugar acts on a larger quantity of copper solution than it is just able to reduce, its reducing power will be increased, the increment varying according to the amount of copper in excess and the concentration of the cupric liquid; in the previous experiments the equivalents varied from 1 : 9·7 to 1 : 12·6 these numbers being by no means the limit of possible variation.

3. In a volumetric estimation of inverted sugar by means of Fehling's solution, the amount of copper reduced by each successive addition of sugar solution is a decreasing quantity, the results obtained are therefore perfectly empirical, and are only true of that particular set of conditions.

4. The statement that 1 equivalent of inverted sugar reduces 10 equivalents of cupric oxide is not true, the hypothesis that 0·5 gram inverted sugar reduces 100 c.c. of Fehling's solution being shown to be incorrect; the real amount under the conditions laid down by Fehling (1 volume of alkaline copper solution, 4 volumes of water, sugar solution ½–1 per cent.) being 97 c.c., the results obtained under this hypothesis are, therefore, 3 per cent. too low. Where, however, the above conditions have been fulfilled, the results although not absolutely, are relatively correct; not so, however, those obtained by gravimetric processes, since the interference of concentration and excess has not been previously recognized.

Grape Sugar, Dextrose.—Time required for reducing Fehling's solution, 2 minutes.

50 c.c. of a solution containing 1 per cent. = 0·5 gram dextrose decompose—

105·2 c.c. Fehling's solution undiluted.
103·7 „ „ „ +1 vol. water.
102·4 „ „ „ +2 „ „
101·5 „ „ „ +3 „ „
101·1 „ „ „ +4 „ „

100 c.c. of a solution containing ½ per cent. = 0·5 gram dextrose, decompose—

104·5 c.c. Fehling's solution, undiluted.
101·1 „ „ „ +4 vols. water.

A repetition of the experiment, using a constant quantity of copper solution, gave the following results:—

Fehling's Solution.	1 per cent. Sugar Solution.
100 c.c. undiluted require	47·5 c.c. = 0·4750 gram dextrose.
100 „ +1 vol. water „	48·25 „ = 0·4825 „ „
100 „ +2 „ „ „	48·80 „ = 0·4880 „ „
100 „ +3 „ „ „	49·20 „ = 0·4920 „ „
100 „ +4 „ „ „	49·40 „ = 0·4940 „ „
	½ per cent. Sugar Solution.
100 „ undiluted „	95·7 „ = 0·4785 gram dextrose
100 „ +4 vol. water „	98·90 „ = 0·4945 „ „

The above numbers show then that 1 equivalent of dextrose (180) in 1 per cent. solution reduces 10·52 equivalents of cupric oxide when undiluted Fehling's solution is used, and 10·11 equivalents when 4 volumes of water are added.

The action of an excess of copper is the same in this case as in that of inverted sugar. These experiments prove that—

1. Dextrose has a greater reducing power for Fehling's solution than inverted sugar under the same circumstances.

2. Results obtained on the hypothesis that 0·5 gram dextrose reduces 100 c.c. of Fehling's solution are not far from the truth, always provided that the conditions of working laid down by Fehling were followed, as under these circumstances the real amount of reduction is 101 c.c.

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[*] Dr. Davy's "Researches on the Nitroprussides of the Alkaloids" has just appeared in full, in the 'Proceedings of the Royal Irish Academy,' 2nd series, vol. iii. (Science).

[†] Read before the School of Pharmacy Students' Association, January 27, 1881.

3. The remarks made with regard to the influence of excess and concentration of the copper reagent on the reducing power of inverted sugar, apply with equal force to dextrose.

4. As in the case of inverted sugar, the results obtained by gravimetric processes are too high.

Milk Sugar.—Time required for reducing Fehling's solution, 6 minutes.

50 c.c. of a solution containing 1½ per cent. = 0·75 gram of milk sugar, decompose—

110·9 c.c. of Fehling's solution, undiluted.
111·0 „ „ „ + 4 vol. water.

50 c.c. of a solution containing 1 per cent. = 0·5 gram milk sugar, decompose—

73·8 c.c. of Fehling's solution, undiluted.
74·2 „ „ „ + 4 vol. water.

100 c.c. of a solution containing ½ per cent. = 0·5 gram milk sugar decompose—

73·9 c.c. of Fehling's solution, undiluted.
74·1 „ „ „ + 4 vol. water.

If the amount of Fehling's solution be retained constant, we have—

Fehling's Solution.	1 per cent. Sugar Solution.
100 c.c. undiluted require . . .	67·6 c.c. = 0·676 grams milk sugar.
100 c.c. + 4 vol. water require .	67·6 c.c. = 0·676 grams milk sugar.

From these figures it will be seen that milk sugar, unlike inverted sugar and dextrose, reduces Fehling's reagent in the same proportion, whether it be applied in a 1½, 1, or ½ per cent. solution, and whether the latter be diluted or not. The small quantity more of Fehling's solution used in the cases where dilution was adopted being accounted for by the greater amount of copper required under these circumstances to produce a reaction in determining the end point, the equivalent of reduction varies on this account from 7·38 to 7·41.

The influence of excess of the cupric reagent is not so great in this case as in those already referred to; it is, nevertheless, of consequence, as is shown by the fact that 0·750 gram of milk sugar, in a 1½ per cent. solution, boiled eight minutes with—

	Gram Copper.	Copper calculated for 100 parts Sugar.
112 c.c. Fehling's solution undiluted, reduced	0·9790	130·53
225 c.c. Fehling's solution undiluted, reduced	1·0133	135·11

Lactose.—Time required for reducing Fehling's reagent two minutes.

50 c.c. of a solution containing 1 per cent. = 0·5 gram lactose decompose—

98·0 c.c. of Fehling's solution undiluted.
93·9 „ „ „ + 4 vol. water.

Employing a constant quantity of Fehling's solution.

Fehling's Solution.	1 per cent. Sugar Solution.
100 c.c. undiluted require . . .	51·1 c.c. = 0·511 gram, lactose.
100 c.c. + 4 vol. water require .	53·3 c.c. = 0·533 gram, lactose.

The reducing equivalent is, therefore, for undiluted Fehling's solution, 1:9·8; when diluted with 4 volumes of water 1:9·4.

The influence of excess of the cupric reagent was shown by heating 0·5 gram lactose with—

	Copper reduced.	Copper calculated for 100 pts. sugar.
196 c.c. Fehling's solution undiluted . . .	0·900	180
188 c.c. Fehling's solution + 4 vol. water . .	0·866	173·5

From these experiments it follows that the reducing power of lactose for alkaline copper solutions is affected in the same manner, though not to the same degree, as that of inverted sugar and dextrose.

Maltose.—Time required for reducing Fehling's reagent 3 to 4 minutes.

50 c.c. of a solution containing 1 per cent. = 0·5 gram maltose decompose 64·1 to 64·2 c.c. of Fehling's solution undiluted. 67·5 c.c. of Fehling's solution + 4 vol. water.

100 c.c. of a solution containing ½ per cent. = 0·5 gram maltose decompose 64·8 c.c. of Fehling's undiluted solution.

When the amount of Fehling's solution remains constant it was found that—

Fehling's solution.	Maltose solution.
100 c.c. undiluted required . . .	77·8 c.c. 1 p.c. = 0·778 gram maltose.
100 c.c. undiluted required . . .	154·5 c.c. ½ p.c = 0·7725 grm. maltose.
100 c.c. + 4 vol. water	74·0 c.c. 1 p.c. = 0·7400 grm. maltose.

As in the previous cases the effect of an excess of copper was determined by the gravimetric method, 0·5 gram maltose being boiled with—

	Copper reduced.	Copper calculated for 100 pts. maltose.
70 c.c. Fehling's solut undiluted . . .	0·5654	113·08
128 c.c. Fehling's solution undiluted . . .	0·5643	112·86
192 c.c. Fehling's solution undiluted . . .	0·5649	112·98
74 c.c. Fehling's solution + 4 vol. water . .	0·5923	118·46
74 c.c. Fehling's solution + 4 vol. water . .	0·5936	118·72
136 c.c. Fehling's solution + 4 vol. water . .	0·6045	120·90
138 c.c. Fehling's solution + 4 vol. water . .	0·6058	121·16

The reducing equivalent of maltose for copper is, 6·1 when the sugar is contained in a 1 per cent. solution, and the Fehling reagent is undiluted; 6·41 when this is diluted with 4 volumes of water, and 6·53 when twice as much of the thus diluted copper solution is used as is required by the reaction.

From these facts it follows that—

1. Maltose has the lowest reducing power of any of the varieties of sugar subjected to examination.

2. It decomposes the copper solution more slowly than inverted sugar, dextrose, or lactose, but more quickly than milk sugar.

3. Similarly with inverted sugar, dextrose, and lactose, concentration of the solutions affects the reducing power but in this case the effect is opposite in kind, the power being increased instead of diminished by dilution.

4. An excess of copper solution does not alter the reducing power in undiluted solutions, it does, however, when the copper solution is diluted with 4 volumes of water. Dr. Soxhlet suggests that this action might possibly be due to a conversion of maltose into dextrose; this, having a greater reducing power, would raise the equivalent.

Lævulose.—By calculating from the numbers obtained for inverted sugar and dextrose, the reducing power of 0·5 gram lævulose in a 1 per cent. solution is found to be 97·2 c.c. for Fehling's undiluted solution and 93·0 c.c. when this is diluted with 4 volumes of water; the equivalents corresponding with these numbers are 9·72 and 9·3.

The second part of the paper is devoted to a consideration of the action taking place between sugar and alkaline mercurial solution. For this purpose, the preparations of Knapp and Sachsse were employed. Knapp's solution is made by dissolving 10 grams of pure dry mercuric cyanide in water, adding 100 c.c. of sodium hydrate solution having a specific gravity of 1·145; the liquid being diluted to 1000 c.c. was ordered to be applied by heating 40 c.c. of it to the boiling point and adding a ½ per cent. sugar solution until all the mercury is precipitated, the end point being attained when a drop of the solution on a piece of filter paper held over the mouth of a bottle containing sulphydrate of ammonium is no longer blackened: this reaction is, however, far less delicate than the one used by R. Sachsse, viz., the addition to the solution to be tested of an alkaline solution of a stannous salt: prepared by adding an excess of potassium hydrate to a solution of stannous chloride: an objection to Knapp's solution is, that an amount of sugar sufficient to reduce the mercurial liquid, if added in one quantity, does not produce the desired result when introduced in portions of 5 c.c. On account of this difficulty Sachsse recommended a liquid containing 18 grams pure dry mercuric iodide dissolved, by means of 25 grams of potassium iodide, in water; to this being added an aqueous solution of 80 grams of potassium hydrate, and the whole bulk then made up to 1 litre. Knapp's solution contains 7·9365 grams of mercury in the litre; Sachsse's, 7·9295 grams. 100 c.c. of the former are therefore equivalent to 100·1 c.c. of the latter.

Preliminary experiments with Knapp's solution showed that it is as necessary to add the sugar in one quantity in this case as has already been proved with regard to the alkaline copper solution: that it is immaterial whether one uses a 1 or ½ per cent. solution of sugar, and that the reducing power found by Knapp, for this solution is entirely wrong, he having asserted that 100 c.c. of his solution are reduced by 250 milligrams of dextrose. Using the same means of detecting the end of the reaction which Knapp had employed, Soxhlet found that not more than 200 milligrams of dextrose, at the most, are necessary for the reduction of this quantity of the mercurial solution; the error is attributed to the use of dextrose obtained by drying commercial dextrose at 100°, treating this with boiling absolute alcohol, and using the crystals which this deposited on cooling without further treatment, such a product being in reality very impure.

Preliminary experiments with the preparation recommended by Sachsse showed that this, like Knapp's solution, gives different results, according as the sugar is added in one or several portions. The way in which it is influenced is, however, different, for when added in small quantities less sugar is required than when the whole amount is added at once; the reverse of this being the case with Knapp's reagent. The results obtained by using a 1 or ½ per cent. solution of sugar are different, a larger quantity of sugar being required when added in a 1 per cent. than in a ½ per cent. solution.

The following table gives the quantity of the various kinds of sugar required for the reduction of a given amount of the two mercurial reagents:—

		100 c.c. Knapp's solution	100 c.c. Sachsse's solution
		are reduced by	
		mgrm.	mgrm.
Dextrose, Anhydrous . .	in ½ °/₀ solution	202·0	325·0
	„ 1 „ „	201·0	330·5
Inverted Sugar .	„ ½ „ „	200·0	269·0
	„ 1 „ „	199·0	266·0
Lævulose . . .	„ ½ „ „	198·0	213·0
	„ 1 „ „	197·0	222·5
Milk Sugar . .	„ ½ „ „	311·0	465·0
	„ 1 „ „	310·0	466·0
Lactose . . .	„ ½ „ „	245·0	438·0
	„ 1 „ „	242·0	442·0
Altered Milk Sugar* . . .	„ ½ „ „	222·0	387·0
	„ 1 „ „	223·0	388·0
Maltose . . .	„ ½ „ „	308·0	491·0
	„ 1 „ „	315·0	506·0

From this it will be seen that the reduction produced by the various kinds of sugar differs more in the Sachsse than in the Knapp solution, and on this account the former is more useful than the latter in distinguishing to which variety a given sugar may belong.

As the result of much observation, the author unhesitatingly awards the Fehling reagent priority of place as regards accuracy, safety and convenience; the mercurial solutions are nevertheless of great value where it is necessary to identify the kind of sugar under examination.

PREPARATION OF PEPTONES.*

BY A. CATILLON.

Meat Peptone.—Meat being our principal nitrogenous food affords the most useful peptone, and the product of its artificial digestion closely represents the general properties of all the albuminoid peptones. It may be obtained as follows:—

Lean beef, finely cut . . .	2 lbs.
Muriatic acid, sp. gr. 1·18 . .	5 drachms.
Water	10 pints.
Pepsine, sufficient.	

All fat and sinews are to be removed from the meat before it is chopped. It is then digested for twelve hours at a temperature of 45° C. (113° F.) in the acidulated water with a slight excess of pepsine. The quantity of pepsine necessary can only be determined by ascertaining its strength through actual experiment. The mixture is to be agitated from time to time, and the temperature must be carefully attended to. Below 40° C. the digestion becomes quite slow, and above 50° there is danger of destroying the pepsine, a result which surely follows near 70°. The mixture, at first like porridge, becomes more fluid by degrees, and in from two to six hours, is almost transparent. It is then a mixture of peptones and syntonin, coagulable by heat or nitric acid.

After twelve hours the liquid is strained and filtered. Rapid filtration is a sign that the operation has been carried far enough. Another test is that the filtrate is coagulated by neither ebullition nor nitric acid.

The liquid is now saturated with bicarbonate of soda, and evaporated on a water-bath till a pellicle forms on the surface of the product. At this stage it has, when cold, a sp. gr. 1·15, and contains very nearly one half of its weight of solid peptones. It has a dark yellow colour, a slight and not unpleasant smell, and an acidulous taste, like concentrated broth, in no way repulsive. On an average meat yields about one-third of its weight of this concentrated preparation, which keeps for a long time without moulding or undergoing alteration of any kind. As solutions of albumen and syntonin are prone to rapid decomposition, this is another test indicating the success of the operation.

When, on the contrary, the manipulation has been faulty, the liquid is brown instead of yellow, it soon becomes turbid, and acquires a strong smell and an unpleasant taste.

Fibrin Peptone can be prepared like meat peptone, but it offers no particular therapeutical interest.

Egg Peptone is also obtained in the same manner, with, however, the following important difference. When some light food is thought advisable for a convalescent, a soft boiled egg is usually recommended, the semi-fluid albumen being considered of easier digestion than the coagulated albumen of a hard boiled egg. With artificial digestion the case is different; raw albumen is much more slowly transformed into peptone than the coagulated, thus proving once more how differently reactions take place in the animal organism and in the chemist's apparatus.

White of egg, then, to be transformed into peptone is to be first coagulated by the heat of a water-bath, and having been cut in small pieces is digested with the proportions of water, acid, and pepsine above indicated. The operation, however, need not be carried on for so long a time; with good pepsine a few hours are sufficient to obtain a solution affording no precipitate, either with heat, nitric acid, or ferrocyanide of potassium acidulated with acetic acid. The solution being saturated with bicarbonate of soda, and evaporated to syrupy consistence, is of a fine amber colour, and almost tasteless and odourless. For these reasons it would be acceptable to the most delicate stomach. The only drawback is that eggs are expensive, yield but little peptone and even that inferior as an aliment to meat peptone.

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* Milk sugar boiled for one and a half hours with 4 per cent. sulphuric acid, in the proportion of 50 c.c. acid to each gram milk sugar, the solution neutralized and diluted to the required strength.

* *Druggists' Circular*, January, 1881. From *Répertoire de Pharmacie.*

Milk Peptone.—This is a great desideratum for sick children, but owing to the chemical constitution of milk, a peptone actually representing it as a whole has not been obtained, and, perhaps, cannot be at all. M. A. Catillon offers a process with which he hardly seems to be satisfied himself, expressing at the same time some doubts as to the value of the product. The difficulty is that the fatty matters of the milk, an important component part, are not affected by pepsine, and therefore cannot be transformed into peptone. On the other hand, they may be emulsified with pancreatine, but even then would not form a permanent mixture with concentrated peptone solutions. As milk deprived of its fatty constituents is of but little value as an aliment, we are ready to accept the conclusions of the writer that meat preparations are, in every way, preferable.

CITRATE OF CAFFEINE.*

BY J. U. LLOYD.

Accepting the fact that caffeine is soluble in 9 parts of chloroform, and that citric acid is practically insoluble in chloroform, I argued that, if the results of my experiments be a mixture of citric acid and caffeine, chloroform should separate the caffeine, leaving the citric acid. That if a definite citrate of caffeine be formed, it might or might not dissolve in chloroform, or, that chloroform might possibly decompose it.

Result.—All endeavours to make citric acid and caffeine unite from aqueous or alcoholic solutions were failures. In all cases the chloroform dissolved the caffeine from the residue, leaving the citric acid.

Attempts to form a citrate of caffeine by double decomposition of barium citrate and solution of caffeine in water acidulated with sulphuric acid were failures.

Citric acid and caffeine in equivalent amounts refused to unite if triturated with chloroform, the caffeine dissolving alone. Then I examined a salt labelled citrate of caffeine, and sold upon the market as such. This was granular and semi-crystalline. It yielded one-third its weight when triturated successively with two portions of chloroform, 15 parts each. This chloroform upon filtration and evaporation gave mostly pure caffeine. The residue, insoluble in chloroform, was mixed with solution of sodium carbonate, when effervescence followed, and a thick magma of feathery crystals resulted. This magma was agitated with chloroform: the crystals at once dissolved; the chloroform solution contained caffeine, the aqueous solution contained sodium citrate. Other experiments supported the above, and I could not doubt but the article under consideration contained one-half its weight of citrate of caffeine, the remainder being citric acid and caffeine. Upon dissolving the original salt in water, decomposition ensued, and subsequent evaporation give simply mixtures of caffeine and citric acid. Thus I was led to conclude that the preparation could not have been made by aqueous solutions of the alkaloid and acid. Then I experimented with various solvents, and found that to make the caffeine unite with the acid, a solution must be used that exerted a solvent action nearly alike upon both the caffeine and the citric acid.* This solvent is best: chloroform, 1 part; alcohol, sp. gr. 0·835, one-half part. The mode of procedure is as follows:

Formula.—Dissolve 30 grains of caffeine in 1 fluid ounce of chloroform and mix this with a solution of 30 grains of crystallized citric acid in ½ an ounce of alcohol. Filter if necessary, and evaporate the filtrate in an evaporating basin over a water-bath until the residue is of a syrupy consistence. Remove the dish, then cool to 50° F., rubbing the contents of the dish with a spatula, and continue until a dry powder results. This is mostly citrate of caffeine, but free citric acid and free caffeine are undoubtedly present to some extent.

Remarks.—As thus prepared, citrate of caffeine is a semi-crystalline, granular powder. It is permanent in the air and soluble in a mixture of alcohol, 1 part; chloroform, 2 parts. It decomposes when mixed with cold water, first dissolving. If the proportions be such that the water cannot hold the caffeine in solution, this substance separates in feathery crystals. Alcohol, sp. gr. 0·835 and 0·805, dissolve it with decomposition and deposition of caffeine crystals if there be an excess of caffeine. It is practically insoluble in carbon disulphide and cold chloroform, although chloroform will extract any free caffeine that may be present. It is necessary, in preparing it, that the evaporating basin be removed from the heat and then cooled. The subsequent rubbing with the spatula favours combination. In one instance, the basin was permitted to remain thirty-six hours quiet and in a cool location, with scarce an appearance of crystallization, but as soon as the syrupy liquid was stirred it solidified into a dry crystalline mass. (This is sometimes the case with berberine, and in this case, when crystallization takes place, it is with elimination of much heat.)

Experiments were made with the object of ascertaining whether, if the proportion of caffeine be increased, all of the citric acid could not be made to enter into combination. As yet this point is open. The indications, however, are that such is not the case, and that at a certain stage combination ceases, both free acid and caffeine remaining. (Perhaps this may be likened to the preparation of sulphocarbolic acid, in which a certain amount of each acid must always remain free.)

Solutions (separate) of caffeine and of citrate of caffeine in mixtures of chloroform and alcohol were sent to Professor Wm. L. Dudley for microscopic examination. He kindly made the investigations and reported two classes of crystals. If the slides be moistened with chloroform, the caffeine disappears at once, the citrate of caffeine remains.

From the results of my investigations I am led to report that:—

Citrate of caffeine is a definite compound. It is decomposed by solvents which dissolve citric acid readily and caffeine sparingly. It may be easily made by the process inclosed, but that it is contaminated with both free caffeine and free citric acid.†

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* This subject has been kindly investigated by Professor Lloyd at the request of one the editors of this paper. The existence of a citrate of caffeine or of any other true salt of caffeine with weak acids has been once believed to be possible, but very strong arguments have at various times been brought forward to prove their non-existence, and nearly all authorities at present take the latter view. The results of Mr. Lloyd's investigations, briefly detailed below, appear to throw a new light on this subject.—ED. N. R. From *New Remedies*, February, 1881.

* The conclusion is: Caffeine will not unite with citric acid in presence of any solvent that dissolves citric acid freely and caffeine imperfectly. Citrate of caffeine is decomposed by solvents that dissolve citric acid freely and caffeine to a less extent.

† Professor Lloyd has sent us specimens of caffeine (pure), citrate of caffeine, made according to his process, and solution of citrate of caffeine, for microscopic examination. One vial containing the latter has a few solid crystals deposited on its inside, which differ from those characteristic of citric acid and caffeine, and are doubtlessly the above-mentioned salt.—ED. N. R.

The Pharmaceutical Journal.

SATURDAY, MARCH 12, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE INTERNATIONAL PHARMACEUTICAL CONGRESS.

SOME months ago we called attention to the fact that a project was then on foot for holding an International Medical Congress in London during the month of August next, and at the meeting of the Council of the Pharmaceutical Society, held about the same time, Mr. HAMPSON, reverting to the resolution which had been passed in 1874 to invite the International Pharmaceutical Congress to hold its next meeting in London, pointed out that as the Medical Congress would have a section devoted to materia medica and pharmacology, it might be desirable to hold the Pharmaceutical Congress about the same time as the Medical Congress.

In the discussion that followed it appeared that there was some good reason for the opinion entertained by Mr. HAMPSON, for beyond the general desirability that these meetings should be in some way associated by reason of the subjects that would most likely be dealt with at both of them, it was made known by Mr. HILLS that the President of the College of Physicians had inquired whether the Pharmaceutical Society would get up on the occasion an exhibition of materia medica. Consequently in pursuance of Mr. HAMPSON'S motion that an invitation should be sent for the International Pharmaceutical Congress to meet in London about the same time as the Medical Congress, a resolution was unanimously passed by the Council instructing the Library, Museum and Laboratory Committee to made arrangements for the reception of the International Pharmaceutical Congress in August, 1881.

In the interval that has elapsed it does not seem that there has been on the part of the organizers of the Medical Congress any development of the idea suggested by the inquiry of the President of the College of Physicians, and if we may judge from the letter addressed by the Secretaries of the Pharmacological Section to the President of the Pharmaceutical Society, read at the last meeting of Council, all that is desired is the recommendation of twenty British and foreign pharmacists who might be invited to attend the meetings of the Pharmacological Section of the Medical Congress. As we learn from this communication that anything beyond the issue of a fixed number of invitations to pharmacists of distinction at home and abroad has been found impracticable, it may be inferred that the idea of bringing together those who would take a practical interest in the discussion of pharmaceutical subjects has been abandoned in that quarter.

Meanwhile, however, in pursuance of the decision arrived at by the Council of the Pharmaceutical Society, steps have been taken to provide for the next meeting of the International Pharmaceutical Congress being held in London next August. About three hundred invitations have been sent out to all the officials connected with foreign pharmaceutical associations, as well as to such individual pharmacists abroad as are likely to be able to attend the meeting. Already a large number of answers have been received, either accepting the invitation or suggesting other persons who would be able to do so, and in several instances pharmaceutical associations have announced their intention of sending deputations to attend the Congress.

It may therefore be regarded as certain that in response to the invitation of the Council of the Pharmaceutical Society there will be a considerable gathering of pharmacists of all nations next August in London, and that the Committee charged with the duty of making arrangements for their reception will have to set to work with diligence at the task of organization. Fortunately this Committee includes among its members one who has already officiated as a delegate of the Society at the meeting of the International Congress in St. Petersburg in 1874, and although Mr. SUTTON, his colleague on that occasion, has retired from the Council, his well known interest in all matters connected with pharmacy will no doubt be a sufficient guarantee for his active support. Of the delegates sent by the Society to the previous meeting of the Congress, at Vienna, in 1869, Mr. SUGDEN EVANS is not now in the country, but from Professor REDWOOD, his co-delegate, the Committee will be able to look for advice and guidance, based upon his experience of the way business is conducted at these meetings and upon his general extensive acquaintance with pharmaceutical affairs.

With such assistance there is no reason to fear any failure in carrying out the International Congress in London in such a way that our foreign visitors may be suitably entertained and that the opportunity afforded for mutual intercourse may be productive of benefit to the future interests of pharmacy.

It is not only in this country that anxiety prevails in regard to questions affecting those engaged in the practice of pharmacy. Although in Germany and in France the exercise of that art is carried on under conditions which are in some respects more advantageous than those obtaining at home, the pharmacists of those countries and of America are deeply engaged in considering what improvements can be effected in the system of pharmaceutical education. On this point, which has not yet been brought to the utmost desirable perfection amongst ourselves, we may learn from our foreign visitors something that will be useful in facilitating the work now in hand by the Committee appointed by the Council to inquire into it.

As regards Pharmacopœia revision, and the position of pharmacists in the execution of that work, we may look forward with certainty to the prospect of benefit resulting from the discussion of this subject, and from the acquaintance to be gained of the manner in which the work is carried out in other countries.

Another very important subject, appertaining to the project of establishing an International Pharmacopœia and constituting, perhaps, the only presently feasible part of that project, is the equalization of the strength of galenical preparations, especially those containing potent drugs. The possibility of establishing standards for such drugs as opium, and of deciding what kind of cinchona bark should now be used for pharmaceutical purposes, should also be borne in mind, as being work that might well be done or prepared for by the action of such a body as an International Congress of pharmacists.

Numerous other subjects will naturally suggest themselves as affording fit material for discussion on such an occasion; but the nature of the meeting, and the difficulties arising from difference of language, will necessitate a limitation of those to be dealt with which will call for considerable exercise of discretion on the part of the organizing Committee, and probably also for the previous preparation of addresses upon the subjects decided upon for the business programme.

We hope soon to be in a position to place before our readers some more definite information on these points, and as to the general arrangements of the Pharmaceutical Congress. In conclusion, it may be useful to state that the preparations for the Medical Congress have been vigorously pushed forward. Invitations have been issued to no less than forty thousand medical men in various parts of the world, and it is expected that the number of visitors will be at least a thousand.

THE ANNUAL DINNER.

We desire to call attention to the announcement on another page that a meeting will be held in the Society's house on Wednesday, the 16th inst., at noon, to make preliminary arrangements for the Annual Dinner of the Members and their friends in May next. We hope there will be a good attendance, in order that the Committee chosen to carry them out may be a widely representative one.

ACCIDENT TO A CHEMIST.

We regret to record a painful accident to Mr. Benjamin Stoakes, Pharmaceutical Chemist, of Whitefriargate, Hull, who while engaged in oiling some soda water machinery had his arm drawn in between the wheels and almost literally crushed off just below the elbow. The arm was amputated and Mr. Stoakes has since been progressing favourably.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

March 2, 1881.

Present—Professor Tichborne, President; Dr. Aquilla Smith, Vice-President; Messrs. Allen, Bennett, Brunker, Collins, Draper, Grindley and Hayes.

The minutes of last meeting having been read and confirmed,

A letter was read from Mr. F. W. Hatton, asking if certain examinations which he had previously passed would be taken in lieu of similar subjects in the examination of the Society, was ordered to be replied to stating that no portion of the examination could be omitted.

The report of the Pharmacy Act Amendment Committee, which consisted in informing the Council that the Committee had addressed a letter to the Pharmaceutical Society of Great Britain, and which has been already published in the issue of February 5, 1881, p. 639, was, upon the motion of Mr. Draper, seconded by Mr. Allen, adopted.

Mr. John Isaac Bernard, having been duly proposed and seconded, was elected a member of the Society.

An account from the Pharmaceutical Society of Great Britain for *Pharmaceutical Journals* supplied to members from January 1 to December 31, 1880, including postage, and amounting to £47 10*s.* 1*d.*, was, after some discussion, passed for payment, upon the motion of Dr. Smith, seconded by Mr. Hayes.

After some routine business the Council adjourned.

Provincial Transactions.

NOTTINGHAM AND NOTTS. CHEMISTS' ASSOCIATION.

The fourth monthly meeting of this Association was held at the rooms, Britannia Chambers, Pelham Street, on Tuesday, February 22. The President, Mr. Fitz-Hugh, F.C.S, occupied the chair, and notwithstanding the inclemency of the weather there was a very fair attendance.

Unanimous votes of thanks were passed to the following: Messrs. Evans, Sons and Co, Liverpool, for refitting materia medica cabinet; Mr. Edward Harvey, of Messrs. Barron, Harvey and Co., for donation of £5 5*s.*; Messrs. Evans, Lescher and Webb, for donation of £5 5*s.*; Mr. Taylor, of Clarke, Bleasdale and Co., for donation of £2 2*s.*; Messrs. Oldfield, Pattison and Co., Manchester, donation of £1 1*s.*; British Pharmaceutical Conference for 'Year-Book of Pharmacy'; Pharmaceutical Society for 'Calendar' of the Pharmaceutical Society; Mr. J. S. Heywood for prize to classes.

In a short speech the President, after remarking upon the loss sustained by the Association by the death of its late lamented Treasurer, Mr. Rayner, intimated that the Council had appointed Mr. W. H. Parker as Treasurer, *pro tem.*, until the Annual Meeting in May. He then introduced the lecturer for the evening, Mr. J. Rogers, F.R.M.S., who proceeded to read a paper on "The Microscope, its History and Uses." Mr. Rogers traced the history of the instrument from the earliest ages, when the Greeks and Romans used a rude kind of glass for magnifying objects, and said that Nero, some two thousand years ago, made use of a rude eye-glass to observe the feats of the gladiators. After tracing the various improvements through various ages up to recent dates, he remarked that this instrument was looked upon in the earlier centuries more as a magical than as a scientific piece of mechanism, and that the greatest improvements and developments of it had taken place during the last century, notably Lester's invention of achromatic lenses. He then corrected a popular error, in the fact that the microscope only simply enlarges the object under view, but that it also produces a true image, correct in every detail, in a magnified form. The lecturer then dwelt upon the use of the microscope in commerce and science as an invaluable method of detecting adulterations in various commercial products, as cotton, wool, seeds, etc.; to water companies, to detect sewage contamination; to the analyst, whereby as small a quantity as the thousandth part of a grain of strychnine may be detected; the physicist and biologist, the geologist and mineralogist, in detecting insect formation of islands, etc., thus deciding their value as coal mining districts. The lecturer concluded by expressing a hope that the study would be more generally adopted, and as one calculated to reveal to the beauties of nature, and also the unseen work of the Great Creator. . The lecture was listened to with great attention, and was illustrated by a number of microscopes; one of which the lecturer brought with him belonged to Ross, and was the one with which that great optician and microscopist worked up to the time of his death, and was especially mentioned by him in his will.

A hearty vote of thanks was given to Mr. Rogers at the close of the meeting.

GLASGOW CHEMISTS' AND DRUGGISTS' ASSOCIATION.

The fifth meeting of the session was held in Anderson's College, 204, George Street, on February 2, Mr. Robert Brodie, Vice-President, in the chair.

After the Secretary had read the minutes of the previous meeting, which were confirmed by the members, Mr. Brodie called upon Mr. J. A. Clarke to give his lecture on the "Chemistry of Food."

Mr. Clarke began his remarks by touching upon the structure and functions of the human body, and then passed on to the various foods that were used by man to build up and renew the body as it wears away by mental or physical work. He then adverted to some of the tables of Dr. Letheby and others on the relative values of the various foods, *e.g.*, beef, bread, starches, sugar, fats, haricot beans, etc., etc., for keeping the body in health. As no single food would do for an adult to perform the various duties of life, it was therefore necessary to take a mixed diet to give the human body all the nutriment which it requires for those duties. Mr. Clarke strongly recommended the use of less butcher's meat and more leguminous and starchy food instead, and said that by doing so many would be saved from having indigestion and bilious complaints. Although not a vegetarian himself, still he had reduced the taking of flesh meat to a minimum, and had thereby felt better in health and had increased in weight upon a leguminous and starchy diet combined with a small quantity of fat obtained by using bacon and butter. In conclusion Mr. Clarke showed by means of one of Messrs. Southall's food cabinets the various constituents which go to make bread, sugar, cheese, beef, milk, eggs, potatoes, etc., etc.

A long discussion followed the reading of the paper, in which Mr. Brodie, Mr. Simpson, Mr. Lees, Mr. Adams, and Mr. J. C. Hunter took part, and the general opinion was that flesh meat ought to form a portion of the diet of mankind, especially when living in such a changeable climate as Great Britain.

At the close of the discussion, Mr. Clarke replied to some points raised by the members who had spoken; after which the Vice-President called upon the members to give Mr. Clarke a hearty vote of thanks for his instructive and entertaining paper. This was duly given by the members and there being no other business the meeting terminated.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The monthly meeting of the above Association was held in the School of Pharmacy, College Street, on Monday night, March 7, Mr. G. C. Osborne, the President, in the chair.

Mr. Hayllar, the Vice-President, reported that the chemistry and pharmacy classes which he had conducted had been held regularly, and were well attended.

Mr. Osborne also stated that good progress had been made in both botany and materia medica.

On the motion of Mr. Norman, it was decided: "That there should be a paper read, on some subject of interest to pharmacy, every month after the business meeting."

The Chairman kindly offered to read the first.

Mr. Hayllar proposed:—"That the Secretary should write to the Secretary of the Pharmaceutical Society, stating that the Association was very desirous of renewing the materia medica specimens, and that any specimens the Society might think fit to send would be very thankfully received."

After some discussion, this was unanimously agreed to.

A vote of thanks to the Chairman brought the meeting to a close.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The annual dinner was held at the King's Head Hotel, Sheffield, on Wednesday evening, February 23. Mr. G. Ellinor, the President, in the chair. Among the visitors were Messrs. A. H. Allen, F.C.S., Borough Analyst, W. Ellidge, London, Messrs. Richards, Laysell, Freetson and Blair (Messrs. J. Brown and Co. Limited).

The loyal and patriotic toasts having been duly honoured, Mr. Cubley proposed "The Pharmaceutical Society of Great Britain," to which Mr. W. Ward, F.C.S., responded. Mr. A. H. Allen then proposed "The Sheffield Pharmaceutical and Chemical Society," to which Mr. Dobb ably replied. Mr. Burnell proposed "The President."

Several other toasts were given including "The Vice-President," "The Treasurer and Secretary," "The Visitors" and "The Ladies." A very pleasant evening being spent.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The fifth meeting of the session was held on Wednesday, February 9, in the rooms of the North British Branch, Mr. J. D. Robertson, President, in the chair.

The minutes of the last meeting having been read and confirmed,

The Chairman called upon Mr. R. Aitken to read paper, of which the following is a summary, on:—

Cochineal and Cochineal Colouring.

While it is easy to say that cochineal in an insect, it is not so easy to show why it should be so regarded. An amusing instance of the errors to which this difficulty has given rise, is that of M. Pomet, who, in a work on materia medica, classes cochineal among the seeds, giving a minute description of the plant from which the so-called seeds were obtained, and a drawing of the plant with the seeds adhering.

The two varieties of cochineal are the silver grain and the black grain. A third variety, occasionally met with, is the granilla, an inferior variety, consisting of very small insects, and probably the young female before impregnation. Some writers regard the difference between the silver grain and black grain varieties as due to a difference in the method of preparing for the market. From inquiries which I have made, however, I am inclined to think that this is not so, and that the silver grain consists of the young female after impregnation, while the black grain consists of the mother after the eggs have been laid.

If one of the insects is allowed to soak in water, and then pressed between two slips of glass, little round bodies exude, which are the young insects. In the natural order Hemiptera, to which cochineal belongs, the various stages of the metamorphosis common to insects take place in the body of the parent. This accounts for the young insects seen on pressing the cochineal, as described.

When cochineal is powdered and boiled with water, it emits a peculiar bug-like odour. Treated with alkalies the colour is intensified. This colour is due to carmine, which is by some believed to be a compound of carminic acid and an organic base called tyrosine. Others regard it as consisting of carminic acid alone. Mr. Warren de la Rue, who takes the latter view, prepared it by first removing the fat from the insect, treating with acetate of lead, decomposing the resulting insoluble carminate of lead with sulphuric acid, purifying and crystallizing. The colouring matter is precipitated by cream of tartar, salts of tin, and oxalate of potash. Alumina, in a gelatinous state, has a strong affinity for it, and will remove the whole of the colouring matter from a solution. Carmine of commerce is, according to Attfield, carminic acid with about 5 per cent. of alumina, or occasionally oxide of tin or albumen, the test for its purity being its entire solubility in solution of ammonia. Cochineal, owing to its high price, is very liable to adulteration, and, I think, I may safely say one does not often see a sample of unadulterated cochineal. In fact, it was the different shades of colour produced in a preparation of which it was one of the ingredients that led me to go into the subject. The text-books say that it is faced up with French chalk, white lead, etc., to give it a silvery appearance and add to its weight, the adulterating powder, of course, filling up the furrows on the insect. The test for this is a microscopic examination, which would show the absence of the white down which exists naturally on the insect. I have examined a good many specimens under the microscopes, and compared them with a genuine sample, and though in some cases there was a difference to be seen, in others it was very difficult to say. This did not seem to me an easy method of distinguishing the genuine insect, and having thought the matter over, I at last hit on a plan which turned out successful. I took a needle, and scraped the white powder out of the furrows, and heated it on platinum foil. If the white powdery matter was genuine, it disappeared on the application of heat; but if adulterated it remained on the foil, and could, if desired, be tested either for lead or talc. This easy method of testing depends on the combustion of organic bodies and non-combustion of the adulterating substances. Certainly this plan would fail were the adulterating substance of organic origin; but I doubt if a suitable one could be found, as weight is the principal object, and that is to be found mostly among inorganic substances.

Another method of testing is to titrate a solution of cochineal with a standard solution of potassium permanganate. Another is to prepare a standard solution of cochineal for comparison with a sample under examination. This last is a good test; but one difficulty remains, viz., that of obtaining a genuine sample. If cochineal is purchased in the ordinary way from any of the drug houses here or in London, I think I can safely say that you will find all samples more or less adulterated. The foregoing tests, of course, apply to the silver grain variety. I have found experimentally that the black grain variety is inferior in colouring matter to the silver grain. I have been told that it is used by confectioners, but, so far as I have seen, they use the silver grain.

Cochineal is of little value as a medicinal agent. The most important preparation of it is liquor cocci or cochineal colouring. I intended to have given a formula for the preparation of a good cochineal colouring, but regret that circumstances have occurred which prevented me going into the subject so thoroughly as I could have desired. I hope, however, to indicate a method by which a satisfactory cochineal colouring may be prepared. The usual method is to boil the cochineal with cream of tartar, salt of tartar and alum, the *rationale* of the process being that the tartaric acid of the cream of tartar liberates the carbonic acid from the salt of tartar, leaving the free alkali, which decomposes the alum, with production of gelatinous alumina, which, as previously stated, has a strong affinity for the colouring matter. This preparation will not keep unless spirit or some other preservative is added to it. After standing some time it gives a brilliant deposit of the well-known pigment lake. It seems to me that a proper preparation of cochineal should be a complete solution of the colouring matter, and not a suspension, as is, to a great extent, the case with this preparation. Another method is to macerate the cochineal with ammonia, and add rectified spirit to preserve it. This makes a very elegant preparation; but if used to colour jellies containing any vegetable acid, the colour will be almost discharged, or at least so altered as to produce anything but a pleasant tint. Another method is that of dissolving carmine in ammonia, but this is too expensive to be practicable. The method I have thought most likely to produce a good colouring is grounded on the following facts:—Gelatinous alumina will completely absorb the colouring matter, and the lake so produced is soluble in ammonia. I therefore throw out the suggestion that a solution might be made by treating cochineal with gelatinous alumina, adding sufficient ammonia to dissolve the precipitate, and driving off the excess of ammonia by a gentle heat; or the process might be reversed, viz.:—Macerate the cochineal in ammonia for some weeks, and then add alumina. This latter plan is used, I believe, by dyers. By prolonged contact of the cochineal with ammonia a new substance, carminamide, is produced.

Mr. Aitken then exhibited a sample of genuine silver grain cochineal, and some fat which he had extracted from the insect.

A hearty vote of thanks was moved by the President, seconded by the Vice-President, and carried with acclamation.

Several queries having been submitted and replied to,

The Secretary exhibited and explained a series of microscopic sections of rhubarb. One slide consisted of a number of sphæraphides separated from the root. Other two consisted of sections of the petiole, with numerous cells, containing sphæraphides. A section of squill bulb was also exhibited containing raphides, and furnishing a fine illustration of the difference between true raphides and the so-called conglomerate raphides or sphæraphides.

At the close of the meeting, the members had an opportunity of examining the various specimens exhibited.

LIVERPOOL CHEMISTS' ASSOCIATION.

The tenth general meeting of the thirty-second session was held at the Royal Institution, on Thursday evening, March 3, 1881, the President, Dr. Symes, in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations were announced: The current numbers of the *Pharmaceutical Journal*, from the Society; the *Canadian Pharmaceutical Journal*, from the Editor; the *Chemists' Journal*, from the President; and several foreign Pharmacopœias, from Dr. Nevins.

The President alluded, in feeling terms, to the death of Mr. John Abraham, and moved that the Secretary be authorized to send a letter of condolence to Mrs. Abraham and family. This was unanimously carried.

Eugenol.

The President said that he had previously made some remarks on eugenol, and had then promised to examine it optically, as regards its rotatory power. He had since done so, and found that in this respect it did not differ from oil of cloves, the rotation for 100 mm. being +0·5. Eugenol had acquired additional importance from the fact that it was the body from which vanillin was prepared by Meissner's new process, in which it was first converted into acetoeugenol, and this product was then oxidized by permanganate of potassium, and subsequently by bichromate of potassium, both in neutral solutions. It was further treated, and finally crystallized.

Mr. A. Watt, F.I.C., F.C.S., made an interesting communication on "Peroxide of Hydrogen," which was followed by a lengthy discussion, in which the President, Messrs. Conroy, Haddock, Tate and others joined.

Dr. G. Tate next read a paper on the "Azo Dyes," which will be printed in a future number of this Journal.

A unanimous and hearty vote of thanks was awarded Dr. Tate for his paper, and the discussion was adjourned until the next meeting.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday March 3, Dr. Roscoe, President, in the chair,

The following certificates were read for the first time:—G. H. With, F. J. Farroll.

It was annunced that a ballot for the election of Fellows would be held at the next meeting of the Society (March 17).

The new list of the Officers and Council proposed for the ensuing year, as announced in our last report, was read from the chair.

The President then called on Mr. F. Hatton to read a paper—

*On the Action of Bacteria on various Gases.**—The experiments were made to ascertain the nature of the action exerted by various gases on the life and increase of bacteria, and to observe what influence the bacteria had on the percentage composition of the gases. The bacteria were obtained by shaking fresh meat with distilled water; the aqueous extract was filtered and exposed to the air for twenty-four to thirty-six hours. It was always found to be full of bacteria. A small flask was half-filled with mercury, filled up with the bacteria solution and inverted in a mercury trough. The gas under examination was then passed up, a small glass vessel was introduced under the mouth of the flask and the whole removed from the trough. The liquid was examined daily as to the condition of the bacteria; the sample being removed by a piece of bent glass tubing, having an india-rubber joint. After about a week the gas was pumped out by means of a Sprengel, and analysed. Atmospheric air was first tried. The bacteria lived well during the fifteen days of the experiment. T 15°—22°. A large absorption of oxygen took place, but it was not replaced by carbonic anhydride. In a second experiment, T 25°—26·58, 20 per cent. of oxygen disappeared and only 17 per cent. of CO_2 were formed. Pure hydrogen after fourteen days had no action on the bacteria; the gas contained 0·34 per cent. CO_2, 98·94 per cent. H. Pure oxygen after ten days was converted into CO_2, 29·98 per cent.; O 70·02 per cent. A mixture of CO, 46·94 per cent.; CO_2, 1·27 per cent.; O 1·27 per cent.; N 50·51 was next tried. After fourteen days the gas contained CO_2, 17·77; CO, 0·55; H 7·58; CH_4, 2·50; N 71·57. In all of the above cases, the bacteria flourished well. Cyanogen was next tried. The solution of meat turned gradually to a thick black fluid; on the fifth day very few bacteria could be seen. From this time, however, they increased, and on the twelth day were comparatively numerous. On the fifteenth day the gas was analysed; it contained, CN, 5·35; CO_2, 57·59; O, 2·24; N, 34·79. A second experiment gave similar results. It appears, therefore, that cyanogen is fatal to bacteria as long as it exists as such, but that it soon decomposes into ammonic oxalate, etc., and that the bacteria then revive, especially in sunlight. Sulphurous anhydride was next tried. The bacteria lived during the fifteen days. The gas contained CO_2, 7·87; O, 0·00; N, 2·13; SO_2, 90·10. Similar results were obtained with nitrogen, nitrous oxide, nitric oxide, and carbonic anhydride, a mixture of H and O, obtained by the electrolysis of water, and coal gas; in all cases the bacteria lived well during the experiment. The author next experimented with a solution of urea, 0·98 per cent. and phosphate of potash, 0·4 per cent., sowing it with bacteria. The bacteria lived well during the fourteen days of the experiment; small quantities of gas were evolved, containing 0·53 per cent. CO_2, 2·64 per cent. O, and 96·82 per cent. N. An experiment was made with spongy iron, air, and bacteria; on the fourth day all the bacteria had vanished; the air was analysed on the fifth day and consisted of CO_2, 0·26, O, 0·00, and N, 99·74 per cent. Experiments were also made with acetylene, salicylic acid, strychnine, (10 per cent.), morphine, narcotine, and brucine; none of these substances had any effect on the bacteria. On the other hand phenol, spongy iron, alcohol, and potassium permanganate were very destructive to these microscopic growths.

Mr. W. M. Hamlet said that these experiments confirmed some observations of his own. He had found that bacteria could exist in almost anything—in carbonic oxide, hydrogen, 1 per cent. creasote, phenol, methylamine, methylic alcohol, and chloroform; moreover Crace Calvert had shown that they could live in strong carbolic acid. In reply to Mr. Warington, the speaker said that the acetic acid fermentation went on in the presence of chloroform.

Mr. Kingzett called attention to the fact that the oxygen was completely used up when the meat infusion was placed in contact with air. He did not think the experiments represented the action of bacteria on gases or of gases on bacteria, but rather the effects of various gases on the mode and extent of ordinary putrefaction.

Dr. Frankland expressed his satisfaction with the results obtained by the author in his laborious research. He must confess that these results had surprised him not a little; the fact that bacteria, which were real organisms, and could not be shielded under the term putrefaction, lived and flourished in SO_2, CO, CN, etc., seemed to him very extraordinary, and the question arose whether the germs to which infectious deseases were probably due were not similarly endowed with a power of great resistance to ordinary influences.

Mr. F. J. M. Page said that Dr. Baxter had proved that with some fever-producing liquids their virulence was destroyed by chlorine and sulphurous acid, and that he had seen some experiments at the Brown Institution which led to the same conclusion; so it seemed that, at all events in some cases, the virulence of infective liquids was due to organic matter essentially different from the bacteria observed by Mr. Hatton.

Mr. Hatton then read a second communication—

On the Influence of Intermittent Filtration through Sand and Spongy Iron on Animal and Vegetable Matters dissolved in Water, and the Reduction of Nitrates by Sewage, etc.—Filtration through sand:—A 14 feet vertical glass tube 3½" in diameter was filled with sand. The water was passed through at the rate of 4 litres per day. Experiments were first made with peaty water diluted with its own volume of distilled water. The organic carbon decreased 1·527 part per 100,000, whereas the organic nitrogen was but little affected. The addition of a nitrifying material in the shape of 5 c.c. of stale urine added to 4 litres of water did not promote the oxidation of the organic nitrogen of the peat during filtration. A filtered infusion of rape cake was substituted for the peaty water and similar results were obtained. Some experiments are then given as to the effect of sewage in promoting the reduction of nitrates. A 5 per cent. solution of clear fresh sewage containing no nitrates was added to a solution containing 0·0853 gram of nitre, the mixture shaken in a large stoppered bottle and estimations of the nitric nitrogen made from time to time. For a time the nitric nitrogen steadily diminished, until in fact the sewage itself began to nitrify, and then the amount increased. At low temperatures the sewage does not seem to nitrify. It was found that when a solution containing nitrates and sewage was allowed to stand in contact with air the oxygen in the dissolved air increased 4·5 per cent., while that in the air above the liquid decreased 5 per cent. In sixteen days the N as nitrates and nitrites decreased from 0·406 pt. per 100,000 to 0·075. Thick sewage was much more active than clear sewage. Spongy iron when shaken up with a solution of nitre converts the nitrogen into ammonia and free nitrogen. Filtration through spongy iron rapidly reduces the nitric nitrogen, converting it for the most part into ammonia. Filtration of peat solution and solution of egg albumen through spongy iron rapidly removed both the organic nitrogen and organic carbon, no nitric nitrogen being formed; all the nitrogen being reduced to ammonia. In some cases the carbon seemed to give rise to some marsh gas.

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* This paper obtained for the author the Frankland prize of £50, at the Institute of Chemistry.

Professor TIDY then read a paper—

On River Water.—In a previous paper the author discussed the action of the three principal agents to which the self purification of running water is due:—subsidence, the scavengering propensities of fish, and the oxidation of the organic matter. This oxidation being effected partly by the oxygen in the atmosphere and partly by the oxygen liberated by plant life. The present communication is a reply to the criticisms of Dr. Frankland on the former paper and to a paper by Miss Halcrow and Dr. Frankland on the oxidation of peat. First as to the oxidation of peat. Notwithstanding Dr. Frankland's objections the author still maintains that the Shannon is admirably adapted to prove oxidation, should such a process be going on. Admit the ever recurring entrance of feeders of peaty water, if it can be shown that in spite of this constant addition of peaty matter there is a manifest lessening of the peat in the water, then the experiment, considering that all the chances and conditions are against proving oxidation, becomes a hundredfold more conclusive than it would otherwise be. Admitting that at four points along a course of forty miles, at Portumna, Killaloe, O'Briensbridge, and at the junction of the Mulcaire, the organic elements do indicate a fairly uniform quantity of peat in the water, the question remains, what has become of the floods of peaty matter which have entered the river during its forty miles' flow? Why does not the peat in the river increase in quantity yard by yard? Starting with a brown water at Killaloe, the river should be black over and over again before it reaches Limerick. The author sums up this part of the paper thus:—I cannot question for a moment that peat is got rid of in the course of the flow of a river and that oxidation is one of the agencies concerned in its accomplishment. He then criticizes the paper by Miss Halcrow and Dr. Frankland on the action of air on peaty water, and objects that in no sense are these experiments, in which the same dribble of water is brought ever and anon into contact with the same few bubbles of air, comparable to the case of the Shannon, a river of great volume, in free and open contact with an ever changing sea of air, luxuriant with vegetable life and fish. In one series of experiments in which some peaty water was allowed to remain for a year in contact with some air in a stoppered bottle, the author objects that admitting oxidation to have occurred at the layer where actual contact took place between the water and air, any carbonic acid formed would act as a party wall to divide the water from the purer air above, and making all allowances for diffusion, there practically would be an end of the process. He also points out that the carbonic acid was in enormous excess in the air above the water, viz., 14·7 parts in 10,000. In passing, the author criticizes Dr. Mills's remarks, and maintains that though the combustion and the oxygen processes both give valuable results, the latter is the better of the two. In the second part of the paper the author discusses the oxidation of sewage matter by running water, and contends that if sewage be discharged into a river so that the pure water is twenty times the volume of the sewage, after a moderately rapid flow of a few miles the whole of the impurities will by oxidation and other agencies disappear, and the water be again restored to its original state of purity. He objects to the opinion of the late Sir Benjamin Brodie on the point in question, as he was a witness who had not made a single experiment bearing on this subject; he then quotes many other opinions favourable to his views, and points out that the Commissions of 1850 and 1869 and the Select Committee of 1867 approved of the Thames, notwithstanding the sewage, as a source of water supply. Dr. Frankland's experiments on the Irwell, the Mersey and the Darwen are next considered. These are, says the author, notoriously polluted sewage rivers, containing no vegetation, devoid of fish, and everything was against the regaining of purity; yet Dr. Frankland's results show in the case of the Darwen a decrease of organic elements of 41 per cent., and in the Irwell of 31 per cent. Again, in the case of the Tees, a river polluted at Barnard Castle by sewage and refuse from dyers and fellmongers, after a flow of sixteen miles, this river is reported at Darlington by Dr. Frankland as of unimpeachable quality, bright and palatable. As to Dr. Frankland's statements that in the Severn a flow of thirty yards reduces the organic elements by 32 per cent. and that after a flow of a mile they were only reduced 12 per cent. more, the author contends that sewage is not of a constant composition, and that some constituents are much more easily oxidized than others. As regards the wonderful diminution of chlorine remarked by Dr. Frankland, the author still maintains that it was taken up by vegetation, and quotes an experiment in which he watered some watercress with a solution containing 40 grains of salt per gallon, and increased the quantity of chlorides by 220 per cent. With respect to Dr. Frankland's criticisms on the experiments with sewage in troughs, the author states that the sewage used was filtered. To the criticisms of Professors Tyndall and Huxley, the author replies by quoting the statistics of ten years, which prove that zymotic diseases do not necessarily result (sewage or no sewage) from drinking river water any more than they can be kept away by drinking chalk water. He asks Professor Huxley this question, Can he give one single well authenticated case where a drinking water in which the chemist failed to detect manifest contamination has caused disease? The author concludes by asking Dr. Frankland, As the dangerous element in a water is entirely outside his ken or detection what, in his judgment, is the good of water analysis? Seeing that 100,000 bacteria may be present in a gallon of water, each bacterium being capable of imparting disease, and yet be undetected by the most refined chemical processes, how can he report any water to be wholesome? What are his grounds for reporting a water containing 0·1 of organic carbon to be of good quality, and a water containing 0·4 of organic carbon to be of inferior quality, seeing that the first may contain millions of bacteria, which may be entirely absent from the second? Why should absolute immunity of epidemics of cholera be promised if only London would drink chalk water, which after all is merely rain water, and must have fallen in certain parts on heavily manured land, and has afterwards filtered naturally through chalk, and yet it be stated that there is not a tittle of trustworthy evidence to prove that artificial filtration (which, judging from analyses, is more complete than natural filtration) affords any safeguard against the propagation of epidemic diseases.

The President said that the Fellows had just listened to a powerful and interesting paper, which was sure to lead to a lively discussion. As it was very late, he hoped the discussion would be strictly confined to the question of oxidation.

Mr. Hawkley had listened to the papers with much interest. Much learning had been displayed, and many ingenious and elegant phrases had been used; but he did not think that anything like a solution of the process of purification, as it existed in nature, had been arrived at. As a practical man, he would say, What does nature teach us? If we go to a mountain covered with peat, we see inky water on the surface, and yet a very few feet below springs of water rise perfectly colourless and bright. This is nature, not chemistry. Similarly, a stream may receive the sewage of towns, and run into the ocean without any colour at all. Moreover, the sewage of millions of inhabitants had been running into the ocean for years, and yet it remained to all appearance free from sewage. On the surface of the ocean one might well say: "Water, water everywhere, and not a drop to stink."

Dr. Frankland said that it would be difficult to notice at that late hour all the salient points of Professor Tidy's elaborate paper; but he would endeavour to refer to some of them. Professor Tidy had explained that the purification of rivers is effected by three processes: subsidence, the action of fish life, and oxidation. As regards the second, he does not clearly state whether the fish remove organic matters in suspension or in solution. Fishes by respiration must clearly remove oxygen from the water; so it would seem that they could only remove organic matter in suspension. However, the substantial difference of opinion was on the question of oxidation, to which he would therefore confine his remarks. He would have liked to have said something about the admirable paper by Mr. Hatton; but as time pressed, he must leave the results to speak for themselves. First, as to the oxidation of peat in the Shannon, Professor Tidy states that in a flow of one mile from Killaloe the organic carbon decreases from ·8 to ·48. This really means that half of the total organic matter has been converted into carbonic anhydride, water and nitrogen or ammonia in the flow of one mile. He would ask any chemist who has been accustomed to organic compounds, whether he is acquainted with any substance which behaves in this way? To take one instance, aldehyde, a substance most prone to decomposition, it, under similar circumstances, would hardly be oxidized perceptibly. How improbable is it that the flow of a mile should cause such an enormous reduction, whilst the exposure of 51 square miles of surface in the loch above should have such a slight influence. Does Professor Tidy really think that this entrance of feeders of peaty water has any very great influence on the composition of the Shannon, a river which drains about one-fourth of Ireland? None of these feeders has a flow of more than a mile, and so they cannot be but insignificant. He must take exception to two of the three new analyses which Professor Tidy gives, namely, those taken one mile below Castle Connell and at Limerick, because the entrance of the largest tributary, the Mulcaire, a river containing but little organic carbon, and much suspended mineral matter (which in its deposition carries with it much organic matter), completely prevents any fair comparison between these two places. Professor Tidy had somewhat ridiculed the experiments which he had carried out with Miss Halcrow on the oxidation of peaty water by agitation in a bottle with air. Professor Tidy, moreover, made the extraordinary statement, "that admitting oxidation to have occurred, any carbonic acid formed would probably act as a party wall to divide the water from the purer air above." Now any scientist who can accomplish such a conception without any great effort of the imagination can accomplish anything if he wishes it. This notion of a gas playing the part of a party wall need not be farther alluded to. The percentage of CO_2 in the air above the peaty water, 14·7 parts in 10,000, which Professor Tidy calls an enormous excess, is readily accounted for, as the air in the laboratory contained 9 parts, and the gases dissolved in the peaty water 199 parts in 10,000. Notwithstanding Professor Tidy's great faith in nature, and his objection to any experiments in a bottle, the speaker ventured to say that in the case of the bottle, which was fastened to the connecting rod of the steam engine, the water was brought into contact with air much more perfectly than in nature, and yet no oxidation could be detected. If the permanganate process detects volatile organic matter, which is missed by the combustion process, why does Professor Tidy not prove his point by estimating the oxygen required by a water before and after boiling. He must protest against the ignorance which was ascribed to Sir Benjamin Brodie. Few people had more opportunities of studying the action of oxygen on organic bodies, and he was justified by this experience in stating that it was absurd to say that organic matter could be oxidized by rivers in such an easy way, although he had not made any experiments directly with river water. Professor Tidy omitted to state, with regard to the supposed decrease of 41 per cent. of organic elements in the Darwen, that between these two points its volume had doubled, and that when a correction was made for this observed increase in volume, the 41 per cent. became 13·2 per cent., and occurred in the organic nitrogen, and no decrease was observed with the organic carbon. The Thames was recommended as fit for drinking purposes by the Commission of 1869 only if the sewage was diverted, and the water efficiently filtered. As to the oxidation in the Severn, where a flow of 30 yards diminished the carbon by 32 per cent.; the time taken to flow 30 yards could not be more than a minute. "If," said Dr. Frankland, "I believed that some substance in the sewage oxidized at this rate, I would endeavour to isolate it, and bring it before this Society; it would undoubtedly burst into flame when exposed to the air." Then we are asked to believe that in one minute the plant life reduces the chlorine by 40 per cent. in this section of the river. The two circumstances taken together, the diminution of the organic carbon and the chlorine, point irresistibly to dilution. In reply to Professor Tidy's questions, he would say that water analysis tells us whether a water has been contaminated with sewage, and if so when; that a water is reported as wholesome and fit to drink when it has been filtered exhaustively through 1000 feet of porous material. On this point he should like to ask Professor Tidy how he can report a water as turbid and yet as perfectly wholesome. If a river water contains 0·4 of organic carbon it has a disagreeable peaty taste. In conclusion, he hoped that Professor Tidy would, after reading Mr. Hatton's paper, change his opinions, and no longer believe in the utter destruction of bacteria by a cold bath in the Thames. When they withstood the action of cyanogen and sulphurous acid, it was difficult to see why they should commit suicide by bursting their envelopes by endosmosis.

Dr. Gilbert, whose remarks were received with hearty approbation, wished to raise a protest against the tendency of Professor Tidy's paper; it, whether intentionally or not intentionally, virtually advocated the discharge of raw sewage into a river the water of which was to be used afterwards for drinking purposes. Now there is no doubt whatever that sewage after passing over land is immensely purified, the organisms are got rid of and the ammonia is oxidized, and it would be a great misfortune, now that much was done in this direction after twenty years' hard work, if it should be understood by the public outside this room that the Fellows of the Chemical Society at all advocated the discharge of raw sewage into a river.

The President said that all must echo the remarks of

Dr. Gilbert; they were most opportune. It seemed that there were two distinct questions. There was no doubt that the peaty matter in a river does disappear, but the oxidation of germs or bacteria was another question. Had Professor Tidy any proof that these organisms were oxidized?

Dr. Bischof asked Professor Tidy whether his statistics included any year when there was an epidemic disease. As to the effect of spongy iron on bacteria, he must refer the Fellows to a paper on the state of Shoeburyness, in the *Lancet* of December 25.

Mr. Kingzett said that oxidation in nature was probably not direct, but was effected by the infusoria, bacteria, etc.

Professor Tidy very briefly replied. He disclaimed all intention of ridiculing Dr. Frankland's experiments or of imputing ignorance to Sir Benjamin Brodie; he quite agreed with Dr. Gilbert's remarks, it was a very serious matter to introduce raw sewage into a river. He should always prefer deep well water; he was emphatically a water purist. He had not the least doubt that sewage ought not to go into the river. He could not understand that shaking up water in a bottle was comparable to a running stream. Statistics are the best proof that organized matters are oxidized.

A paper, by Dr. F. R. Japp and C. Colborne Graham, on "β Diquinoline," was taken as read. The quinoline employed was prepared from a mixture of aniline, nitrobenzine, glycerol and sulphuric acid; it boiled at 229°. Equal volumes of quinoline and benzoyl chloride were heated in sealed tubes to 240° to 250° for six hours. A crystalline product was obtained which was boiled with strong HCl, filtered, extracted with ether and finally precipitated with caustic soda. The base was obtained in colourless, satiny laminæ, fusing at 191°, soluble in chloroform and boiling benzene. Analysis indicated the formula $C_{18}H_{12}N_2$. Its salts are diacid. A platinochloride was prepared. The authors suggest the name α diquinoline for the liquid prepared by Greville Williams.

The Society then adjourned to March 17, when the following papers will be read:—"On the Volumes of Mixed Liquids," by F. D. Brown; "On Boron Hydride," by F. Jones; "On the Action of Aldehydes on Phenanthraquinone in presence of Ammonia," by F. R. Japp; "On the Action of Benzoic Acid on Naphthaquinone," by F. R. Japp; "On the Alleged Formation of Nitrous Acid during the Evaporation of Water," by R. Warington; "On the Absorption of Solar Rays by Atmospheric Ozone and on the Blue Tint of the Atmosphere," by Professor Hartley; "Note on the Sweet Principle of *Smilax Glycyphylla*," by C. R. A. Wright and E. H. Rennie.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, February 24, Mr. R. H. Parker, Vice-President in the chair.

A paper was read by Mr. C. Thompson, on the Estimation of Manganese.—The processes described in the paper for this purpose were divided into two classes:—1st. Those used for estimating the amount of MnO_2 present in manganese ores. Under this head the following processes were briefly described and commented on, viz.:—*a*. Bunsen's iodometric method, by dissolving the ore in HCl, and passing the evolved chlorine into a solution of KI, when the liberated iodine is estimated; *b*. Weldon's process, by dissolving the ore in ferrous sulphate, and estimating with bichromate or permanganate of potassium; *c*. Lensenn's process, by the action of ferricyanide of potassium on MnO_2; *d*. Fresenius and Will's method, by the decomposition of oxalic acid in the presence of H_2SO_4 and MnO_2. 2nd class. Those processes by which the total amount of manganese can be estimated. In this class Guyard's process for the precipitation of Mn as MnO_2 by $K_2Mn_2O_8$; this process has been shown to be untrustworthy. The process of Volhard, who found that in the presence of either a zinc, barium, magnesium or calcium salt, manganese may be precipitated as pure MnO_2 by permanganate of potassium. The method of working this process was described at some length, as was the standardizing of the permanganate solution by means of a standard solution of hyposulphite and iodide of potassium. The author had worked upon this process, obtaining as the results of four experiments on a sample of $MnCl_2$, the following percentages:—98·4 per cent., 98·7 per cent., 98·8 per cent., and 98·7 per cent. Pattinson's process, by precipitating the manganese by a solution of hypochlorite of calcium, in the presence of either ferric or zinc chloride, was next described. Beilstein and Jawein's two processes for the separation of Mn and Fe were next referred to, in the first of which the manganese is precipitated by iodine from a mixture of mangano- and ferro-cyanides of potassium as MnO_2, which precipitate is afterwards estimated by Bunsen's or Weldon's process. The second process is based upon the fact that $KClO_3$ throws down a precipitate of MnO_2 from a boiling HNO_3 solution of the manganese and iron ores. Lastly, a modification of Eggertz's process was mentioned, using ammonium salts in place of sodium salts, as proposed by Mr. Dunstan. After a short comparison of the above processes, Volhard's was pronounced the most simple and accurate of all the volumetric processes.

A discussion followed the reading of the paper, and after a vote of thanks had been passed to Mr. Thompson for his interesting paper, the meeting adjourned.

Parliamentary and Law Proceedings.

THE MANUFACTURE OF COLOURED FIRES.

At the Leeds Police Court, on Friday, March 4, before Mr. Bruce, Mary Ann Fourness and Son, who carry on the business of chemists in Kirkgate, Leeds, were charged with having unlawfully carried on the manufacture of certain explosives, to wit, coloured fires, elsewhere than at a factory for explosives either lawfully existing or licensed for the same, under the Explosives Act, 1875.

The Town Clerk (Mr. G. W. Morrison), stated that the proceedings had been instituted at the instance of the Home Office, and that he now appeared to prosecute by the desire of Lieutenant Colonel Majendie, Her Majesty's Chief Inspector of Explosives. The charge was brought under the above named Act, section 4 of which, taken together with section 39, prohibited the manufacture of explosives (which, by section 3, included coloured fires), except at a factory for the same lawfully existing or licensed under the Act. Any person carrying on the manufacture at any unauthorized place was liable to a penalty not exceeding £100 a day for every day during which he so manufactured. The defendants had carried on the manufacture of coloured fires upon their premises in Kirkgate, Leeds; and, as he was instructed, they had also illegally transmitted some of the coloured fires by rail. Mr. Fourness now admitted the illegal manufacture by pleading guilty to the charge, and he had therefore to leave the case in the hands of his worship.

Mr. Bruce inquired what these coloured fires were. In a certain sense, brandy when lighted was a coloured fire.

The Town Clerk explained that the substances in question were those generally used in theatres for scenic effect, or pyrotechnic display. The defendants had supplied the Grand Theatre in Leeds.

Mr. Fourness stated that the coloured fires were not explosive, as was admitted by Superintendent Baker.

The Town Clerk drew attention to the fact that the Legislature considered those substances dangerous, as one of the Orders in Council under the Act required that the operations of mixing and packing coloured fires or stars should be carried on in a building or room exclusively appropriated for that purpose. The defendants had erred unknowingly, and he did not press for a heavy penalty.

In reply to certain observations of the learned Stipendiary as to the nature of the offence,

The Town Clerk read the following extracts from the Guide Book, written by Her Majesty's Chief Inspector:—"It is not an uncommon belief that because a squib or cracker, for example, or a 'coloured fire,' is in itself an apparently innocent article, it can hardly be necessary to enfore the Act in its strictness as against such manufacture. This view cannot be too emphatically condemned. Coloured fires, if not made with great care and with suitable ingredients, are very liable to spontaneous ignition, and must therefore be regarded as the reverse of harmless; and 'lightning paper' does not differ practically from gun cotton. Several very disastrous accidents have occurred in the illegal manufacture of fireworks in dwelling-houses."

As the defendants had committed the offence through ignorance of the statute, Mr. Bruce inflicted a penalty of 4l. including costs, remarking, however, that if any person was summoned before him again for an offence of this kind, the penalty would certainly be a very substantial one, and one that would show that the Act of Parliament was to be strictly observed.

Reviews.

EXPERIMENTAL CHEMISTRY FOR JUNIOR STUDENTS. By J. E. REYNOLDS, F.R.S. London: Longmans. 1881.

This is the introductory volume to a series of which the three remaining portions are to expound the elements of inorganic and organic chemistry. The author aims in this volume, at conveying a rather comprehensive knowledge of the principles of chemistry by means of numerous and well selected experiments. By reading it, and repeating as many of the experiments as possible during apprenticeship, students of pharmacy would do much to lessen the difficulties they will meet with in gaining the technical knowledge of chemistry which they must afterwards acquire.

Dr. Reynolds is, if not original, at least somewhat unusual in his method. He does not begin by introducing his readers to the whole family of the non-metals, but almost confines himself to hydrogen and oxygen and their compounds, with occasional reference to a few of the metals, and, by experiments on these, he gives abundant opportunity for acquiring a sound knowledge of the nature of elements and compounds; isomerism; laws of chemical combination by weight and volume; equivalents; the atomic theory, and the system of notation which is its outcome; methods of determining atomic and equivalent weights; the nature of acids, bases and salts; the characters of metals and non-metals; atomicity (explained by a graphic system which is hardly so satisfactory as that which expresses combining process by hands or arms); the relation of chemical to the purely physical forces, and many other matters of fundamental importance.

The one impediment to the usefulness of the book seems to us to be the comparatively expensive nature of some of the apparatus, which would preclude its use by most young students. There is no doubt, however, that careful reading and repetition of the simple experiments, with which it abounds would be an excellent preparation for extended chemical study. As many of the exercises are quantitative a cheap balance would, however, be almost a necessity, to secure the full benefit offered by study on the lines of this admirable little book. We may add one regret that there is no list of apparatus, with probable prices, attached, which would be particularly useful with a book of this kind for quite inexperienced students.

CHEMISTRY: GENERAL, MEDICAL AND PHARMACEUTICAL; including the Chemistry of the British Pharmacopœia. A Manual on the General Principles of the Science and their Applications in Medicine and Pharmacy. By JOHN ATTFIELD, F.R.S., etc. Ninth Edition. London: J. Van Voorst. 1881.

When a book reaches a ninth edition it may sometimes be fairly looked upon as having passed beyond the ordeal of criticism. But with works on science the case is different. The restless activity of research in the present day is so richly productive of fresh knowledge of facts that the work of keeping such a manual as that under notice *au courant* with the progress of science is no slight task; on the other hand if this task be not properly performed such a book would soon deteriorate in value. How well Professor Attfield has kept his book abreast of the times is evidenced by the fact that it is as much a favourite among our go-a-head cousins across the Atlantic as it is with students in this country.

In the present edition, for instance, we observe that the sections on the alkaloids include notices of the latest work of Wright on the aconite alkaloids, of Ladenburg on the so-called "tropines," of Thresh on capsicine, of Jobst and Hesse and Oberlin and Schlagdenhauffen on the dita alkaloids. Dr. Senier's table for the identification of the principal alkaloids, acids, etc., has been added. The section on the estimation of the cinchona alkaloids has been practically rewritten, and now includes De Vrij's methods for the separation of the mixed alkaloids from cinchona barks and for the separation and quantitative determination of the different cinchona alkaloids, and Kerner's test for the purity of sulphate of quinine as well as Paul's modification of it. The pages relating to the cinchona alkaloids have had the advantage of being revised by Dr. De Vrij. In a like manner for the estimation of morphia the methods of Prollius, Petit, and Flückiger are given. Similar illustrations might be quoted from other parts of the book.

Professor Attfield's Manual has long enjoyed and probably will continue to enjoy a great popularity among students as a practical text book; but it may now fairly aspire to another office. The adaptation of this 'Chemistry' to the requirements of medicine and pharmacy, the frequent revisions it has received, and last, but not least important, its unusually voluminous index, should secure for it a place among the books of reference of medical practitioners and chemists and druggists.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[500]. Taking the prescription literally, there could be no objection to the use of syr. gummi arabici (as the particular kind of syrup necessary is not specified), though I should have dispensed syr. gummi rub. (Squire), as the mixture was probably prescribed for some pulmonary complaint, such as phthisis, in which case the syr. gummi rub. would, doubtless, be more effective.

In instances of this kind it would be a good plan for the dispenser to notify on the prescription the preparation he made use of, so as to ensure uniformity in colour, etc., when dispensed in another establishment.

Bedford. HENRY W. NICHOL.

[500]. "Mucilago" was quite correct in dispensing "syrup. gummi arabici." I cannot see why he should have been in doubt what to dispense. If a customer asked for an ounce of "gum," I do not suppose he would give him red gum, but gum arabic, which is generally understood when gum is spoken of.

EMBRYO.

[502]. If this mixture was sent out perfectly clear, it must have been filtered, as it is impossible to get a clear mixture without so doing. It is quite right when practicable to send out mixtures as bright as possible; but in this case filtering is taking an unwarrantable liberty, as by doing so the most useful part of the medicine is removed.

JUNIOR.

[503]. I should certainly have dispensed this ointment precisely as written. It is not a duty of the dispenser to consider what "it is likely the prescriber intended," or what he "probably" meant, but to follow the prescription as nearly as possible and practicable.

JUVENIS.

[503]. It appears very reasonable to make the ointment of veratria, 4 grs. to the ounce, although in very severe cases of neuralgic rheumatism, it has been prescribed of much greater strength, as in the following prescription:—

℞	Veratriæ	grs. xxxvj.
	Olei Olivæ	ʒss.
	Adipis	ʒviiss.
	Ol. Bergamot.	♏x.
	Ol. Santal.	♏ij.

Bedford. HENRY W. NICHOL.

[505]. The correct and most elegant mode of dispensing the mixture, and that most likely in keeping with the intentions of the prescriber, who evidently did not wish the quinine to be in solution, but simply diffused through the mixture, would have been to have dissolved the sodæ salicylas in a portion of the water, then to have added the syrup and a small quantity of mucilag. acaciæ (about ʒiv); to have rubbed the quinine down very fine in a mortar, and to have added it to the mixture gradually, shaking well up after each addition.

"Dalex" was not at all justified in adding acid to dissolve the quinine. Doubtless if that prescription is taken to another establishment to be prepared, it will be sent out with the quinine diffused through the mixture; hence one of the causes for the frequent complaint we hear of mixtures not being sent out from "two places alike."

ROBERTUS.

[510]. In reference to "Minor's" inquiry respectin liq. cinch. cord., I beg to offer the following abstract:— "The bark of the *Cinchona calisaya*[*] was formerly termed *cordifolia.*" Therefore there can be little doubt but that the ext. cinch. flav. liq., B.P., would have been the proper preparation to have dispensed, it being synonymous with liq. cinch. cord.; also with inf. cinch. spissatum (Lond.).

Tavistock Street, Bedford. HENRY W. NICHOL.

[513]. How should the following mixture be dispensed, and what is the extent of the decomposition?—

℞	Cit. Ferri et Quiniæ	ʒj.
	Ammon. Carbon.	ʒj.
	Sp. Ammon. Aromat.	ʒiv.
	Tinct. Opii	ʒij.
	Aquæ	ad ℥viij.

R. A. P.

[514]. When ext. sarzæ co. liq. is prescribed, what preparation should be dispensed, and what is most likely to be intended?

C. E. OWLES.

[515].

℞	Elixir Picis Liq.,	
	Chlorodyni	āā ʒij.
	Sy. Scillæ	ʒj.
	Mist. Acaciæ	ad ℥iv.

M. ft. mist.

A teaspoonful once in four hours while cough is troublesome.

Will any of your readers tell me what is intended by "elixir of tar," as ordered in above prescription, and how it is made?

PHARMACIST.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE PROPOSED CHANGE IN THE CONSTITUTION OF THE SCOTCH BOARD OF EXAMINERS.

Sir,—In your Journal of Saturday I see reported the proceedings at the meeting of the Executive Committee of the Chemists and Druggists' Association, lately held in Birmingham, wherein the removal of clause 1 from the proposed Pharmacy Act Amendment Bill is, as I think, very severely commented upon.

After the remarks of the Vice-President of the Association, and the humiliation under which he says he and some other members of our London Council are suffering, it would be unfair were I not to offer one or two words in explanation, especially as the two Scotch members at the London Board are so distinctly pointed at as the parties through whom alone the erasure was made.

Let me say the whole matter in connection with this clause was well threshed in an unusually full meeting of Council, every member, I think, being present, when the decision was arrived at. The result was made known in the usual form, and there I fancied the matter was at an end. I may remind you that Mr. Frazer and myself took our stand upon the proceedings at certain meetings in Edinburgh and Glasgow, and of which ample evidence was at the moment before the Council, proving that it was the unanimous wish of those present at these meetings that clause 1 should be deleted from the present Bill.

I am quite aware that at first sight it may seem an ungracious thing on the part of the two Scotch members having taken exception to this proposed clause, but the ground of our procedure, in addition to the above, may be easily explained.

Going back to the time when the Act of 1852 was being prepared, the late Jacob Bell came to Edinburgh to enlist the sympathies of chemists and druggists in connection with the movement. He was warmly received, as he deserved to be, and found no lack of earnestness or interest in this proposed Act, and most of those in business gave him all the assistance they could. When, however, he promulgated the arrangement, which was then contemplated, that there should be one Central Board of Examiners, sitting only in London, he was met with very strong opposition; indeed, intimation was distinctly made that unless a Board was conceded for Scotland, a separate Bill would be applied for north of the Tweed. Not until after Mr. Bell's return to London was the appointment of our Edinburgh Board agreed to, with powers to extend the sittings to Glasgow and Aberdeen, if such a course was thought desirable; but the establishment of a part of the Society itself was effected under the name of the "North British Branch," this being the title given to it by the Founder of the Society himself.

Since 1852, the English and Scotch Boards have done good work, and still continue their labours. No Scotchman has, so far as I know, ever been proposed or elected to a seat at the London Board of Examiners, though it is admitted that the Council has this power. This refers to a period of nearly thirty years. During the same period there has never been any difficulty in obtaining the services of gentlemen resident in Scotland to undertake the duties of examiners here, and it has never up to the present time been explained why such a change as that embodied in the deleted clause was even proposed; not only so, but I believe that practically no one in business could be found ready to go up to London five or six times a year, and there spend several days during an examination, so that it is scarcely to be wondered at that no proposal has hitherto been made to transplant Scotch examiners into English soil.

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[*] Collected in Bolivia and southern Peru.

I am quite alive to the great importance that there should be as nearly as possible identity in the two examinations, and I need scarcely say how well the interchange of deputations coming and going between the two Boards alternately has tended to ensure this. It must also be remembered that the President and Vice-President of the Society are members, *ex officio*, of our Scotch Board, and therefore it is not surprising that the feeling here should be so strong and unanimous in favour of letting well alone, and not disturbing a course of action which has worked so well in the past.

Thus, with no reason given for desired change, with the fact that existing arrangements have worked so well, and for so many years—with a distinct and conclusive clause in the existing Act—looking to the constant change in the Council itself and to the extent of the powers sought in this clause, by which at some future time the entire complexion of the Scotch Board might be altered—and with the conviction that, whether from a "clannish" feeling or not, our Scotch chemists and druggists are unanimously against any such innovation as the one lately proposed, I feel there was no other course left for my colleague, Mr. Frazer, and myself, then to give the proposed clause our firm opposition, and which I am glad to say the vote in Council has confirmed.

Edinburgh, March 8. JOHN MACKAY.

BRANCH PHARMACIES.

Sir,—There have been a few letters written to you on the question of legislation for branch shops, but although I have always deprecated the multiplication of shops where the owner cannot possibly give personal superintendence, yet I think there are difficulties which have been overlooked by recent writers to your Journal.

Two facts I would especially impress on them:—First, that branch shops are not all alike.

It is one thing for a chemist to open a branch shop quite out of the neighbourhood of his own business, putting an unqualified assistant in to manage it and giving no personal superintendence himself from one week's end to another; it is quite another thing for a chemist to have two businesses in one locality in such proximity to each other that he can give personal superintendence every day. Such businesses exist and are for the convenience of the public as much as for the welfare of the owner. In an instance like this, at which shop is the qualified assistant to be?

Secondly, if an Act came suddenly into force, compelling branch businesses to be superintended only by those possessing the Minor or Major qualification, it would be disastrous both to a large number of experienced assistants and also to the public.

To the former, for there must be hundreds of such well qualified to conduct businesses, and they would practically be thrown out of employ; and to the latter, for I refuse to believe that a young man, about twenty-one years of age, with Minor qualification, is better fitted to conduct a business than a man with double his experience, and thus "the safety of the public" would not necessarily be the result of the change.

No one need suppose that I have a contempt for the pharmaceutical examinations. Possessing a Major qualification myself, I am not likely to undervalue them, but I do contend that they cannot take the place of practical experience.

Looking at the proposed legislation generally, I wish I could bring myself to believe that the House of Commons will render it illegal for corporate bodies to dispense and sell poisons. And if it does not what remains but further restrictions? And if the privilege we ask is not likely to be granted, for pity's sake save us from being further persecuted.

Liverpool. JOHN J. SMITH.

Sir,—I am pleased to find the question of branch shops is not allowed to be put on one side, and I earnestly trust it may be dealt with satisfactorily. It seems an injustice to those of us who at great expense and time have satisfied the requirements of the law by passing the pharmaceutical examinations, to see unqualified men taking the position of master in the management of a branch.

There is more reason in a qualified man managing for an irresponsible body of men than for an unqualified man managing a branch for a chemist, it may be, in another town. If we are to use our endeavours to put a veto on stores dispensing and retailing poisonous patent medicines, and I trust we shall succeed, let us by all means be thorough in legislating, and put a veto upon the avaricious chemist who in opening branches in all directions puts one in mind of the octopus stretching out his arms and encircling a wide area. If he wants more than one shop make him keep a duly qualified man, as much as the widow, whom some would like to crush.

Before I close, I should like to say one word about the selling of drugs by grocers. Is it not possible to confine the sale of drugs to chemists alone? It is bad enough to see grocers selling Epsom salts, castor oil, seidlitz powders, antibilious pills, digestive pills, Godfrey's cordial, spirit of nitre, etc., etc.; but when my customers tell me that Mr. Catchall, the grocer, recommends his "cough mixture" and "teething powders," it seems difficult to find out how to compensate ourselves for the expense we have been put to.

We have to "wait" for customers now quite enough, and those that we get are thoroughly earned by the necessary skill we have to acquire, and the many restrictions put upon us in the conducting of business. I hope this question will not be ignored by those who are framing the draft Pharmacy Act.

A MINOR MAN.

THE RELATIONS OF MEDICINE AND PHARMACY.

Sir,—In your issue of the 19th instant, three letters appear, offering suggestions with reference to this subject. There seems to be a general feeling, both among medical men and chemists, that the time has arrived for attempting its permanent settlement. Such a settlement cannot but conduce to the interests of the chemists and the public, and also to the relief of medical men.

It seems to me a reasonable proposition that the doctor having seen his patient should prescribe, and leave the prescription to be dispensed by the family chemist.

I attach importance to that part of the proposition which leaves the dispensing in the hands of the family chemist. For the doctor to name a special chemist appears to me very objectionable, except in cases where the family have no special chemist. Under such circumstances he should always recommend the nearest.

With regard to medical charges, this is a question that concerns the medical practitioner himself alone, and need not be further discussed here. What really is pertinent to the question is the scale of charges which chemists are prepared to adopt if this change be carried out. It is quite evident that what may be called "fancy prices" can no longer be charged. In many districts the scale of medical fees for visits and medicine is so low that the addition of the present very considerable charges made by some chemists would become a serious burden to the patient. Medicines must therefore be charged for with some reference to their commercial value; of course, the chemist must also be paid for the education and training which are compulsory by Act of Parliament.

One thing further demands attention. What are chemists prepared to say concerning their own practice of prescribing? Are they ready to meet medical men half way on the field of improvement? If medical men are willing to give up the very considerable profits of dispensing, are chemists equally ready to abstain from this old but reprehensible practice? In concluding this letter I would venture to ask the opinions of some of your correspondents on this point.

Mildmay Park, N. JAMES WILLIAMSON, M.D.

Sir,—That there should be cause for these continual bickerings 'twixt doctors and chemists is much to be regretted, and yet of the justice of the cause there is little doubt. Both parties have, and do even now, go much out of their way. But it seems only probably that a little application of the "give and take" principle will do more to regulate matters than legislation.

"Counter practice" is a widely embracing subject and yet I think a Royal Commission would find that the majority of chemists do their best to regulate it within fair and honest limits. But the dangerous knowledge regarding medicines, unfortunately possessed, or rather volunteered, by the outside public of the present day, is a point of great importance with the pharmacist, and requires all his skill and energy to cope with. It is this dangerous knowledge so frequently applied that gives rise to the statement in the *Lancet* that "to perpetuate a prescription is to incur a risk of injuring the patient, and in any case to wrong the practitioner." Of the injustice of this remark, the medicals themselves must be fully aware, for the remedy can only be applied by their orders to patients. But what shall be said to the growing practise of people obtaining ingredients *singulatim* and making use of their parlour table as a dispensary for their own medicine and for distribution to their friends?

One cannot but also, on looking fully in the face the cause of the success of patent and proprietary medicines, heartily thank the medicals for their patronage and suggestions in this matter.

We should all, as pharmacists, be only too glad to see the time arrive when doctors prescribe and chemists dispense, only, until then, as Cæsar says, *omnes inter se differunt*, etc.

RANUNCULUS.

DISPENSING CHARGES.

Sir,—I was glad to see the letter of B. S. J. in your issue of the 19th ult. I quite agree with him that we shall do more good by developing the dispensing portion of our trade than by trying to bolster up the sale of patents, the latter being a kind of business which no conscientious man can regard with much satisfaction. I agree with him too in believing that in order to increase our dispensing we must charge such prices as will satisfy the medical men and the public that it is to their interest to deal with us, though I think your correspondent goes too far when he intimates that "no professional skill" is required in compounding even the simplest prescription.

I fear there is a tendency at present to make up for our losses on proprietary articles by forcing up the prices of drugs and prescribed medicines. Some of the prices in the lists issued by the Liverpool and Manchester chemists are, in my opinion, far too high. Thus the prescription given by B. S. J., would by the Manchester tariff be charged 1*s*. 8*d*., because it is taken in teaspoonfuls, while another mixture, taken in ounce doses, would be charged 1*s*. 4*d*., though the ingredients might be as expensive and might take longer to mix. What sense or reason is there in this? If we charge a fair price for the drugs and for the time and skill required, what more can we justly ask?

But my chief object in writing is to point out a weakness in the present system of dispensing charges. I believe it is the general practice to charge the same on making up a prescription the first time as on all subsequent occasions. In cases of repetition, not only is the labour of copying the prescription saved, but it must be obvious that it can be dispensed more quickly the second or third time than the first. Perhaps this applies more especially to small shops, where the dispensing is chiefly done by one or two persons; but even in large concerns, the first dispenser can often make a note in the prescription book, which will save a good deal of time to a subsequent dispenser in the same establishment.

According to my views, the price of your correspondent's mixture should be estimated thus:—Ingredients, 5*d*. or 6*d*.; dispensing, about the same; bottle, 1*d*. or 2*d*.; copying about 3*d*.; total, 1*s*. 3*d*. for the first time. In case of repetition I should charge 1*s*., or a penny less if the bottle is sent to be refilled. Of course, in many cases, the second item would require to be more than 6*d*., according to the time employed; but in not a few the first items would be less than here indicated. In dispensing pills, the ingredients are usually cheaper, while the time occupied is greater than in the case of mixtures. For an ordinary box of twelve pills, I should charge 1*s*. the first time, and 9*d*. on subsequent occasions. For twenty-four pills, 1*s*. 3*d*. and 1*s*.; for six pills or less, 9*d*. and 6*d*. The practice advocated in the Manchester lists, of charging less for pills when prescribed with a mixture than when ordered alone, seems to me as devoid of reason as that of charging by the dose.

One word, in conclusion, on the latest project for a patent medicine league, with a system of "Boycotting" those wholesale and retail dealers who refuse to be bound by its conditions. Do the advocates of this precious scheme object to buy books at "2*d*. in the 1*s*. discount?" Would they have any tolerance for a trades union of booksellers who should try to keep up their prices by such means as have lately been suggested?

BETA.

THE SALE OF STAMPED LOZENGES.

Sir,—The thanks of the trade are due to Messrs Shillcock for having tried to obtain a proper exposition of the Patent Medicine Act in so far as it relates to the sale of stamped lozenges, but I question much if we are any wiser than we were before the correspondence between Bromley and Somerset House.

We knew previously that it was illegal to sell "Shillcock's Lozenges" in boxes without stamps, and we knew also that it was legal to sell the same lozenge without stamp, providing no claim was laid to proprietorship by using the possessive case, adopting simply the words, "Cough Lozenges, Shillcock;" but the main question still remains unanswered, viz., Is it legal to sell "Shillcock's Cough Lozenges" by the ounce, they not being in boxes?

I have long since come to the conclusion that the expositors of the law at Somerset House either are unable to understand it themselves or purposely refrain from giving other than vague explanations.

For some months I have discontinued the use of the possessive case on my cough lozenges, to avoid being pounced on by some over diligent officer of the Excise, and would advise others to do the same; they need not then live in fear of the law.

I have myself seen the reply of the Commissioners of Inland Revenue to a question as to the legality of selling "——'s Bronchial Lozenges," in which they unmistakably say they may be sold loose without being liable to duty; but, if Messrs. Shillcock took this as their authority they might some day find to their discomfort that "circumstances alter cases."

As an instance of the partiality or the incomprehensibility of the law, I may mention that last spring a chemist was fined for selling "Children's Cough Mixture" unstamped, though no claim was laid to any exclusive proprietorship, whilst a neighbour was and is still allowed to sell "Infants' Carminative Mixture" unstamped. The former label, altered to read "Cough Mixture for Children," but in all other respects the same, has since been submitted to the authorities and allowed.

Wherein does the difference lie?

When some one shall have obtained an answer to the main question, at once clear and decisive, they will confer a favour by submitting it to your readers. Till then, I would advise them to "beware of man-traps."

Manchester. H. KEMP.

J. E. Lord.—The address of Mr. Swan is Mosley Street, Newcastle-on-Tyne.

R. J. R. and G. N. R. have not complied with the regulation as to anonymous communications.

Sigma.—The Registrar of the Medical Council, 315, Oxford Street.

X. L.—No person who is not registered under the Dentists Act may use any name or title implying that he is qualified to practise dentistry, or recover any fee or charge for the performance of a dental operation.

J. Osborne.—The question should be addressed to a surgeon.

J. Thomas.—Place them for some time in a closed compartment with some odorous substance.

COMMUNICATIONS, LETTERS, etc., have been received from Messrs. Bell, Boyce, Arato, Baker, Snell, Planchon, Stephens, Collins, Radius, Sanderson, Alpha, Sloper.

OPINIONS AS TO THE ORIGIN OF COMMERCIAL VANILLA.

The following details have been placed at our disposal by Mr. J. Ch. Sawer:—

An imperfect knowledge of the species and varieties of this most valuable orchid has led to frequent controversy as to the origin of the vanilla found in commerce, whether the whole of it is derived from one species of plant of the genus *Vanilla*, from several distinct species, from several varieties of one or more species, or from several commercial sorts of fruit yielded by one or more varieties or species.

Delteuil gives a list of the vanilla plants cultivated in various countries, from which it appears that in Mexico are found the *V. planifolia* (yielding the finest fruit), *V. sativa*, *V. sylvestris*, and *V. pompona* (with short thick fruit called "vanillon"); Guiana and Surinam, *V. guyanensis*; Bahia, *V. palmarum*; Brazil and Peru, *V. aromatica* (which is the least aromatic of all); and at Réunion two sorts, which appear to be varieties of *V. planifolia*, the one usually called the small, the other the large vanilla, characterized by the stalk being thicker, the leaves much larger, the flowers larger and of a deeper yellow tint, the fruit thicker, shorter and triangular, but this being of inferior aroma its cultivation has been almost generally abandoned.

In a paper recently communicated to the 'Société d'Emulation,' by M. Jaillet, on the "Culture and Preparation of Vanilla,"[*] the author infers from the writings of various botanists on this subject, also from personal observation, that the *V. planifolia*, *V. sativa*, and *V. sylvestris* are identical, the distinctive specific characters not being clear and decided, but depending upon the effects of age, climate, and vigorous growth. He concludes that although there really exist several species of vanilla and that there may be many varieties of the same species, all the commercial vanilla is furnished by the *V. planifolia*. This would appear to be the opinion of the authors of the 'Pharmacographia,' as *V. planifolia* alone is mentioned as the commercial source, but perhaps referring only to the products of Mexico and Réunion.

According to Bentley and Trimen ('Medicinal Plants') there are several varieties of vanilla found in commerce, as Mexican or Vera Cruz, Bourbon, Mauritius, Java, La Guayra, Honduras, Brazilian, etc., the finest being the Mexican, of which there are different qualities. They further state that these varieties of vanilla are doubtless derived from different species of the plant. The finest, such as the Mexican, is commonly said to be the product of *V. planifolia* (Andrew),[†] synonymous with *V. claviculata* (Swartz), *V. sylvestris?* and *V. sativa* (Schiede), *V. viridifolia* (Blume), and *Myrobroma fragrans* (Salisbury).[‡]

Scheide, a writer on the botany of Mexico,[§] considered the *V. sylvestris* as probably a synonym of *V. planifolia*, but Morren[||] states that the exactness of that opinion is not clearly demonstrated, and declares that the writings of Blume,[¶] Swartz,[**] Plumier[*] and Desvaux,[†] merely render more difficult the question as to which species, varieties and sorts are to be attributed the vanilla of commerce; also that this question could only be solved by an experienced naturalist who should examine the plants in the localities where they actually grow, compare the different length, thickness, shape, colour, flavour and value of the fruit yielded by each species and variety and accompany the diagnoses with drawings made on the spot. This argument does not authorize M. Jaillet to quote him as an authority for stating that the whole of the commercial vanilla is derived from *V. planifolia*; Morren simply says that the finest vanilla closely resembles the fruit of that plant.

The culture and preparation of vanilla, requiring great care and management, are described by M. Jaillet as follows (some slight remarks from other authors being added, and one or two words corrected):—In Mexico, plantations are established either in virgin forests or in open fields. In the former case it is necessary to cut down all shrubs, climbers, and such large trees as would give an excess of shade, leaving only young trees suitable to serve as supports to the plants. Preference is given to those containing a milky sap, as the plant attaches itself to the bark by means of aërial roots (produced from the nodes), which are its veritable organs of nutrition, the subterranean roots being very insignificant in comparison to the size of the plant (it is not uncommon to observe the gradual decay of the stalk near the root and at the same time a remarkable development of the same stalk as it increases in length). Close to each tree two cuttings are planted side by side in the following manner: in a shallow trench of about an inch and a half deep and fifteen or twenty inches long is imbedded a cutting as far as three joints or eyes, the three leaves being first stripped off; the trench is then covered up with dried leaves, leaf-mould, coarse sand, brush-wood, etc. (The bed should be slightly raised above the level of the soil, in order to prevent a collection of stagnant water which might rot the plants.) The remainder of the shoot, 3 or 4 feet long, is tied against the tree. The supporting trees should be quite 12 or 15 feet apart to allow sufficient room for the development of the plant, the growth being very rapid. After a month the cuttings will have taken root, and must be carefully kept free from weeds and underwood of all kinds. In the third year these plants will commence to bear fruit. In the case when it is desirable to plant a field, plain, or low-lying ground, the method in Mexico is first to thoroughly plough up the land and sow it with maize. While this is growing a quantity of young lactescent trees of the fig tribe make their appearance over the field; these, after a year or eighteen months, are large enough to support the vanilla plants, which are set in the manner above described, and from them the finest product is obtained.

The mode of cultivation adopted in the Island of Réunion is different. In Mexico where the fecundation of the flower is left to nature, the plant is allowed to climb up over the trees, but in Réunion where the fecundation is performed artificially, the plant must not be allowed to grow out of reach of the cultivator. When it is desired to start a plantation in a forest, the cuttings are set at the foot of trees and the trunks are connected together transversely by sticks so as to form a trellis on which the plant can spread; but the planter is careful never to lop the trees, for the reason that the vanilla, more than any other orchid, loves a humid soil and is injured by the direct burning rays of the sun. It is under large trees that the vanilla is seen in its typical form, vigorous and productive. When an open field is selected as the site of a plantation, the necessary supports for the plant must first be grown. For this purpose mangoes and fig-trees are employed, but preference is given to the *Jatropha curcas*, the tree producing the physic-nut, which strikes readily from cuttings, is of rapid growth, and furnishes an abundance of lactescent juice well suited to supply the necessary nourishment to the vanilla plant.* When these young trees have attained a size sufficient to shade the plant, cuttings of the orchid are set in the following manner:—Between the trees and along the lines in which they are planted, a trench 8 inches deep is dug; the cuttings are placed in it and covered with a little leaf-mould, dry leaves and straw; the rainy season is preferable for this operation, as success in striking the cuttings depends essentially on moisture and shade. When the young shoots begin to grow, it is only necessary to guide them along the trellises and allow the aërial roots to rejoin the trench between the supporting trees, and in two years the plantation is in full bearing.

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[*] *Répertoire de Pharmacie*, viii., p. 357.

[†] 'Botanist's Repository,' vol. ii., p. 538.

[‡] 'Paradisus Londinensis,' t. 82.

[§] 'Botanische Berichte aus Mexico,' 1820. 'Linnæa,' 1829, vol. iv., p. 514.

[||] 'Bulletins de l'Academie Royale de Belgique,' 1e Série, xvii., part 1, p. 130.

[¶] 'Flor. Javæ;' 'Bijdragen,' 422, and 'Rumphia,' vol. i., p. 197—198.

[**] 'Nova Acta. Upsal.,' vol. vi., p. 66; 'Fl. Ind. Occid.,' 1515; and 'Schrader's Journ. Bot.' vol. ii., fig. 1.

[*] 'Plantarum Americanum,' and Catesby's 'Hist. Nat. de la Caroline,' vol. iii., tab. 7.

[†] 'Annales des Sciences Naturelles, 3e Série, 1846, p. 117.

Fecundation.—As the labellum (the upper lip of the stigmatic orifice) totally covers the female organ, and the anther rests on that valve of the stigma, it is evident that notwithstanding the dehiscence of the anther, the orifice which allows passage to the pollen is closed by the labellum, thus rendering spontaneous fecundation comparatively rare. It does, however, sometimes occur and may be attributed to the passage of a winged insect, or to the action of the wind detaching the pollen from the anther; but it seems more rational to suppose that the brush-shaped appendage situated on the labellum is solely intended for the purpose of collecting the pollen and then depositing it on the stigma at the moment when the flower begins to droop and fade. Still the natural fecundation is a rare occurrence, for in Guiana, Mexico, and all other countries where the plant is left to itself, it has been observed that a length of 12 to 26 inches of vine will only produce one pod; the number of flowers on such length of stalk may amount to forty, all of which can be artificially fecundated. The old process for performing this operation consisted in cutting the labellum, and was not always successful; this was improved upon by a creole slave in the colony, who discovered that a more rapid and sure method was to slip away the labellum from beneath the anther, so bringing that organ in direct contact with the stigma. In this manner it is possible to obtain more than 3500 pods on a single plant, but such forcing would cause the plant to perish before the fruit could mature. Therefore, it is advisable to select the finest flowers on each bunch, fecundating only those which present a large fleshy peduncle. It is an ascertained fact that the handsomest fruit are produced from the first flowers, but the best from the last flowers which open on each bunch. A bunch should not be allowed to bear more than five or six fruits, and the fecundation is assured when the flower is persistent and dries at the extremity of the fruit. This result obtained, the remainder of the bunch with all its buds should be cut off.

Harvesting the Fruit.—As above observed, the fecundated flower decays at the extremity of the ovary, and after some days falls off, leaving the persistent gynostem attached to the fruit, which continues to grow for a month, but must be left on the stem for six months longer to allow it to ripen. Each pod should then be cut off separately, as it matures, instead of detaching the entire bunch, as is done in some countries. The only certain indication of maturity is the crackling produced when the pod is pinched between the fingers. The apple-green or greenish-yellow colour is not a sufficiently reliable sign. It is quite as important to avoid gathering the pods too soon as too late. If unripe, the product will lack fragrance, colour, etc.; if over-ripe the pod will be yellow at the end, and, if not already split, is apt to become so in curing.

Curing the Fruit.—The odour of vanilla does not pre-exist in the ripe fruit, but is developed by the process of fermentation. When a pod is allowed to remain on the plant, it splits into two unequal parts, becoming first yellow, then brown, and finally black. While it is drying, it exudes an unctuous liquid of dark red colour, called "balsam of vanilla," and when quite dry becomes brittle and devoid of all perfume.

The following are the various processes for curing the vanilla:—

Guiana Process.—The beans are placed in ashes, and there left till they begin to shrivel; they are then wiped, rubbed over with olive oil, and their lower end having been tied, are hung in the open air to dry.

Peruvian Process.—The beans are dipped into boiling water, tied at the end, and hung in the open air for twenty days to dry; they are then lightly smeared over with oil of palma christi, and a few days later are tied up in bundles.

Mexican Process.—As soon as gathered the beans are placed in heaps under a shed, protected from sun and rain, and in a few days, when they begin to shrivel, are submitted to the *sweating* process. This is carried on in two different ways, according to the state of the weather. If it happens to be warm and fine the beans are spread out in the early morning, on a woollen blanket, and exposed to the direct rays of the sun. At about midday or one in the afternoon the blanket is folded around the beans, and the bundle is left in the sun for the remainder of the day. In the evening all the vanilla is enclosed in air-tight boxes, so that it may sweat the whole night. The next day the beans are again exposed to the direct action of the sun. They then acquire a dark coffee colour, the tint being deeper in proportion to the success of the sweating operation. Should the weather be cloudy, the vanilla is made into bundles, and a number of these are packed together into a small bale, which is first wrapped in a woollen cloth, then in a coating of banana leaves, and the whole, enclosed in a mat, is firmly bound, and sprinkled with water. The bales containing the largest beans are now placed in an oven heated to 140° F. When the temperature of the oven has fallen to 113°, the smaller beans are introduced, and the oven is closed tightly. Twenty-four hours afterwards the smaller beans are taken out, and twelve hours later the larger ones. During this process the vanilla has *sweated,* and acquired a fine chestnut colour. The delicate operation of drying has now to be commenced. The beans are spread on matting, and exposed to the sun every day for about two months. When the drying is nearly complete, sun-heat is no longer needed, and the beans are spread out in a dry place until the necessary degree of desiccation is arrived at; they are then tied up in small packets.

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* The possible danger of the acrid matter contained in this tree being absorbed by the vanilla plant has been alluded to in this Journal by a writer in "The Month," vol. xi., p. 430.

Réunion Process.—The beans are sorted, according to length, to be scalded. The long ones are steeped in water heated to 194° F., during ten seconds, the medium size during fifteen seconds, and the short ones fully a minute. They are then exposed to the sun between two woollen blankets until they acquire the characteristic chestnut colour. After this exposure, which may last from six to eight days, the beans are spread out under sheds to dry gradually.

The sheds in this colony being roofed with zinc, they really constitute drying stoves, through which a current of hot air continually circulates. This desiccation takes about a month, during which time the only care necessary is to turn the beans frequently, so that they dry evenly. At the moment when it is found that the beans may be twisted easily round the finger without cracking,—that is to say, when they have acquired a degree of dryness which can be known only by experience,—the operation requiring the most minute and vigilant care commences: this is termed the *smoothing* process. The operator must pass every bean between his fingers, and repeat this frequently; for, on drying, the beans exude from their entire surface a natural fatty oil. It is to this oil, which exudes as the fermentation proceeds, that the lustre and suppleness of the bean is due. When sufficiently dry, they are tied up in bundles of uniform length. In this manner the three commercial sorts are termed:—1. *Fine Vanilla.* 8 to 11 inches long, nearly black, unctuous, glossy and clean looking; these soon become covered with frost-like crystals. 2. *Woody Vanilla.* 6 to 8 inches long, lighter in colour, more or less spotted with grey, not glossy; these are the pods gathered in an unripe condition; they crystallize very little, if at all. 3. *Vanillons,* of which there are two sorts, those obtained from short, but ripe fruit, which are excellent and frost well, and those from abortive and unripe fruit, whose perfume is simply the result of absorption from the fine beans with which they have so long been in contact.

The total yield of the Mauritius and Réunion plantations is estimated as follows:—

1875	29,255 kilos.
1876	34,322 „
1877	41,270 „
1878	35,000 „
1879	40,000 „

The *Liatris odoratissima*, a North American plant, commonly called "wild vanilla," is not an orchid; the name is simply given on account of the odour of its leaves resembling that of vanilla and tonquin beans. It has been described in this Journal, vol. v., [3rd series], p. 489.

The *Angræcum fragrans*, (Dupetit-Thouars, 'Orchidées d'Afrique') is an orchid much resembling the vanilla. It is synonymous with *Aerobion fragrans* (Sprengel), and *Aeranthus fragrans* (Reichenbach). In Réunion and Mauritius it is known as "faham" and in Madagascar as "fanave." The dried leaves and fruit possess an agreeable odour, resembling a mixture of vanilla, tonquin beans and mellilot. Commercially, we know only the leaves. The aromatic principle contained in them is soluble in alcohol, in ether, and in boiling water; it has been isolated by Gobley[*] in the form of small white silky needles, which on being pressed between the fingers or slightly warmed develop the characteristic odour of "faham" and bitter almonds. On analysis this substance was found to contain—carbon, 76·12; hydrogen, 4·12; oxygen, 19·76; approximating it to the constitution of coumarine. The fruit is supposed to contain a larger proportion of this principle than the leaves. The plant is propagated by seed. An infusion of the leaves is taken as a beverage; the mucilaginous and bitter properties contained in them are considered to act as a digestive and as a remedy for pulmonary consumption, and the dried leaves when smoked as beneficial in cases of asthma. A somewhat similar odoriferous principle has been found in the leaves of other orchideous plants, as the *Orchis fusca*, and the *Ophris antropophora*, but not identical with pure vanillin.

The amount of vanillin in commercial vanilla from various sources has been estimated at from 1½ to 2½ per cent. It has been doubted whether the odour of vanilla is entirely due to vanillin, and some chemists who have studied the question aver that they have detected large quantities of benzoic acid in Mexican vanilla; but the researches of Tiemann and Haarman[†] show that this must have been vanillic acid or a mixture of this acid with its aldehyd, vanillin. Whether such was the case, or whether the samples operated upon had been tampered with (it is known that inferior qualities are dusted over with benzoic acid to imitate the natural efflorescence), it is still believed that pure vanillin, although the principal vehicle of the aroma, does not constitute the sole flavour and perfume of the vanilla bean and that the vanillin prepared artificially by Messrs. Tiemann and Haarman will not quite discourage the Mexican and Bourbon planters.

As for the East Indian *vanillon,* the odour more resembles that of heliotrope, probably owing to a trace of benzoic aldehyd; it is exclusively used in perfumery. According to the above mentioned German chemists the amount of vanillin, in this bean is only about 0·4 per cent., and it is more difficult to isolate than from ordinary vanilla by reason of the presence of a minute quantity of oily matter which adheres to it with great tenacity.

CONTRIBUTION TO THE KNOWLEDGE OF AUSTRALIAN ALSTONIA BARK.[‡]

BY O. HESSE.

The bark of *Alstonia constricta* was examined in 1863 by Palm, who obtained from it a bitter substance, which he called "alstonin," by precipitating a decoction of the powdered bark with tannic acid and then treating the resulting compound of bitter substance and tannic acid in a suitable manner. According to Palm this substance was a non-nitrogenous resin, and therefore not an alkaloid.

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[*] *Journ. de Pharmacie*, xvii., p. 350.

[†] *Ber. Deutsch. Chem. Ges.*, Sept. 18, 1876.

[‡] Abstract of a paper in the *Annalen der Chemie*, vol. ccv., p. 360.

The method formerly adopted by the author[*] in the separation from this bark of one of the alkaloids,—namely, chlorogenine,—was based upon the assumption that Palm's "alstonin," notwithstanding the alleged absence of nitrogen, consisted essentially of chlorogenine, an assumption that was confirmed by a control experiment made with a small specimen of authentic bark supplied to the author by Professor Flückiger. This being established, the author did not hesitate to call the alkaloid in question "alstonine," instead of "chlorogenine," the former name being older than the latter. The name "alstonine," however, in the course of time became repeatedly applied to other substances.

Thus Baron von Mueller, to whom the author's previous work on the Australian bark was evidently unknown, in his work, 'The Organic Constituents of Plants' (p. 239), gives the name "alstonin" to Palm's substance. He also invests with it (p. 230) a body which he obtained working in conjunction with L. Rummel, by acidulating an alcoholic extract of the bark with a little hydrochloric acid, adding a slight excess of ammonia to the clear filtered solution, treating the separated flocks with ether, evaporating this solution, once more treating the residue with dilute acid, and repeating the above process. The "alstonine" obtained in this way was an orange-yellow transparent mass, melting below 100° C., and having a distinctly basic reaction. It was easily soluble in ether, alcohol and dilute acids, less so in water. All these solutions showed in the dilute condition a strong blue fluorescence, which was not altered by acids or alkalies. Concentrated nitric acid dissolved this substance with a crimson-red colour, sulphuric acid with a red-brown.

Subsequently Oberlin and Schlagdenhauffen[†] gave the name "alstonine" to a crystallizable alkaloid, which they extracted direct from the same bark by means of ether, and by crystallization from a little ether separated from another alkaloid that they named "alstonicine." They were of opinion that their alkaloid formed the basis of the substance similarly named by Mueller and Rummel.

Before, however, the author became acquainted with Oberlin and Schlagdenhauffen's communication, he had ascertained by experiment that a basic mass was removed from the bark by ether, which corresponded essentially with porphyrine. A subsequent attempt to separate this mass by means of ether into a crystallizable and an amorphous portion was unsuccessful, and this led him to undertake a fresh investigation of the bark, the results of which form the subject of the present paper.

It was first ascertained that extraction of the bark with ether yielded only a small portion of the alkaloid, which, however, consisted principally of porphyrine. In order to obtain a larger proportion of the alkaloids an alcoholic extract of the bark was dissolved in water, and this solution supersaturated with sodium bicarbonate, when a brown flocculent substance, evidently a decomposition product of chlorogenine or alstonine, separated, and was removed by filtration. The clear filtered solution was now treated repeatedly with petroleum spirit, and this with a small quantity of acetic acid until nothing more worth the trouble was extracted. In this way porphyrine and other substances soluble in ether were separated from the carbonated solution, whilst the alstonine (chlorogenine) remained dissolved in the liquid.

Alstonine (Syn. *Chlorogenine*).

This alkaloid is obtained from the carbonated solution just referred to by supersaturating it with caustic soda and shaking with chloroform. There results a blackish brown solution of alstonine, which is filtered, and then after the addition of sufficient water and acetic acid is freed from chloroform by distillation. The acid residual solution is filtered to separate a small quantity of brown flocks, then treated with animal charcoal, which besides colouring material, however, also takes up a considerable quantity of precipitated alkaloid. The solution so purified is then precipitated with caustic soda, which throws down a large quantity of brownish yellow flocks that quickly settle, but cannot be washed on the filter. The saline liquor is therefore separated as much as possible by decanting three times with cold water. This manipulation is successful, though at the same time a portion of the alkaloid is dissolved, which may be recovered from the washings by shaking with chloroform. When the saline liquor has been removed as completely as can be, the flocculent alkaloid is washed upon a filter with cold water, the organic matter being separated as much as possible from the sides of the filter with a platinum knife, and distributed in the water. Finally, the alkaloid is brought in thin layers upon smooth blotting paper, and dried at a low temperature in the air.

The alkaloid then appears as a brown amorphous mass, which can be rubbed to a brownish yellow powder. In the exsiccator it loses water, and becomes darker in colour and eventually coffee-brown, especially when rapidly heated to 80° C.

In the earlier experiments the author used ammonia to precipitate the alkaloid, but has now abandoned it, because the ammonia imperfectly precipitates the alkaloid. It produced in the acid solution of alstonine a more abundant precipitate, but this gradually disappeared again, except a small portion. For the alkaloid as precipitated by ammonia the formula $C_{21}H_{22}N_2O_5 = C_{21}H_{20}N_2O_4 + H_2O$ was formerly published, whilst the alstonine precipitated with caustic soda gave figures corresponding with the formula $C_{21}H_{20}N_2O_4$.

	Calculated.	Found.
C	69·23	69·01
H	5·49	5·47
N	7·69	7·36

The alkaloid obtained as above contained only a trace of ash.

The air-dried alkaloid contains 3½ molecules of water, part of which is given off in the exsiccator and part when dried at 120° C. The dried alkaloid exposed to the air rapidly retakes up one molecule of water.

Alstonine, when freshly precipitated, dissolves readily in chloroform, but less freely after being dried in the air. It is also freely soluble in alcohol, but it is very difficultly soluble in ether, especially in the dried form. Its hydrate (containing 3½ H_2O) melts below 100° C., whilst the anhydrous alkaloid first becomes liquid at 195° (uncorr.).

Alstonine. contrary to Palm's opinion, is a strong base and forms salts with acids. The platinum salt, obtained by precipitating a solution of the hydrochlorate with platinum solution, when analysed gave results corresponding to the formula $(C_{21}H_{20}N_2O_4)_2 \cdot PtCl_6H_2 + 4H_2O$.

With respect to the salts of alstonine the author adds that the sulphate, hydrochlorate, tartrate and oxalate are freely soluble in water, but that in an excess of the acids the salts are thrown down as brown flocculent masses. A similar behaviour to that of these acids is observed in an acid-like constituent of the Australian *Alstonia* bark, which is obtained in brown amorphous flocks, and forms with alstonine a difficultly soluble indifferent compound. The author thinks it very probable, therefore, that this compound is identical with Palm's "alstonin."

Porphyrine and Porphyrosine.

As before mentioned, petroleum spirit withdraws from the carbonated solution several substances which can be transferred from it to acetic acid. The acid then acquires a magnificent blue fluorescence and gives with excess of ammonia a reddish white flocculent precipitate. This precipitate is dissolved in ether and the solution treated with animal charcoal, which takes up not only a small residue of alstonine, but also another basic substance which can be withdrawn from the animal charcoal by means of dilute acetic acid. The acid assumes a splendid purple-red colour and gives with excess of ammonia a flesh coloured precipitate, which changes rapidly in the air. This alkaloid the author has named "porphyrosine," and postponed its further examination.

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[*] *Berichte*, vol. xi., p. 2234.

[†] *Pharmaceutical Journal* [3], vol. ix., p. 1059, from the *Journal de Pharmacie*, June, 1879.

After the separation of the porphyrosine the ethereal solution is likewise treated with dilute acetic acid and this solution precipitated with ammonia. The precipitate, after drying in the air, is boiled for some time in genuine ligroin; a portion passes into solution, but upon cooling a certain quantity separates out. The porphyrine, however, remains essentially dissolved and can be obtained by evaporation of the solution. For its complete purification it is necessary that the alkaloid should be treated in acetic acid solution with animal charcoal.

The porphyrine precipitated from the decolorized solution by means of ammonia forms white amorphous flocks, which upon drying in the air yield white coherent masses that can be triturated to a white powder. It dissolves freely in ether, alcohol and chloroform, and upon evaporation of these solutions is again obtained as an amorphous residue. The melting point of this alkaloid after drying in the exsiccator is 97° C. (uncorr.).

If the alcoholic solution of porphyrine be diluted freely with pure water a faint blue fluorescence becomes perceptible in it.

Concentrated pure sulphuric acid dissolves the alkaloid with a purple colour, which becomes paler pretty quickly and passes into a yellowish or brownish green. Concentrated sulphuric acid containing molybdic acid also dissolves the alkaloid with a purple colour. Concentrated sulphuric acid containing chromic acid dissolves it with a greenish blue, passing into a yellow-green. In acid solutions porphyrine shows a blue fluorescence.

The quantity of porphyrine contained in Australian *Alstonia* bark is very small, the author having obtained only 0·6 gram of pure alkaloid from nearly 2 kilograms of bark.

An analysis of the platinum compound gave results corresponding with the formula for the alkaloid of $C_{21}H_{25}N_2O_2$. The platinum compound, dried at 120° C., corresponds with the formula $(C_{21}H_{25}N_2O_2)_2 \cdot PtCl_6H_2$, but the air-dried compound contains also 4 molecules of water.

Alstonidine.

This alkaloid was separated from the portion of the alkaloids difficultly soluble in ligroin. This portion was dissolved in a sufficient quantity of boiling ligroin, from which, upon cooling, at first isolated needles and afterwards concentrically grouped needles crystallized out. All attempts to obtain these apparently different substances by crystallization from ligroin were unsuccessful. The mixture was, therefore, dissolved in a little boiling alcohol and sulphuric acid added until the solution distinctly reddened blue litmus paper. Upon cooling the sulphate of a new alkaloid crystallized out, which was collected, dissolved in dilute hot alcohol and decomposed with ammonia. Upon the cooling of this solution the alkaloid crystallized out in colourless concentrically grouped needles. This alkaloid has been named by the author "alstonidine."

Alstonidine dissolves freely in chloroform, ether, strong alcohol and acetone, and crystallizes upon the evaporation of the respective solutions. It also dissolves freely in hot dilute alcohol, crystallizing out upon cooling in colourless needles. The alcoholic solution has a weak basic reaction, and an intensely bitter taste, and shows a blue fluorescence that becomes more intense upon dilution with water. Solutions of alstonidine in dilute acids show an intense blue fluorescence. In such solutions, ammonia and caustic soda produce white flocculent precipitates that become crystalline almost immediately.

Alstonidine melts at 181° C. (uncorr.). In alcoholic solution it gives no colour with ferric chloride. Concentrated sulphuric acid, pure or containing molybdic acid, and concentrated nitric acid dissolve the alkaloid without any noteworthy coloration; but upon dilution of these solutions with water they assume a bright blue fluorescence. Concentrated sulphuric acid, to which some powdered potassium dichromate has been added, dissolves the alkaloid with a blue-green colour that becomes paler after a time; the intensity of the colour is restored by shaking, but it again becomes pale, and this may be repeated until a point is reached when the solution remains a greenish colour.

Alstonidine forms salts with acids. The sulphate forms colourless needles which easily crystallize from hot water. The hydrochlorate crystallizes in beautiful long needles, freely soluble in water and alcohol. The hydriodate crystallizes in colourless stellate grouped needles. The sulphocyanate forms white needles that are very difficultly soluble in water. The platinum compound is obtained as a yellow flocculent precipitate slightly soluble in hot water. The gold salt also forms a flocculent precipitate, whilst the mercuric chloride compound crystallizes in colourless needles, which are pretty freely soluble in water, especially boiling water.

If solution of potassium dichromate be added to a hydrochloric solution of astonidine no blood-red colour is produced as with the corresponding porphyrine solution, but a yellow flocculent precipitate is at once formed.

On account of want of material the author is compelled to postpone any communication as to the composition of this alkaloid and its salts.

Alstonidine presents much similarity to Oberlin and Schlagdenhauffen's alstonine, but differs from it definitely in that the latter with sulphuric acid containing chromic acid is coloured first blue-green, then violet, and finally purple-red. The author thinks that the method adopted by those chemists for obtaining their alstonine almost suggests the idea that the alkaloid might have contained a certain amount of alstonidine. That those chemists should have so completely separated their alstonine from their alstonicine (which he considers to be evidently his porphyrine) by crystallization from ether that the latter in acid solution no longer showed a blue fluorescence he does not think possible; since, notwithstanding the great difference in solubility in ligroin shown by porphyrine and the crystallizable portion of the alkaloids, porphyrine could not be so obtained as to no longer show fluorescence.

The author considers that the list of alkaloids from the Australian *Alstonia* bark is by no means completed with the substances named. This is indicated not only by the difference in the crystallization before referred to. In the separation of alstonine from the chloroform solution at first dilute acetic acid was used, but this only took up a small portion of that alkaloid. Dilute sulphuric acid was therefore added and the mixture shaken, when a red-brown turbid acid solution resulted which upon standing became clear, with a separation of small scarlet needles. These crystals were recognized as the sulphate of a special alkaloid, but the quantity of it was so small that an investigation of the alkaloid had to be deferred.

FERRIC SUCCINATE.

BY PROFESSOR WM. T. WENZELL.*

Since succinic acid in combination with the ferric radical has recently been introduced by the medical profession as a remedy for the relief of jaundice, resulting from obstruction of the biliary duct by calculi, and with apparent success, a demand for a preparation combining efficiency and elegance has arisen. The originator of this medicine recommends the use of the hydrated succinate of iron as the preparation from which he has obtained such good results in the treatment of the affection referred to. But the preparation is unsightly, and anything but elegant as a pharmaceutical product.

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* Read before the California Pharmaceutical Society and California College of Pharmacy, October 13, 1880. From *New Remedies*, February, 1881.

Ferric succinate, in hydrated state or dried, presents a cinnamon-brown amorphous substance, quite insoluble in water. It is readily prepared by adding to a solution in water of an alkaline succinate, a solution of ferric sulphate, as long as a precipitate is obtained. In this reaction, contrary to the law first enunciated by the Saxon chemist Wenzell, a half century ago, "when two neutral salts are mixed together in solution, and a decomposition is effected, the products of the decomposition would be also neutral salts," a basic ferric succinate is produced instead of a neutral succinate—a portion of the succinic acid being liberated and remaining in solution. The reaction takes place between 1 molecule of ferric sulphate and 3 molecules of the neutral or normal ammonium succinate, and with the assimilation of 2 molecules of water:—

$$\underset{\text{1 mol. ferric sulphate}}{Fe_2(SO_4)_3} + \underset{\text{3 mol. ammon. succin.}}{3(NH_4)_2C_4H_4O_4} + 2H_2O =$$

$$= 3(NH_4)_2SO_4 + \underset{\substack{\text{Basic ferric succin.}\\ \text{(hydrated.)}}}{Fe_2O_2H_2(C_4H_4O_4)_2} + \underset{\text{Succinic acid.}}{H_2C_4H_4O_4}.$$

Hydrated ferric succinate occurs in the form of an amorphous precipitate, containing 1 molecule of water, of which it is deprived on drying, and converted into the basic salt $Fe_2O(C_4H_4O_4)_2$.

The hydrated salt is insoluble in a cold solution of succinic acid or ammonium succinate, more soluble in boiling solutions, from which it separates slowly on cooling. It is more soluble in ammonium citrate, even at ordinary temperatures.

A solution of ferric succinate in ammonium citrate is quite permanent, and can be mixed with succinic acid and ammonia without decomposition. An excess of ammonia merely deepens the colour. The solution, evaporated at a temperature not exceeding 130° F., solidifies, on cooling and standing for a time, into a crystalline mass. By experimental synthesis, working with exact molecular weights, it was found that three molecules of ammonium citrate were required to dissolve one molecule of the precipitated ferric succinate, and from these data the following composition of the double salt of ferric succinate and ammonium citrate has been deduced: $Fe_2O(C_4H_4O_4)_2 . 3(NH_4)_2C_6H_6O_7$, and from this molecular formula a working formula for its preparation has been calculated:—

Liquor Ferri et Ammonii Succinatis (*Solution of Succinate of Iron and Ammonium*).—Dissolve 50 grains of succinic acid in 3 fluid ounces of water, neutralize nearly with ammonia and dilute to 6 fluid ounces. Transfer the solution to an 8 ounce bottle, add ½ a fluid ounce of the officinal liquor ferri persulphatis and agitate well. Transfer the mixture to filter and wash the precipitated ferric succinate thoroughly with distilled water. Next take 89 grains of citric acid, put it into a beaker, and add with stirring a sufficient quantity of water of ammonia until the acid is dissolved and the solution neutral.

Finally, transfer the moist ferric succinate to a porcelain capsule, add the solution of ammonium citrate and dissolve, assisted by a gentle heat.

This solution, when diluted to measure 6 fluid ounces, will contain to the fluid drachm 2 grains of the ferric succinate, $Fe_2O(C_4H_4O_4)_2$, or 5 grains of the double salt.

INDUCTION OF CURRENTS AND SOME PRACTICAL APPLICATIONS THEREOF.*

BY JOSEPH STAPLETON.

On the 24th of November, 1831, Michael Faraday read a paper before the Royal Society, in which he described some experimental results in electricity that he had then recently obtained. The title of the paper was: "1. On the Induction of Electric Currents; 2. On the Evolution of Electricity from Magnetism; 3. On a new Electrical Condition of Matter; 4. On Arago's Magnetic Phenomena."

This was the first account of the phenomena in question which had hitherto appeared, and with these phenomena the name of Faraday will be associated as long as the science of electricity exists.

I propose this evening that we should go over this paper together experimentally, and endeavour to verify some of the conclusions in it as far as it is possible to do in the course of one short hour. I believe we shall all of us find it exceedingly interesting; and, moreover, the subject is one of growing public importance, as it is owing to the discoveries detailed in this paper that the electric light is to-day a commercial possibility as a means of illuminating our streets and public buildings.

This is the principal reason why I decided to bring before your notice this evening the subject matter of a Royal Society paper of forty-nine years ago, and also, if I may venture to say so, my wish to do something, if ever so little, towards keeping our remembrances of our distinguished countryman's services to science fresh and green in our minds.

Faraday commences his paper by saying that "The power which electricity of tension [meaning thereby frictional, or statical electricity as we now call it] possesses of causing an opposite electrical state in its vicinity has been expressed by the general term induction." He says next that "it is with this meaning that he purposes using it in this paper."

Then he goes on to notice that certain induction effects of electrical currents have been described and recognized as such, as in the case of "magnetization [meaning as in the formation of electro-magnets]; Ampère's experiments of bringing a copper disc near to a flat spiral; his [Ampère's] repetition with electro-magnets of Arago's extraordinary experiments, and perhaps a few others." Then Faraday reasons that "it appeared unlikely that these could be all the effects induction by currents could produce, especially as upon dispensing with iron almost the whole of them disappear, whilst yet an infinity of bodies exhibiting definite phenomena with electricity of tension still remain to be acted upon by the induction of electricity in motion," voltaic or, more scientifically, kinetic electricity being here meant.

After noting that "it appeared very extraordinary that as every electrical current was accompanied by a corresponding intensity of magnetic action at right angles to the current, good conductors of electricity, when placed within the sphere of this action, should not have any current induced through them or some sensible effect produced equivalent in force to such a current," he goes on to say that these considerations led him "to investigate experimentally the inductive effect of electric currents."

We come now to part one of Faraday's paper, "Induction of Electric Currents." I will quote the first paragraph of this part entire:—

"About 26 feet of copper wire, one-twentieth of an inch in diameter, were wound round a cylinder of wood as a helix, the different spires of which were prevented from touching by a thin interposed twine. This helix was covered with calico, and then a second wire applied in the same manner. In this way twelve helices were superposed, each containing an average length of wire of 27 feet and all in the same direction. The first, third, fifth, seventh, ninth, and eleventh of these helices were connected at their extremities end to end, so as to form one helix; the others were connected in a similar manner; and thus two principal helices were produced, closely interposed, having the same direction, not touching anywhere, and each containing 155 feet in length of wire. One of these helices was connected with a galvanometer, the other with a voltaic battery of ten pairs of plates, 4 inches square, with double coppers, and well charged, yet not the slightest sensible deflection of the galvanometer needle could be observed."

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* Lecture delivered before the Chemists' Assistants' Association.

Such a compound helix is now before you, which I have made from the definite and concise directions given by the great master in experimental electricity in the foregoing paragraph. There are one or two differences, however. I did not use "thin interposed twine;" neither did I separate each elementary helix with a layer of calico. I avoided these tedious items by using cotton-covered wire which did all this without my intervention; this kind of insulated wire was probably not a commercial article in 1831, though so common now and so easy to obtain of any instrument maker or wire drawer.

Faraday states that with this compound helix he failed to observe any deflection of the galvanometer needle. Let us try the same experiment, using a more delicate galvanometer than he possessed. Through one of these composite helices I will send the current from five Grove's cells and with the other composite helix I will make a circuit through a Thompson's reflecting galvanometer wound with a long coil of fine wire. On completing the connections and pressing down the contact key which makes contact with the battery we observe that the light spot moves across the screen in a definite direction which we note; the key still being down, and consequently the current still circulating in the coils of the helix, the light spot comes to rest nearly at the zero of the scale. Waiting until the light spot is quite steady and then breaking the battery contact suddenly we get a deflection in the opposite direction. Before we examine these results I propose we should go a little further into Faraday's paper.

He constructed another similar compound helix, using in this case six lengths of copper wire and six lengths of soft iron wire, both wires being longer than those of the preceding helix; but whether the same battery current was sent through the copper or the iron wire he was unable to obtain any effect at the galvanometer. But still he persevered, and it is perhaps well for science that he did so. He made another coil of two long copper wires and he increased his batteries tenfold, and now,—but we will give it in his own words: "when the contact was made, there was a sudden and very slight effect at the galvanometer, and there was a similar slight effect when the contact with the battery was broken."

Then he goes on to say that repetition of these experiments, with a still stronger battery, produced no other effects; "but it was ascertained, both at this and the former time, that the slight deflection of the needle occurring at the moment of completing the connection, was always in one direction, and that the equally slight deflection produced when the contact was broken, was in the other direction; and also, that these effects occurred when the first helices were used."

And now the discovery of current induction is complete, and we see how laborious and painstaking has been the search for the truth. It would seem from the text, that Faraday was expecting effects different from those he obtained; it would appear as if he had expected a constant flow of induced electricity in the secondary circuit, when the battery current was flowing in the primary wire. Further on, he writes that the results he had previously obtained with magnets led him "to believe that the battery current through one wire, did, in reality, induce a similar current through the other wire, but that it continued for an instant only and partook more of the nature of the electrical wave passed through from the shock of a common leyden jar, than that from a voltaic battery, and therefore might magnetize a steel needle, although it scarcely affected the galvanometer."

He found that this expectation was verified, and he goes on to describe several successful experiments in this direction. These experiments are all very valuable and interesting, but we must proceed with the further development of the subject.

It occurred to Faraday that there might be some particular action on making and breaking the contact of the primary wire, so he set about producing the induction in a different manner; he made a wide zigzag form of copper wire representing the letter W, and secured it on a board. A second, precisely similar piece of apparatus was made. One of these wire shapes was connected with a galvanometer, the other was made part of a battery circuit. On approaching the battery wire to the galvanometer wire, the galvanometer needle was deflected, and on removing it a deflection in the opposite direction occurred. I will make this experiment with two bobbins of wire made to slide within each other. I am indebted to Mr. Neeves for the loan of this and other pieces of apparatus on the table, which he has very kindly lent me for this occasion. One of these coils I connect with the reflecting galvanometer; through the other I allow the current from one Grove's cell to flow. On approaching the two coils to each other, we get a very evident movement of the light spot. On the withdrawal of the coil we see that the movement of the light spot is reversed. We must now endeavour to ascertain experimentally the direction of the induced current relatively to the primary current.

The following is perhaps a simple method of remembering the action of a current on a magnetic needle:—

"Imagine a watch, strung on a wire conveying a current, so that this current goes in at the back of the watch and comes out at the face through the central pivots; then the south pole of the magnet is impelled in the direction of the hands of the watch." (Fleeming Jenkin.)

If we apply this in our case it will mean that the light spot must travel to my left hand, as the directing magnet of the galvanometer has its north pole to my right hand. I will now repeat the preceding experiment, taking care to insure that the battery current is going in the same direction in the primary wire and in the galvanometer coil; that is, assuming for a moment that the current is going through the primary coil and the galvanometer coil at the same time, which of course it is not. Under these conditions, on making contact with the battery we see that the light spot moves to the right. On breaking contact the movement is to the left. This experiment then tells us that the induced current at "make" is in the reverse direction to the primary current, and at "break" in the same direction.

Now we can state the first law of current induction:—

"*When a current begins to flow, it induces an inverse current in a neighbouring conductor; when it ceases, it induces a direct current, and both the currents thus induced are merely instantaneous*" (Deschanel).

Next I will vary the strength of the primary current by suddenly interposing a resistance in the primary circuit. I have previously arranged that the direction of the continuous primary current is the same as in our previous experiment; that is, that an "induced current direct" will give us a deflection to the left. On making the experiment we see that the light spot moves to the left, which indicates an "induced current direct." On withdrawing the resistance the deflection is in the opposite direction. Hence the second law of current induction may be stated thus:—

"*When a current receives a sudden increase, this produces an inverse current in a neighbouring conductor, and when it is suddenly decreased a direct current is induced.*" (Deschanel.)

Bearing in mind our experiment of approach and withdrawal of the primary coil and the experiments performed since, we can see that Ferguson's summary of current induction is correct and also conveniently concise, which is:

"*A current which begins, a current which approaches, or a current which increases in strength, induces an inverse momentary current in a neighbouring conducting circuit; and that a current which stops, a current which retires, or* *a current which decreases in strength, induces a direct momentary current in a neighbouring circuit.*"

We may now proceed to the second part of our subject, which is part two of Faraday's paper, "The Evolution of Electricity from Magnetism."

I must be somewhat brief here and give results obtained without much detail or I shall be unable to notice much of the matter I have arranged to speak of.

Faraday devised an experiment in which a welded iron ring (soft iron), with three layers of wire, insulated from each other and connected so as to form one long helix, was connected with a battery of ten pairs of plates; a somewhat similar set of helices, containing two layers of wire, was wound on another part of the ring, and these were made part of a galvanometre circuit. On making contact with the battery Faraday found that the momentary deflection produced was far greater than he had obtained before with a battery of tenfold power when he used helices of much greater length of wire, but containing no iron. [The experiment was then made with the coils previously used, a *bar* of iron being inserted in the primary coil.]

He also noted that the induced currents at "make" and "break" were inverse and direct respectively as in the former experiments without iron in the helices.

Faraday states that he obtained a minute spark between charcoal points in these magneto-electric induction experiments at "make" generally, but rarely at "break." This result is what one would scarcely expect with our present knowledge of the subject; it would seem to us now that the spark should be seen on breaking contact, and perhaps barely perceptible on making contact. But we must accept this observation as probably correct, as Faraday was too close and accurate an observer to be easily mistaken.

Faraday's second experimental magneto-electric induction apparatus was composed of eight superposed helices, four of which were constituted battery and four galvanometer circuit respectively; these helices were wound upon a pasteboard tube, so that an iron bar could be inserted at pleasure. He found scarcely any induction effects without, but very powerful effects with the iron bar in the tube.

This was undoubtedly the first induction coil ever seen, as far as we know, and was the ancestral apparatus from whence we have derived the 42-inch giant coil of Mr. Spottiswoode.

I think it is perhaps desirable, before proceeding further, to state that I had at first intended to describe some of the principal dynamo-electric machines in use for producing the electric light, but I found that it would be almost impossible to do even scant justice to this development of the subject without compromising the value (such as it is) of the observations on the induction coil; I have therefore been obliged to somewhat unwillingly refrain from going into this grand practical outcome of Faraday's electrical researches.

It was soon found that it was necessary to use a fine wire, giving a great number of turns, in place of the stout wire used by Faraday in the secondary coil.

The tension or electromotive force of the induced current is largely dependent on this fact.

The iron rod of the primary coil was next replaced with a bundle of iron wires, by which greater rapidity of action was secured. This improvement, due to Bachhoffner and Sturgeon, dates from 1837.

Ruhmkorff, of Paris, appears to have been the first to construct induction coils, commercially, capable of giving a spark in air. Ruhmkorff's first induction coil is said to have been brought out in 1850 or 1851. To Ruhmkorff must be assigned the merit of surmounting the difficulty of securing the proper insulation of the secondary wire. The success of Ruhmkorff's induction coil was doubtless due to the great care expended on this part of the apparatus.

The next great improvement in the induction coil, due to Fizeau, was the addition of a condenser to the primary circuit; a great accession of power was immediately manifested by the instrument. Thus slowly was the induction coil brought to the state in which we are familiar with it. These gradual developments of the instrument occupied a period of twenty-two years, from 1831 to 1853.

The most approved forms of the apparatus of to-day consist of an iron wire core surrounded by a few layers of stout copper wire insulated with silk or cotton, the whole forming the primary coil; to this is attached the condenser by a branch circuit. In all expensive instruments the primary coil is placed in an ebonite tube; on this ebonite tube the secondary coil is wound. The secondary coil is composed of fine copper wire, all silk-covered and making a great number of convolutions parallel with the primary wire. The length of the secondary wire may vary from 280 miles in Mr. Spottiswoode's coil to perhaps a quarter or half a mile in small coils, giving from ⅛ to a ¼ of an inch spark.

The induction coil on the table is the joint production of Mr. W. A. H. Naylor (whose absence from our midst this evening, enforced by serious illness, we all, I am sure, deeply regret) and myself; its construction was undertaken by us with a view to its use in spectroscopic investigations. (I will not this evening give you any details of the technical difficulties we had to overcome in its construction, but will reserve them until our next meeting, at which I have undertaken to stand in my friend's place, at the request of your secretaries.) The greatest length of spark we have obtained is 8¼ inches with a slow working mercurial break driven by an independent battery.

I will now proceed to show you the instrument in action. I have arranged to use five large Grove cells in the primary circuit; for making the alternate interruptions of the battery current, I am using an electro-magnetic circuit breaker, devised and constructed (for my friend and myself) by Mr. Neeves, who has most kindly offered me his valuable assistance this evening. The break is worked by three independent cells; three cells give sufficient current to maintain a rather rapid movement of the platinum contact piece, and I dare say the coil spark will be sufficiently continuous to show most of the experiments I have contemplated here.

I will first show you the spark with the primary condenser in circuit and then the spark without the condenser. No doubt we shall be able to see that there is a considerable difference between the two sparks. Next I will restore the condenser to its place and add a condenser (a leyden jar) to the secondary circuit, and you will not fail to notice the somewhat startling change in the character of the spark. Next Mr. Neeves will assist me to show you the spark from several jars charged in "cascade." [The experiments were then made.]

I will endeavour to explain briefly some of the conclusions that have been arrived at respecting the induced current. The electromotive force of the discharge is believed to be almost entirely dependent on the number of convolutions of the secondary wire, and on the strength of the magnetic field produced by the iron core of the primary coil; a part of the effect is also probably due to the relative nearness of the two circuits. From my own experience I am inclined to think that within certain small limits close proximity is unimportant. The electromotive force of the discharge is greater the greater the rapidity of demagnetization of the core, provided the magnetic force of the core is at a maximum when the circuit is broken. Hence a comparatively prolonged contact is required, which should be suddenly broken; any cause tending to delay magnetization, or any cause tending to delay demagnetization reduces the efficiency (the length of spark) of the instrument. Such an obstruction exists, as I shall point out presently. I must not forget to say that these observations apply to the "induced current direct" alone. I am not aware how far they affect the "induced current inverse."

Mr. Warren De La Rue has shown, in some experiments with the chloride of silver battery invented by him, that great differences of potential are capable of producing strong induced currents. He passed the discharge from 2280 chloride of silver cells through the primary circuit of one of App's induction coils, capable of giving a 6 inch spark when worked with six bichromate cells, and he found that the chloride of silver discharge working through a condenser in the primary circuit gave thick strong sparks full 6 inches in length. The chloride of silver battery gives a very feeble current, owing to the high internal resistance of the cells; that is to say, the quantity of electricity that flows per second is very small; but the small quantity that does flow possesses considerable tension (or electromotive force), but is incapable of producing much chemical decomposition in a voltameter. Hence it would appear that under certain circumstances electrical discharges are capable of producing as great induction effects as strong currents possessing little electromotive force; this observation, perhaps, accounts for the increased length of spark obtained by increasing the battery power, though at the same time we may not sensibly increase the current.

In the induced currents of the secondary wire, it is found that the electromotive force of the direct current enormously exceeds that of the inverse current; for instance, in Mr. Spottiswoode's coil a spark about 1 inch in length is given on making contact (and you will remember that this is the inverse current, as I showed you), and on breaking contact 42 inches, thirty Grove's cells working through the primary circuit. In all other coils the spark at "make" is scarcely visible, while at "break" of course it is the spark that we are all familar with.

It is found that the two induced currents convey similar quantities of electricity, but as I have just said the tensions are remarkably different. Professor Blaserna, in an elaborate research, has measured the time duration of the two induced currents, and he found that the two currents formed and attained a maximum in the respective times of—

·000485 second for the inverse current.
·000275 „ „ „ direct „

In induction coils these time results are complicated by the time required for the magnetization and demagnetization of the core.

I have said that a hindrance to magnetization and demagnetization of the core existed. This interfering cause is due to an induced current which forms in the primary wire simultaneously with the battery current; this effect Faraday named the "extra current." Faraday explained this "extra current" as due to the inductive effects of the coils of the wire on each other. It has been established by experiment that on a current commencing to flow in a wire, a current in the *same* wire is induced in the opposite direction, and on the current ceasing to flow a current is induced in the same direction and both these currents are momentary.

It is thus easy to see that the "extra current" meeting the battery current will of necessity delay it, and thus hinder the rapidity of magnetization, and that on the battery current ceasing the "extra current" will tend to delay the demagnetization of the core. This is not merely a theoretical difficulty, it is a practical one, and is probably the reason of the difference we observed in the spark given by the coil when the condenser was removed. The coil condenser in great measure, no doubt, diminishes the mischief caused by this "extra current." I am not aware that it is decisively known to what the decided advantages gained by the use of the condenser are due. But there are certain reasons known for believing that the condenser gives rise to a very brief reverse current which neutralizes the "extra current," and thereby secures rapidity of magnetization and demagnetization, thus increasing the inductive effect of the primary coil on the secondary wire.

These reasons are, however, somewhat too complex to discuss this evening. I will endeavour to do something in the matter of proof at our next meeting, at which we are to go into the "Construction of Induction Coils."

A great deal more might be said on this subject of induction, but I have already dealt somewhat fully with it for one evening, so I will conclude by mentioning a few practical applications of the induction coil.

The induction coil has been applied rather largely in military and submarine operations as a means of firing mines, torpedoes and cannon. Captain Noble, by using induction coils, has succeeded in timing the passage of a cannon ball at various parts of the bore of the weapon, by means of the "chronoscope" invented by him.

Captain Noble's device consists of a rapidly moving train of wheelwork actuated by a heavy weight. The train of wheelwork rotates metal discs; on the circumference of each disc a strip of white paper is fastened; the paper is covered on one side with a coating of lamp black. The paper is connected with one terminal of an induction coil; the other terminal of the coil is fixed so as to be just clear of the revolving edge of the disc. The primary circuit of the coil is so arranged in one part of the bore of the gun that it is cut by the shot in its passage along the bore; the severing of the primary wire with a continuous current flowing through it gives rise to a spark from "the induced current direct," which burns a mark on the blackened side of the paper strip. The primary circuits of other coils are similarly arranged in different parts of the bore. The distance between the marks burnt on the paper strips is measured by a micrometer gauge measuring to $\frac{1}{1000}$th of an inch. The linear velocity of the paper strips, the distance between the marks and the distance of the primary circuits from each other all being known give the necessary elements for calculating the velocity of the shot in different parts of the bore of the gun.

The paper strips generally move at the rate of about 1000 linear inches to the second, so that 1 inch between the marks corresponds to a time interval of 1000th part of a second, and as the micrometer gauge measures to $\frac{1}{1000}$th of an inch it is possible to obtain a linear estimate representing *a time interval as minute as the one millionth part of a second.*

Mr. J. E. H. Gordon has recently made an important practical application of the induction coil in electric lighting; he has developed the experiment, due to Mr. Spottiswoode, of using the alternating current of a De Meriten's magneto-electric machine to excite the primary circuit of an induction coil. The De Meriten's machine gives extremely rapid reverse currents which produce a a thick strong spark from the secondary wire; the coil needs neither condenser nor contact breaker. Mr. Gordon utilizes this strong spark to heat to incandescence two little balls of platinum or platinum iridium alloy connected to each terminal of the coil.

A light equal to forty candles is said to be obtained in this way from a comparatively small induction coil of a modified form. The inventor is experimenting with a generator, containing one hundred coils, which yields one hundred independent lights at an expenditure of two-horse power, exclusive of what is required for the exciter. I am not clear as to what is meant here, as if the De Meriten's machine is used it needs no exciter, as it is excited by permanent steel magnets. But we shall know more about the system when the patents have been secured.

Within the last few days Professor Ayrton has suggested that a simple form of induction coil should be used as a test of the intermittence of a dynamo- or magneto-electric current. The intermittent current passing through the primary wire at every pulsation would produce an induced current which could be employed to heat a platinum wire immersed in water or alcohol; the rise of temperature after a given time would by calculation give the amount of intermittence so to speak.

We have a beautiful example of induction of currents in the "Bell telephone," in which the extremely feeble currents which reproduce speech are formed in the magnet coils by temporary changes occurring in the magnetism of the steel magnets, which are brought about by the vibrations of the ferrotype diaphragm.

Professor P. G. Tait has calculated that the current which works the Bell telephone is about a *thousand million times less than the current used "in ordinary telegraphic work"* (Fleeming Jenkin).

I must, however, refrain from giving you any other examples of magneto-electric induction, or I ought justly to describe the various machines used in producing the electric light.

A method of reproducing speech by using induction coils has been discovered recently by M. Dunand. Stated briefly, the following are the principal details of his discovery:—In the primary circuit of an induction coil a carbon microphone is interposed. A continuous current from a few Leclanche cells flows through the primary wire and the microphone. In the circuit of the secondary wire a number of Grove's or Bunsen's cells are employed. which are connected by one pole with a condenser of thirty-six sheets of tinfoil, 2¾ inches square; the other pole of the battery goes to the one terminal of the secondary coil, the other terminal of the coil goes to the condenser. If while matters are thus arranged, words are spoken near the microphone, the charged distant condenser reproduces them; *thus the sheets of tinfoil appear to speak.*

I experimented with this method with the view of exhibiting it to you this evening; but the results I got, though sufficiently decisive to show that the principle was correct, were too feeble to warrant me in bringing it experimentally to your notice.

A possible reason why I failed to obtain such strong effects as M. Dunand is perhaps to be found in the fact that not having Leclanche cells at hand, I used two Grove's cells in the primary circuit. These gave too strong a current for the purpose, as was shown by the fact that at every slight movement of the carbon contacts a feeble electric arc formed between them, which rapidly destroyed the contact points of my hastily improvised microphone. I intend experimenting further with this interesting inductorium telephone at my earliest leisure.

Many other applications have been made of the induction coil, but time forbids that I should go much further into them. However, I must not conclude without mentioning the great services rendered by this grand electrical instrument in spectrum analysis, and how important a place it has held in the splendid researches of Mr. Crookes on "Radiant Matter."

Other minor but useful offices it has held satisfactorily in medical applications, etc., and in lighting gas in inaccessible places in churches, etc., and at the Albert Hall, South Kensington, and possibly elsewhere.

I have now to gratefully acknowledge my indebtedness to Professor Ayrton, of the City and Guilds of London Institute, for looking through most of my subject matter; to Mr. A. H. Allen, of Sheffield, for the lantern slide I have to show you; to Mr Neeves, for his kind assistance and the loan of many pieces of expensive apparatus; to Mr. Cooper, for his lantern and limelight apparatus; to Messrs. Cetti and Co., for the beautiful vacuum tubes about to be shown, and to your two Honorary Secretaries for the facilities they have granted me in setting up my experiments.

As a fitting conclusion, Mr. Cooper will show you on the screen a lantern picture of the man to whose great mind and acute mental vision we owe the discovery of the "induction of currents," and whose life and career in science all young scientific men may well endeavour to imitate as far as their abilities will permit them to do so, the "prince of experimenters,"—Michael Faraday.

TROUSSEAU'S CATAPLASM.*

Dr. Dieulafoy gives the following directions for its preparation:—Take, according to the size of the afflicted articulation, 3 or 4 pounds of bread—4 pounds are sufficient for the knee-joint, 2 pounds for the wrist. Cut it into pieces, removing carefully the hard portions of the crust, and soak the bread for about a quarter of an hour in water. It is then taken out, tied in a cloth, and squeezed to express a part of the water absorbed, so that the bread remains moist but not too wet. It is then put into a steam-bath, and allowed to remain there for three hours, when it becomes like dry paste, which is softened by the addition of camphorated alcohol. This dough is then kneaded for about five minutes, till it is of the consistency of plum pudding. This is the most delicate point in the making of the cataplasm, because if it is too soft it will give way and spread out under the pressure of the dressing, and if it is too hard it is apt to crumble and break in small pieces, which might injure the skin. The degree of consistency of the cataplasm must, therefore, be very carefully supervised, because, unless one is in the habit of making it, there is always a tendency to make it too soft, either because the bread has not been squeezed sufficiently before having been put into in the steam-bath, or because too large a quantity of camphorated alcohol has been poured upon it. The dough, having thus been prepared, is spread on a linen bandage in the shape of a rectangle, large enough to cover the whole of the joint. The poultice must be at least one-third of an inch thick at the edges, in order to prevent the thinner portions from drying too quickly.

The surface of the cataplasm is then painted with the following liquid mixture:—

Camphor,	7 grams	(105 grs.)
Extr. opii,	5 „	(75 „)
Extr. bellad.	5 „	(95 „)
Alcohol, q. s.		

This being done, it is applied by being put over the affected joint, and covered by a non-evaporant covering. The whole is then firmly fixed by means of a long flannel bandage, over which is placed a linen one of the same length. These bandages vary in length, according to the size of the joint, and, consequently, to the size of the poultice. The joint having been thus bandaged, it must remain perfectly immovable; the compression, although firm, must not cause the underlying parts to become œdematous; this may be prevented, however, by bandaging them also. In order to prevent the layers of the bandages from slipping, they must be sewn to each other. The cataplasm then remains in the same position for eight or ten days, after which time it is removed, and found to be fresh and moist as if it had been just applied; it still smells of camphor, and does not present the least trace of mould. The skin which has long remained in contact with it is perfectly healthy; unless the cataplasm should have been too thin at the edges, thereby either drying too soon, or giving way under the pressure of the bandage, and causing the skin to excoriate. This is Trousseau's cataplasm. At first sight it may appear too expensive for poorer patients, because the cost of the material amounts to from 2*s.* 6*d.* to 5*s.*, if the appliance is made in a hospital. If, however, we consider that, the expense having been once incurred, the cataplasm remains in its place for at least eight days, during which time no other medicine is given, we are soon convinced that it is even cheaper than most other appliances. The indications for the use of this cataplasm are so obvious that they need not be repeated here. In every kind of chronic or subcute inflammation of the joints, when other means, such as blisters and cauterization, have proved unsuccessful, and even in the first instance, Trousseau's cataplasm will be found most useful and advantageous.

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The Pharmaceutical Journal.

SATURDAY, MARCH 19, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

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THE RELATIONS OF MEDICINE AND PHARMACY.

WE are glad to find that a response is being made to the request of Dr. WILLIAMSON, and that some expression of opinions as to the possibility of improving the existing relations of medicine and pharmacy is being offered. Naturally those opinions will vary as they will be given from different points of view, but if expressed with moderation and a due regard for the influence of diverse conditions, we cannot but think the discussion of this subject will be productive of benefit. Though we do not at present propose to offer any remarks upon the letters we have received, we cannot omit expressing our sense of obligation to Mr. WADE for the very excellent exposition he has furnished of some of the salient points to be considered by those who would endeavour to bring about a more strict adjustment of medical and pharmaceutical functions.

This subject has been for some time past under discussion in the United States, and last November we called attention to what was being done by the College of Pharmacy and the Medico-Legal Society of Philadelphia. As a further contribution towards the settlement of the points at issue, a circular has lately been issued to medical practitioners and pharmacists in Philadelphia, inviting their special attention to the resolutions passed at the conferences which had taken place.

These resolutions refer to the sale of patent medicines, the repetition of prescriptions and to counter practice. As regards the last named point it is stated that as the diagnosis and treatment of disease belong to the province of a distinct profession, and as a pharmaceutical education does not qualify the pharmacist for these responsible offices, he should, where it is practicable, refer applicants for medical aid to a regular physician.

On the question as to renewal of prescriptions, it was decided that physicians, when writing a prescription which they do not wish renewed, should write on the bottom "*Do not renew,*" and also inform the patient of the fact in every case.

In reference to patent medicines it was decided to request druggists to place them out of sight and to discourage their sale.

In the circular that has been sent out it is urged that the prevailing abuses to which these resolutions relate make the druggist the business rival of the physician instead of his professional coadjutor, and that it was mutually recognized by both physicians and pharmacists that a mutual or interprofessional code of ethics should be adopted for the future guidance and adherence of both professions. It is also stated that though no appreciable good could be effected without reasonable co-operation, a united effort on the part of physicians and pharmacists towards the correction of abuses must directly tend to elevate pharmacy to a legitimate basis and to restore to the practice of medicine the professional domain that has been encroached upon by nostrum practice.

It is now proposed to effect this co-operation by a mutual agreement between physicians and pharmacists, and printed forms for the signature of each have been sent out. The pharmacist on the one hand engages to adhere to the terms of the three resolutions above quoted, and in all cases where applicants for medical treatment can be referred to a regular physician that they shall not be prescribed for by either himself or his employees. On the other hand, the physician engages to promote legitimate pharmacy by witholding his professional patronage from all patent and trade marked pharmaceuticals, and to use his patronage and influence in favour of those pharmacists who comply with the request of the medical profession regarding the correction of the abuses specified in the agreement.

It will be evident from what we have here stated as to the proposed mutual agreement that the points in regard to which improvement in the relations between medical men and pharmacists is desired in the United States are somewhat different from those which have to be considered in this country. Medical dispensing, which to a great extent makes legitimate pharmacy an impossibility here, does not appear to be so much the custom in the United States, and in regard to dispensing, it is mainly an unauthorized renewal of prescriptions that constitutes any ground for difference between medical men and pharmacists. On this point the medical profession in the States maintain that a prescription is written as a confidential direction or order to the druggist expressing what remedies shall be prepared for the patient to meet existing indications for the treatment of disease; that medicines should not be used except under the judicious observation of the physician, and that a prescription is not intended for the continuous use of patients or their friends. At the same time, however, it is admitted that it is the business of the physician to make a compact to that effect with his patients and to seek the aid of the pharmacist to secure its observance. Unless he make such a compact and instructs the druggist accordingly he has no right to complain of his prescriptions being repeated.

The point next in order of importance to the renewal of prescriptions without directions appears to be the trade in patent medicines and proprietary nostrums. This is evidently looked upon by the medical profession in America as a serious source of injury to the public as well as an encroachment upon their legitimate province, and there seems to be a determination to prevent the credulous public from being "misguided by the fulsome advertisements of "pharmaceutical speculators that are constantly "displayed in the medical and pharmaceutical "journals, and in the secular and religious press." The trade in these articles is regarded as outside "legitimate pharmacy," and for that reason the United States pharmacists are urged both in their own interest and in that of the medical profession to discourage the sale of those articles.

INTERNATIONAL MEDICAL CONGRESS.

We are enabled, by the kindness of Mr. MacCormac, the Honorary Secretary-General of the International Medical Congress, to make known the following particulars in regard to some of the entertainments and excursions arranged for by the Reception Committee.

On Tuesday, August 2, an informal reception of visitors will be held in the afternoon at the Royal College of Physicians, and it is thought that an excellent opportunity will thus be offered for introductions.

On the evening of Wednesday, the English members of the Congress are to entertain their foreign *confrères* at a Conversazione at the South Kensington Museum.

On Thursday and Friday, other entertainments are to be given, but they have not yet been definitely fixed upon.

On Saturday, August 6, there will not be any business meetings later than 1 p.m., and in the afternoon excursions will be made to various places of interest in the neighbourhood of London. On that day also the Harvey Memorial Committee proposes that the statue of Harvey shall be unveiled at Folkestone, and in view of that occasion most liberal arrangements have been made by the South Eastern Railway Company. A special train will take between one and two hundred members of the Congress, with other distinguished persons, to Folkestone free of cost, and they will be received there by a deputation of local authorities. After the ceremony of unveiling the statue, the Mayor and Corporation will entertain their visitors at a banquet in the Town Hall. This visit will afford foreign visitors to the Congress an excellent opportunity of seeing an English watering place at its best time. On the same day another excursion has been planned by Dr. Langdon Down, who has generously invited 500 members of the Congress to a garden party at Normansfield, Hampton Wick. Dr. Down will meet his visitors at Teddington Station and guide them through Bushey Park to Hampton Court Palace. The party will then proceed by water to Normansfield. On the same day, also, Sir Joseph Hooker will receive a number of members at Kew Gardens.

On Sunday special services will be held in St. Paul's Cathedral and Westminster Abbey, at which Canon Liddon and Dean Stanley will respectively officiate.

CINCHONA BARK MARKET.

At the bark sale last Tuesday, no less than 6221 parcels of bark were offered, of these 515 were of East Indian growth and 101 were from Ceylon. All the remainder were from South America, chiefly of the kinds known as soft Columbian, New Granada and Carthagena bark. We understand that crown bark and red bark are now being cultivated in South America, and that from the examination of samples which have reached this country, the amount of alkaloids in these cultivated barks is much larger than in the natural grown bark.

THE SUPPLY OF DRUGS TO THE ARMY.

Last week a question was put to the House of Commons by Mr. Gabbett as to the conditions under which medicines are now obtained for the use of the army in England, Mr. Childers, in reply, said that quarterly requisitions are received and settled for the different stations, numbering upwards of one hundred, and the drugs are then supplied direct to those stations by either the Apothecaries' Company or Messrs. Savory and Moore, "according to the prices tendered," the prices being checked by those paid by the Admiralty Contract Department, which purchases from the drug trade. In Ireland medicines for the use of the army are similarly supplied by the Apothecaries' Company of Dublin.

POISONING BY ŒNANTHE CROCATA.

The evidence given in an inquiry held on Monday in Plymouth showed that three Greek seamen, who had been sent to obtain water, gathered and ate a quantity of the roots of the hemlock water dropwort, under the impression that it was "wild celery." The result was that one of the men died a few hours afterwards, another was still lying in the hospital, and the third attributed his more prompt recovery to his having borrowed a shilling from his captain directly he became unwell and expending it in rum, which he drank.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of the above Association will be held at 17, Bloomsbury Square, W.C., on Thursday March 24, 1881, at 8.30, p.m., when a paper will be read on "Heat in Relation to Chemical Action," by Mr. H. Allen.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting will be held at 32a, George Street, Hanover Square, on Wednesday, March 23, when a paper will be read by Mr. G. F. Snow, upon "Sulphur."

Provincial Transactions.

BRIGHTON ASSOCIATION OF PHARMACY.

A meeting of the above Association was held in the Town Hall, Brighton, on Friday evening, March 11, 1881, the President, Mr. W. D. Savage, in the chair.

After the reading and confirmation of the minutes of the last meeting,

The President introduced the subjects of the Pharmacy Amendment Bill, 1881, and the Medical Act Amendment Bill, 1881, which resulted, after a discussion, in which Messrs. Hornsby, Vizer, Barton, Cornish, Pears, Walmsley and Leigh took part, in the following resolutions being passed:—

Moved by Mr. E. B. Vizer, seconded by Mr. M. Leigh:—"That a communication be made to the Pharmaceutical Council in confirmation of an opinion already expressed:—That the 4th clause of the Pharmacy Amendment Bill, 1881 (referring to the compulsory sale of a business carried on by a widow three years after the death of her husband) is an unjust and unnecessary infliction, and this meeting would urge the Council to withdraw the clause in favour of the present 16th clause of the Act of 1868, which has hitherto worked satisfactorily."

Moved by Mr. Cornish, seconded by Mr. H. Barton:—"That this meeting is of opinion that clause 15, section 26, of the Medical Act (1858) Amendment Bill, 1881, intended to supersede the 28th clause of the Apothecaries Act, 1815, would fetter the free action of the legitimate business of a chemist and druggist; that this meeting would urge upon the Pharmaceutical Council the necessity of watching the progress of the Bill, and if desirable to employ counsel to oppose the introduction of any clauses likely to interfere with the public requirements and the interests of the trade."

The Auditor's report for the year was received, and showed a balance in hand of £5 6s. 4*d*.

The next meeting was arranged to take place in June, when a paper will be read by Mr. Marshall Leigh on "Trade Policy."

A vote of thanks to the Chairman brought the meeting to a close.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held in the Church Institute, Oldham, on Monday evening, March 7, Mr. Bambridge, President, in the chair.

After the minutes for the meetings during the preceding month had been read and accepted, the Chairman called upon Mr. Buckley to read his paper on "Vegetable Tissue and the Cells of which it is composed."

The essayist commenced by describing the various forms which the cell assumes in consequence of being developed in a confined space, and the unequal nutrition to which various parts of the cell-wall are subjected. He then proceeded to describe the different kinds of tissue formed by the union of these cells, showing what parts of a plant were composed of parenchymatous, and what of prosenchymatous tissue; also pointing out the parts of a plant in which spiral and laticiferous vessels, ducts, pitted and dotted cells, etc., are located. Mr. Buckley next spoke of the contents of cells and their uses, observing that protoplasm was the real living matter of the plant, to which all the rest formed either the framework or the food, and showing the differences in colour when protoplasm and cellulose—the constituent of the cell-wall—were subjected to the application of sulphuric acid and iodine. Under the influence of sunlight it was shown that chlorophyll exerted a great influence in the utilization of carbonic acid gas by the plant. The chemical composition of starch and cellulose was pointed out as being identical, and that much of the former was, during germination and at the time of flowering, transformed into sugar, this change being taken advantage of in the process of malting. The different varieties of sugar existing in plants came in for a share of attention, and in like manner sap, gum, nuclei, and the more important of the substances found in the cells of plants.

A vote of thanks was moved to Mr. Buckley for his interesting paper and cordially responded to.

The President then proposed a vote of thanks to the honorary members who had come forward so handsomely and in such numbers with their subscriptions, more having been received this year than in any previous year. The vote of thanks was passed unanimously and the meeting terminated.

ABERDEEN SOCIETY OF CHEMISTS AND DRUGGISTS.

The annual conversazione under the auspices of this Society was held in the St. Katharine's Hall, on Wednesday, February 16. Dr. James Moir occupied the chair.

After tea the Chairman gave an interesting address on the effects of smoking. To prove his statements, the learned doctor quoted statistics, which although quite in accordance with facts, seemed strikingly fanciful to those unacquainted with the baneful results arising from the habit. At the conclusion of the address a pleasant hour was spent in listening to vocal and instrumental music contributed by ladies and gentlemen present. The usual vote of thanks brought this part of the evening's enjoyment to a close. The hall was then cleared for dancing, which was kept up with much zest and to the apparent enjoyment of all till well into the morning. During the interval some of the younger members of the fraternity gave a good rendering of the piece "Furnished Apartments," much to the enjoyment of all present. All the company agreed in saying that pleasant though the whole of the past meetings were, this one had surpassed them all.

The annual meeting was held on March 12, 1881, Mr. Coutts, in the absence of the President and Vice-President at the commencement of the meeting, was called to the chair. The minutes of the previous meeting were read and confirmed.

The Secretary then read some correspondence with the Pharmaceutical Society relative to an application for an annual grant of £20 for the purpose of providing suitable rooms for laboratory, museum, library and lectures.

After a prolonged discussion, in which all the members took part, it was agreed that the subject be remitted to the Lecture Committee for their further consideration and report. The Secretary was also requested to procure, if possible, a copy of a Bill just drafted by the Society, and for which the sanction of Parliament is to be asked, and to submit it to the said committee for their report.

The Secretary announced the following donations to the library, viz:—'History of Pharmacy,' from the Pharmaceutical Society; 'Year-Book of Pharmacy' from the Conferenec; Barker Smith's translation of 'Joulie's Quantitative Estimation of Phosphoric Acid.'

The Treasurer then presented his annual report which showed a balance of £32 16s. 3½*d*. standing to the credit of the Society.

The following gentlemen were then elected office-bearers for 1881–2:—

President, Mr. R. D. Presslie; Vice-President, Mr. G. E. Broomhead; Secretary, Mr. A. Strachan; Treasurer, Mr. Jas. Paterson; Librarian, Mr. C. Coutts; Auditor, Mr. J. Gordon.

The Lecture, Library and Price List Committees were then arranged, the President, Vice-President, and Secretary to be members *ex officio*.

On the motion of Dr. Moir, a vote of thanks was passed to the office-bearers for 1880–1.

Proceedings of Scientific Societies.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting held at 32A, George Street, Hanover Square, on Wednesday, March 9, Mr. G. F. Snow, Vice-President, in the chair, a paper was read by Mr. C. E. Stuart, on "Quebracho Bark, True and False."

The author stated that although some difference of opinion might exist concerning the medicinal efficacy of the recently introduced white quebracho bark and wood, yet, as the interest of the pharmacist was to keep himself well acquainted with all new remedies, the few notes which he had just put together concerning the above drug would, he hoped, be found useful. The appearance of the white quebracho bark, *Aspidosperma Quebracho-blanco*, and its microscopical details were described at some length, but as this has also been so recently done in this Journal, repetition is unnecessary. Details were given of the alkaloid aspidospermine, and from a series of chemical tests tried on a strong infusion of the bark, the action of ferric chloride and tannin (aqueous solution)—neither causing marked darkening or precipitation—were specially selected as distinctive. Of four false barks examined, three differed only slightly, in appearance and microscopic structure, from the white quebracho; the other bark showing almost identical arrangements, and hard stone-cells (sclerenchyma) and crystal-bearing fibres, precisely similar to those of the true bark, abounded. But all three were darkened by ferric chloride (a specimen obscurely referable to *Loxopterygium Lorentzii*, red quebracho, only slightly) and gave more or less copious fine white flocculent precipitates with tannin. The fourth gave a tannin reaction only and possessed no crystal-bearing fibres. The author believes that these are the only barks likely to be by any chance substituted for white quebracho, and therefore the two reactions noted above seem to form a rapid and easy method of distinction, entirely apart from appearance and microscopic structure, though these are, to anyone who has seen the true bark, sufficiently characteristic.

The paper, which was copiously illustrated by a series of specimens kindly lent from the Pharmaceutical Society's museum and by Messrs. Christy and Co., together with microscopic preparations by the author, was followed by a lively discussion.

The meeting concluded with a vote of thanks, proposed by Mr. C. Parkinson, and seconded by Mr. J. R. James.

Parliamentary and Law Proceedings.

POISONING BY AMMONIA.

On Wednesday evening, March 9, an inquiry into the circumstances connected with the death of William Spyvee, aged 75, was held at Lincoln, before Septimus Lowe, Esq., city coroner. In opening the inquiry the Coroner remarked that the case the jury were about to investigate that evening was one of some little importance, and would require their strict attention and earnest consideration. It appeared the deceased, William Spyvee, feeling ill, applied for some medicine to a chemist named Gadd, who gave him some strong ammonia, and from that he suffered considerably and died that morning.

The following witnesses were then examined:—

George Cunningham, aged 16, in the employ of Mr. Gadd, deposed that on Monday morning, about quarter-past eleven o'clock, as he was going into his master's shop deceased was coming out. He, however, turned back again, and sat on a bag of corks which had just come in, and, pressing his breast with his hands, cried "Oh." He stood up and held both his hands up, and then slipped down again. Whilst he was doing that Mr. Gadd was mixing some "stuff" up. Witness saw him get 6 drachms of rhubarb mixture, and he then went to the back counter and poured some more "stuff" in the measure which contained the rhubarb, and gave it to Mr. Spyvee. The "stuff" that he mixed with the rhubarb was ammonia. The deceased put the measure containing the draught to his mouth and began to spit. He had not taken above 2 drachms of it when he gave Mr. Gadd the measure. Deceased then stood up, and Mr. Gadd fetched him some water from upstairs, and also some milk. Witness was sent to Dr. Lowe's surgery for a doctor, and when he got back the deceased was upstairs. To the Coroner:—Mr. Gadd put 6 drachms of rhubarb in the ounce measure and filled it up with ammonia. The ammonia he used was the strong liquid, and was in a bottle on the back counter. Witness did not perceive any smell from the ammonia when it was poured out of the bottle. Mr. Gadd himself put the ammonia on the back counter. Both the water bottle and the ammonia bottle were exactly alike, but they did not stand near each other as a rule. When the deceased spat out the medicine he did not make any complaint of feeling worse, but merely pressed his hands to his stomach, and exclaimed "Oh." He did not seem as though he was going to be sick. In answer to the foreman, witness said that when the deceased gave Mr. Gadd the measure back, the latter smelt it directly and threw away the remainder left in the measure. To the Coroner:—The ammonia bottle was kept on a top shelf, and the water bottle near the glasses on the counter. Witness produced the ammonia and the water bottles, both of which were exactly similar in shape, each having a label about a couple of inches long.

Dr. G. M. Lowe stated that in consequence of information received from his assistant, he called at Mr. Gadd's shop, and Mr. Gadd informed him that the deceased had gone to his home. Mr. Gadd also told him that that morning the deceased came to his shop and complained of certain pains and seemed faint. He sat down, and Mr. Gadd then proceeded to mix him a draught of his own accord. He put into a measure 4 drachms of the rhubarb mixture, and then proceeded to fill it up, as he thought, with water. He had just previously been using the ammonia. The deceased took the draught and immediately complained of a pain in his stomach and throat. Mr. Gadd then perceived the smell of the ammonia, and gave the deceased some water, and he vomited freely. He sent for a doctor, and the deceased was seen by his (Dr. Lowe's) assistant from the surgery, who gave him the usual antidote and some oil. He was attended to in Mr. Gadd's private room until he had sufficiently rallied to return home, and as the day was moderately mild he returned without difficulty. Witness found him at his residence, having some milk. He found the lining membrane of his throat and mouth intensely red and corroded, and his breathing was very much embarrassed, as though the wind-pipe was inflamed. His extremities were cold, and his pulse feeble. They immediately removed him to a bedroom, put a steam kettle on the fire, and obtained the services of a trained nurse. Witness had a preparation of acetic acid and olive oil administered, also beef essence and milk. Deceased subsequently had spasmodic breathing. Between the paroxysms he was cheerful and composed, and quite conscious; he complained of a burning pain along the gullet and stomach. On examining his chest, witness found the deceased had symptoms of extensive disease of the valves of the heart, with an undoubted tendency to bronchitis, and he considered him in a most perilous condition. He was carefully watched and attended to throughout the night and the following day, but he sank and died early that morning. Witness was of opinion that he died from the effects of the administration of the dose of ammonia. Strong ammonia was a powerful alkali, which had a corrosive effect upon animal substances. It would corrode the mucous membrane of the mouth, gullet and stomach, and the vapour inhaled would be liable to produce inflammation in the wind-pipe and air passages. A teaspoonful had been fatal in the case of an adult, but a much smaller dose would have been fatal in a case like the deceased's, where there was so much appearance of disease.

The Coroner: Do you think the bronchitis was produced by the ammonia?

Witness: I think it was in a great measure incited by it. When ammonia of that strength was poured out it had a very suffocating, pungent odour. Witness had no doubt that death was attributable to the ammonia, and there was no need for a *post-mortem* examination to verify what he had said in any way.

Charles Frederick Gadd, after receiving a caution from the Coroner, to the effect that whatever he said would be taken down in writing, and might be used in evidence against him, said he was an apprentice of the Pharmaceutical Society by one examination, which qualified him to practise as a chemist and druggist. On Monday morning, about ten o'clock, the deceased came into his shop and purchased 2 ounces of sublimate of sulphur for rheumatism, for which he paid 1½*d*. He said he had been very poorly, and rose very early in the morning, and had had some brandy and tea given to him. At the same time he complained of pains in his legs and arms, and thought he had wind at the stomach as well. He went to the door and opened it, and then returned, closed the door, and sat on a bag of corks which witness had opened previously near to the door. He threw his arms out, and then pressed them to his chest, and complained of pains, which he thought proceeded from wind. Witness, to relieve him, took immediately 6 drachms of rhubarb mixture, and, anxious to give it to him, hurriedly measured 2 drachms of what he thought was water, making up the mixture to an ounce. He went across the shop and handed it to the deceased, and stood by him until he had taken, he should think, about a quarter of it, when the deceased handed back the measure to him. Perceiving the smell of ammonia, he immediately got some cold water to dilute the ammonia in his mouth, and afterwards some cold milk. He assisted the deceased upstairs into his (Mr. Gadd's) own room, and there deceased vomited. The vomit was coloured with the rhubarb, and smelt of ammonia. Witness then got half a tumbler of milk and two teaspoonfuls of brandy, with the intention of reviving him. He seemed somewhat better, and witness told him he would acquaint his wife about it before he went home, to which he agreed. Witness got a cab and took him home, but he appeared a little upset when they got there, and complained of the motion of the carriage. Witness stayed a quarter of an hour, and then left, and saw deceased again in the evening. The last time he saw him was the previous night at ten minutes past ten o'clock, and the last words he said were "I'm better, my boy."

To the Coroner: He gave the deceased the dose as an act of kindness; he thought it was his duty to relieve him if possible. The bottle of what he supposed to be water was standing on the back counter. He had been using the ammonia five minutes previously for scouring liquor. As a rule, they were in the habit of putting back the bottles in their places after using them, but he did not on that occasion. The draught of air passing through the back door, which was open, would, he thought, account for his not perceiving the smell of the ammonia when he poured it out of the bottle. It was about ten o'clock when he gave it the deceased; he sent for a medical man immediately. No one was at home in the surgery, but they said as soon as anyone come they would send them. Witness gave deceased an ounce of olive oil in the meantime, besides the brandy and milk; he complained of a scalded tongue. As a rule the water bottle was kept on the ledge and the ammonia on a shelf that could just be reached by standing on tiptoe.

The Coroner: Do you think it wise to have a drug like that in a similar bottle to the water bottle? Both having the same appearance, do you not think it wiser to have different coloured bottles or different shapes?

Witness: Yes, perhaps it would be better.

In answer to the Coroner, witness said he had known the deceased six months, but he had never given him medicine before. They generally used to have a little conversation together when he came in, but on that occasion he seemed to be very dull. There was a label both on the ammonia and on the water bottles. Witness had been engaged in the business seventeen years, and that was the first accident of the kind he had had.

The Coroner then reviewed the whole of the evidence, remarking that the only difficulty about the case was that Mr. Gadd, being in the habit of mixing medicine, and being where ammonia was often used, could not have perceived the smell of the ammonia, as when it was poured out it was pungent and powerful. Of course, if Mr. Gadd should have been supposed to give the deceased that drug with any evil intent the consequences would have been most serious. It would have been a case of murder. If he gave it to the deceased with great negligence, and without any authority whatever, and if he exhibited carelessness and wilful negligence or anything like that, then the case was manslaughter. If, on the other hand, the jury thought there was not the slightest intention to do it with an evil object, and there was no wilful negligence or criminal carelessness, then they would have to say it was homicide by misadventure.

The jury then consulted together in private for a short time, and on the Coroner being afterwards called in, the foreman (Mr. Edward Cooling) said the jury agreed that the death arose through homicide by misadventure. At the same time the jury would like the Coroner to urge upon Mr. Gadd the necessity of having his bottles better marked. They thought the labels on the bottles were so small that they could not easily be distinguished one from another, and they also wished Mr. Gadd to have different classes of bottles for the water and the ammonia.

The Coroner accordingly called Mr. Gadd into the room, and placed before him the recommendation of the jury, and further reprimanded him for his negligence.—*Lincolnshire Chronicle.*

Review.

PERUVIAN BARK. A Popular Account of the Introduction of Chinchona Cultivation into British India. By CLEMENTS R. MARKHAM, C.B., F.R.S. 1860—1880. With Maps and Illustrations. Pages xxxiii., 550. 8vo. London: John Murray.

We are glad to find that Mr. Markham has fulfilled his promise of giving a popular history of the introduction into and cultivation of the Cinchonas in India. The book is divided into three sections. Part I. gives a history of the efforts to obtain seed and plants from South America, and Parts II. and III. give the history of the introduction into and results of the cultivation in India.

In Part I. much is necessarily repeated which is to be found in the author's 'Travels in Peru and India,' but there is also much new matter which will be read with interest, and the whole history of the attempt is brought down to date so that, as the author puts it, the question should be familar to "Englishmen and the educated classes of India."

The story of the reckless destruction of cinchona trees has often been told, and how that fears, far from groundless, were entertained of the falling off of supplies of Peruvian bark in the face of a constant and increasing demand. A remedy for this state of things could not be hoped for unless conservation and acclimatization were resorted to.

Dr. Royle urged most strongly the desirability of introducing the Cinchonas into India, but it was reserved for Mr. Markham to carry out the idea. Considering, as he says, that in India, fever, except in normal years of cholera, is the most prolific cause of death,—far more than all other diseases and accidents put together, amounting in fact to one and a-half million a year,—he formed the resolve to endeavour to place the Peruvian bark, in the cheapest and most available form, within the reach of every native.

The first step towards this goal, that of the introduction of cinchona into India, has been successfully accomplished.

The difficulties of this first task are by no means to be overrated. There was the obtaining and transit of seeds and plants from almost inaccessible and most hostile countries to India; to convert these wild plants into cultivated ones; to study closely their native habitats and find a fitting home for them in India; to find out by the most searching tests the best and most suitable species, and, lastly, to ascertain the cheapest available form of alkaloid for use in India.

The early history of the Peruvian bark is well known to our readers. As might be expected, Mr. Markham still fights with an earnestness worthy of the best days of Spanish chivalry for the spelling of the generic name *chinchona*, instead of *cinchona* as now adopted. We thought the question had been settled, and on our part can only quote the words of the late Daniel Hanbury:—"Changing so well-established a name and its many derivatives . . . . has not met with the general acceptance either of botanists, pharmaceutists or chemists."

The descriptions of the various cinchona regions supplying the crown, red, Colombian, grey and calisaya barks are well written, and the strenuous and long continued efforts to represent these in India show an amount of perseverance rarely equalled and still more rarely crowned with such success.

After obtaining seeds and plants the great difficulty was the selection in India of the site for the first trial. In this Mr. Markham was fortunate enough to obtain the assistance of the late Mr. McIvor, then in charge of the Utakamand Gardens, whom he styles, and most justly, the "ablest arboriculturalist in India." No wonder, then, the author says that he "gladly and with perfect confidence" committed this trial to Mr. McIvor's care, and this confidence proved to be one of the most important factors in the present success. McIvor studied the question carefully, and was fortunate enough to steer clear of the earlier mistakes of the Dutch in Java.

One of the good results of cultivation soon became apparent. A sample of grey bark collected from the same tree whence seeds had been obtained yielded 1·8 per cent. of alkaloids, whilst the bark of plants raised from those seeds yielded 7·5 per cent.

The author gives the results of experiments on the best methods of cultivation and harvesting the bark. As to harvesting, two methods present themselves: coppicing and mossing. *Coppicing* is cutting the trees down near to the ground and allowing one or more shoots to grow up in place of the removed stems. *Mossing* is removing a strip of bark, and by excluding atmospheric influences by means of moss, allowing the cambium to renew the bark so removed. Certainly coppicing presented the most obvious method, but McIvor's process of "mossing" was a grand step in the improved results obtainable. As is well known, "renewed" bark gives (probably from a process of translocation) richer alkaloidal results than original bark. Mr. Markham, however, thinks that the operation of "mossing" cannot be performed by other than skilled persons. But this we are by no means prepared to admit; removing a strip of bark and then covering the denuded portion with moss, or (what seems to answer equally as well) a mixture of cow-dung and clay, is certainly within the capacity of the most ignorant coolie.

At Utakamand the hybridization of cinchonas seems to have first been noticed. As Sir Joseph Hooker remarked, some years ago, this may have been going on in the native habitats of these trees. But certainly under cultivation, it has had, and still will have, when better understood, a most important bearing on the whole subject, especially as analysed hybrids have yielded as much as 12·2 of total alkaloids: a result far in excess of the parental stocks.

Cinchona succirubra, *C. officinalis* and *C. Calisaya* are greatly in preponderance at Utakamand, the first being the species recommended specially for use in India, and the two latter to supply the English market.

Altogether, this Garden, as a nursery for the cinchonas, has been a grand success, and all its net receipts are now clear profits; this result Mr. Markham rightly attributes to the endeavours of Mr. McIvor. Since his death the object of the Government seems to have been to obtain large *present* returns, and thus many valuable trees have been sacrificed.

As to other centres of cultivation, Ceylon undoubtedly carries off the palm, and interesting facts are given respecting this island; also of the early failures in Java, and the subsequent successes, due to the labours of Junghuhn, De Vrij, Van Gorkom and others.

To return to India, Sikkim claims some attention. There certain species only are found to grow profitably; but its chief interest arises from the fact that up to the present time the most successful attempt to carry out what the author deems to be the true object of his enterprise—that of preparing a "cheap alkaloid"—has been made here.

The results of the Madras and other medical commissions, as our readers well know, pointed out that quinidine and cinchonidine were very little below quinine in therapeutical value, and that a preparation containing these together with cinchonine—a combination Dr. de Vrij has most aptly termed "quinetum"—would, if cheap, be very desirable.

Mr. Broughton's "amorphous quinine" was adjudged by a committee to be too costly, but it seems on good grounds that such a verdict was premature. Moreover, Mr. Broughton was too much addicted to criticizing others, and especially Mr. McIvor's labours, instead of imitating his concentration of energy. However, he made a good beginning and cleared ground for future workers.

Mr. C. H. Wood, who was appointed quinologist to the Darjiling Plantations in Sikkim, carried with him not only theoretical but practical knowledge, and, as might be expected, his efforts gave much better results. In 1879 128,000 ounces of quinetum were prepared at a cost of 1 rupee per ounce, thus effecting a computed saving of about £64,000 to the revenues of India. It still, however, remains to be proved whether India in this matter can be independent of the home market, and naturally, Mr. Markham looks upon the satisfactory settlement of this question as the keystone of the enterprise.

There are now under cinchona cultivation, 847 acres on the Nilgiri Hills and 2242 acres in British Sikkim in the Government Plantations, besides some 4000 acres of private plantations on the various hill districts of Southern India, and 5578 acres in Ceylon. In 1879–80, 1,172,060 lbs. of bark were sold in the London market from British India and Ceylon.

A well conceived plan, we are told, is half the battle. Mr. Markham's plan was a good one, and has met with brilliant success. Some part of his success, however, is doubtless due to his having had official charge at the India Office for so long a period; a period to all searchers for information not easily to be forgotten.

We would willingly close our notice here, but there is yet a dark side to the subject which we must notice. Mr. Markham, as might be expected, speaks but lightly of his own services; but the praise he gives to his coworkers belongs also to him in an eminent degree. The labours of Dr. Spruce, the veteran botanist, of Mr. Weir, Mr. Pritchett, and Mr. Cross, who has made five or six journeys, are all alluded to; nor is Mr. Ledger forgotten, who, although not under Mr. Markham's orders, yet in obtaining the calisaya variety named Ledgeriana by Mr. J. E. Howard, has laid India and Java under a debt of gratitude. These men all worked with a zeal and energy beyond all praise. They were paid bare remuneration in the hope and expectation that, should the enterprise prove successful, better acknowledgement awaited them. Mr. Markham says the Government is now netting thousands of pounds sterling; but a "deaf ear" has been turned to all his appeals. Can we wonder then that Mr. Markham speaks of his "indignation at the injustice and treatment of these gallant men"? Then, too, it is patent to all how much of the success in the selection of the best species has been due to the elaborate analyses which have been made, and to no one is the Indian Government more indebted than to Mr. J. E. Howard, not only for analyses, but for advice at every step; and for these splendid and gratuitous services he receives but a letter of thanks, whereas, as a comic writer once put it, "official bumbledom obstructing a royal progress with an address, written by someone else, receives the honour of knighthood."

The book is well got up, and has a capital bibliography and index, and will well repay careful perusal.

Dispensing Memoranda.

[510]. In this prescription I think "Minor" should have used "liq. cinchon. cord., Battley." The ʒss ordered would give a dose equivalent to ℥j of decoction, whereas if "ext. cinchon. flavæ liquid." were used each dose would contain only ♏5 or half the minimum dose of the Pharmacopœia.

Edward H. Storey.

[512]. If F. J. O. uses ferri sulphas exsiccata that is thoroughly dry and reduces it with the potassæ bicarbonas to a very fine powder and then adds confectio rosæ gallicæ and syrupus and beats into a mass quickly, he will be able to make a pill very small (it should not be larger than a 5 grain pil. rhei co.) which on drying is quite hard.

H. C. H. O.

[514]. "Decoctum sarsæ co. conc. (1 to 15)" may be used for extract. sarsæ co. liquid., but it is impossible to say if this is the exact preparation intended by the prescriber, who should be consulted if possible.

Edward H. Storey.

[515]. A form for "elixir of tar" is given in Dorvault's 'Practical Pharmacy' as under—

Elixir de Goudron.

Alcool à 70°	100 parts.
Goudron des Landes	5 „
Sucre	15 „

Mix the sugar with the tar in a mortar, add the alcohol little by little, and continue stirring until the sugar is dissolved, then filter.

The alcohol is about the same strength as proof spirit, B.P. Goudron des Landes is the tar obtained from *Pinus maritima.*

Eardly.

[516]. Can anyone suggest a good medium by which the following can be made presentable without materially diluting it?—

Iodine,	
Ac. Carbolic.	āā p. aq.

It is usually ordered to be melted together, but the result is most unsatisfactory.

Sloper.

[517]. I have had the following given me to dispense:—

Camphoræ Chloral.	gr. v.

Ft. pil. Mitte viij.

Will someone be good enough to inform me what is the best excipient to make them up with?

Sloper.

[518]. Could any reader kindly inform "Sanitas" what is meant by tincture of tar?

[519].

℞	Potass. Iodid.	gr. 5.
	Amyl. Nit.	♏ 2.
	Pulv. Tragac. Co.	gr. 5.
	Glycerini	♏ 20.
	Aquæ	ad fl. dr. 4.

M. Mitte fl. ez. 9.

A tablespoonful three times a day, half an hour before meals.

This prescription was dispensed a few days ago. The result was a mixture of a dark purple colour, and certainly not very elegant appearance. A little pot. bicarb. added before the pot. iodid. prevented the change, and formed a presentable mixture. Would it be justifiable to make the addition?

I may mention that the prescription was dispensed and sent out as ordered.

Alpha.

[520].

℞	Argenti Nitrat.	gr. x.
	Aq. Destill.	ʒss.

M. Sign. The drops.

J. D.

The above was brought to be dispensed this morning. There was nothing to indicate its use. Remembering the proverb about the middle way, I put it into a blue fluted hexagonal bottle, but did not label it "Not to be taken." Was this the correct thing to do? I may add that the symbol after the words "aq. destill." was so written that it might have been taken for ℥j. I read it ʒss, however, and dispensed it accordingly (facsimile of original enclosed).

Islander.

[521]. The formula for pil. quiniæ, B.P., is—

Sulphate of Quinine	60 grains.
Confection of Hips	20 „

Now, whenever I have had quinine pills to make, the excipient being confection of hips, I have invariably found that it takes about 20 grains of confection of hips to make a satisfactory pill with 24 grains of sulphate of quinia. Can any of your readers say whether they have ever made "quinine pills," B.P., with a satisfactory result?

Junior,

[522].

℞	Hydrocyanici Acidi (W.'s)	♏ 12.
	Liq. Bismuthi (Scht.)	℥j.
	Tr. Calumbæ	ʒiss.
	Bismuthi Carb.	gr. 60.
	Mucilage	℥ij.

M. 1 ʒ every second hour.

A short time ago, a poor woman (club patient) brought the above prescription about 9 o'clock at night. She informed me it was for an infant three months old. Considering it a very powerful medicine for so young a patient, I wrote a note to the surgeon who had sent it, asking him if it was correct, as to the age of the child, etc. As I lost my customer, since she did not return, I presume my qualified friend was annoyed at my sending the prescription back.

What would you have done in this case, made it up?

Perhaps some of your readers will give me their opinion.

Ferrum.

Correspondence.

*** ***No notices can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.***

GREAT BRITAIN *v.* SCOTLAND.

Sir,—When I expressed an opinion, in answer to Mr. Bell's question at the meeting of the Executive of the Chemists and Druggists' Trade Association in February last, with regard to the deletion of clause 1 of the Draft of the Amended Pharmacy Bill, I simply gave expression to a genuine conviction, a conviction which Mr. Mackay's apologetic explanation in your last issue does nothing to remove, but something to fix.

The clause our Scotch friends were up in arms against, led by the two gallant members of the Council of the Pharmaceutical Society of Great Britain, ran as follows:—

"Whereas by the Pharmacy Act, 1852, it is enacted that for the purpose of conducting examinations in Scotland the Council of the said Society shall appoint fit and proper persons in Scotland it shall be lawful for the said Council to appoint for the purpose of conducting such examinations any fit and proper persons whether such shall be in Scotland or otherwise."

The justice of this proposal requires no demonstration or apology, it being already legal for Scotchmen to sit on the London Board of Examiners. Surely there was no injustice or outrage in the endeavour to make the law uniform and equitable, irrespective of the existence of the river Tweed. It was not contemplated, as Mr. Mackay gratuitously assumes, to change the character of the Scotch Board of Examiners. Convenience and the relative distance of Edinburgh and London will always regulate and rule the constitution of each Board. But it might have been expedient and desirable, for the sake of mutual experience, and in order to promote uniformity of practice, to occasionally interchange one or two members of each Board; or in the event of finding an Englishman—a contingency, of course, highly improbable—living a few miles south of the Tweed, "fit and proper" to serve on the Edinburgh Board, this unique individual might have ventured, with proper decorum, to have taken his seat near his Scotch brethren in pharmacy, in spite of his hailing from another part of the United Kingdom.

I think it is well to remember that the Society is the Pharmaceutical Society of Great Britain, not of England and Scotland, with no distinction of nationality, membership only being the test of suffrage and of executive capacity. In the past, distinction of race and clan was a natural outcome, which often resulted in the glory of true patriotism; but in the management of a Society in which membership, and not difference of location or nationality, is the bond of union, it is much to be regretted that a misdirected national sentiment should blind the understanding, and occasion discord and unnecessary difference of views.

205, St. John Street Road, E.C. ROBT. HAMPSON.

THE RELATIONS OF MEDICINE AND PHARMACY.

Sir,—With the three leading paragraphs of Dr. Williamson's last letter I think most chemists will accord, but those following will scarcely tend to promote the good understanding which was looked for in the "movement of several members of the British Medical Association."

If medical charges are to be left as fancy fees, and concern "the medical practitioner himself alone," then Dr. Williamson and his coadjutors may spare themselves further trouble in arranging the prices that chemists should charge for dispensing, because that argument which applies to one branch of the profession is equally applicable to the other. Fancy fees of medical men and fancy prices of pharmacists are wonderfully alike, and must be considered together. It is true that "in many districts the scale of medical charges for visits and medicine is very low;" indeed, so low, as to prevent qualified chemists from obtaining a living in a legitimate manner, or rarely, if ever, seeing a prescription, and so low as to raise serious doubts as to the value of both advice and medicine obtained from such practitioners. But this is exceptional, and does not apply to the general relationship of medicine and pharmacy.

Dr. Williamson will doubtless allow that a medical man who has created for himself a position which permits him to reside in a neighbourhood where his house rental is from £150 to £300 or more per annum, provided with expensive equipage, liveried servants, etc., would not be content to receive the same fee as another equally clever, but living at a rental of £50 per year, doing his rounds daily on foot, and only occasionally indulging in a cheap vehicle. In many instances these gentlemen supply precisely the same article of equal value; the one will consider five guineas not at all in excess of his desert, while the other will be very well satisfied with five shillings. It may be argued that this in no way applies to chemists' charges, but I humbly submit the comparison does apply. Taking all chemists as equal in qualification, which by the time surgeons have ceased to dispense they will be, is there no difference in the style in which medicines are prepared and delivered, beyond the purity of the drugs?

What are called "fancy prices" are not fairly represented or understood, or Dr. Williamson would scarcely suggest the greater consideration of "commercial value;" neither would B. S. J. express astonishment that a 4 ounce mixture, or eleven days' medicine, should in one town be charged 2*s.* 6*d.*, and in another only 1*s.* 2*d.* Nor would he believe that the chemist who asked the higher price obtained much greater profit than he who was amply repaid by the smaller amount.

In wealthy neighbourhoods, where the aristocracy and moneyed folks contribute to the maintenance of physicians, there are pharmacists also, who undertake to meet the requirements of the luxurious by entering into heavy expenses and responsibilities. It is very possible that there may not be any difference in the effects of medicine dispensed at a pharmacy paying a rental of £50 or at one of £300 per year; or whether the corks are purchased at 6*d.* or 1*s.* 6*d.* per gross. It may not lessen its efficacy if the mixture is sent out in common glass bottles uncapped, not sealed, folded in cheap demy, after the manner of cutting shops and private surgeries; but if pills are to be gilded or silvered, and all the sundries employed are double or treble value to those used in other pharmacies, then it is easily understood why a prescription which costs at one place 2*s.* 6*d.* to prepare is equal in "commercial value" with that which elsewhere was obtained for less than half the price.

It may do very well for dispensing surgeons to purchase odd and any shaped bottles of the "rag, bone and bottle merchant," but that is not the custom with respectable pharmacists who supply the better class public, that expect to find their prescriptions finished off neatly and not dispensed in the slipshod manner of surgeons.

Dr. Williamson wishes to know what "are chemists prepared to say concerning their own practice of prescribing?" That will depend entirely upon the answer given by practitioners as to their habit of dispensing. If chemists are told they must reduce their prices, but medical men must be left to charge what they please, it can scarcely be called meeting "half way."

Chemists would be glad to give up their old legitimate right to prescribe, if they could make sure of supplying the medicine which medical men prescribe. The error is with the practitioners supposing that chemists wish to prescribe. They do it solely in self-defence, and because the poor and middle class public demand it of them. If they did not prescribe, hundreds, who never see a prescription of the practitioners surrounding, could not possibly exist; and counter practice with the sale of proprietary articles, etc., is their only hope. The "reprehensible" practice, as Dr. Williamson is pleased to call our old established privilege, has been bred and fostered by some of his own fraternity, who, not content with their fees for advice and visiting, have also grasped "the very considerable profits of dispensing," which is the natural source of the chemist's income, and so long as medical men continue to deprive the chemists of this their very natural right, they must expect that every effort will be made to compete with their opponents, as far as the law permits.

In any change the initiative must proceed from the dispensing practitioner; but it will be useless, if he is determined to arrogate to himself the right to regulate chemists' prices, without regard to his own fees.

Some medical men may affect to look down upon the educated chemist of the present day as an inferior animal, below their social status; but the requirements of the Legislature do not permit the chemist to despise himself or to accept a position incompatible with his studies and responsibilities.

The difference between a tradesman and a professional man, I take it is, that the former is able to enter into commerce without culture or education, the other is compelled to pass through a curriculum and examination. A chemist is, therefore, professional, yet through the dispensing practitioner monopolizing his calling he is driven to trade, which is not now his legitimate occupation.

174, Warwick Street, Pimlico. JOHN WADE.

Sir,—As one who takes an active interest in our relations to the medical profession, I should be glad of an opportunity of replying to Dr. Williamson's last letter.

Dr. Williamson remarks that the medical charges are to be left to the practitioner, and on that particular point no doubt we are all agreed.

I do not believe in fancy prices for dispensing or anything else, and should be willing to supply medicines according to a fixed tariff, if the rates were fixed by a society of chemists, say the Birmingham Trade Association. If a meeting could be arranged to be held in London in May next, after the annual meeting of the Association, and medical men or representatives from the British Medical Association be invited to attend, much good would result from the ventilation of the subject.

Respecting "Counter Practice," I have never encouraged it, and believe in division of labour as applied to medicine and pharmacy. My practice has only been to suggest simple remedies in the absence of the regular medical adviser, and then only in slight ailments; but you cannot abolish the custom altogether; the point is to draw a line fairly to all concerned.

Much assistance may be given to medical men desirous of giving up dispensing, by local chemists suggesting less expensive remedies than quinine, or ext. cinch. flav. liq., for the poorer classes, and sending round samples of such preparations as quineti sulph., ferri et cinchonid. cit., liq. cinchon. E. I., etc., to medical gentlemen for their gratis patients or others who are unable to afford the more expensive articles. The majority of chemists would no doubt be glad to make allowances on medicines to poor people, and if medical men would mark the prescription with an X the chemist would understand that the medicine was to be charged at a reduced rate.

An important element in reckoning the price of a medicine is the time required in preparation, and this, unfortunately, is often lost sight of, not only by medical men but chemists also.

If the general public are to have medicines much cheaper than the present rates of the Manchester list, something will have to be done by arrangement with local practitioners to order medicines from certain fixed formulæ, which can be kept ready prepared, and so save time in copying the prescription and compounding.

I hope to see some practical result from this discussion, and believe that it is to our mutual interest, and desirable for the convenience of the public that the practice of medicine and pharmacy should be separated as much as possible.

Sandown, I. W. GEORGE BROWN.

Sir,—The questions of "counter practice" and the relations of "medicine and pharmacy" are not likely to meet with solution while such disingenuous and uncalled for attacks are made upon chemists and druggists by your contemporary, the *Lancet*.

Fortunately, it is not the full exponent of general medical opinion, although no doubt it does express the views of a certain section of "malcontents," who would be satisfied with nothing short of an entire monopoly in all that relates to medicine.

With regard to the "relations of medicine and pharmacy," we are asked, "What are chemists prepared to say concerning their own practice of prescribing?" "Are they ready to meet medical men half way on the field of improvement?"

My own reply to this is (and, I believe, I express the sentiments of not a few), "As practised by us, certainly not." It would be practically impossible. We do not pretend, nor have we ever done so, to treat disease. We confine ourselves to simply aiding, when asked, the public by suggesting what we consider the best remedy to bridge them over a temporary difficulty; this is counter practice, pure and simple, and why should we relinquish it? It is simply nonsense to talk about "diverting fees from the pockets of the doctors."

Why, sir, if we were to give up this "legitimate counter practice" to-morrow, not a medical man about us would be a sovereign the richer for it. The public would suggest their own remedies, or apply to some charlatan for advice. My experience goes to prove that the public (rightly or wrongly, I do not pretend to judge) have a peculiar dread of a "doctor's bill," and they will stave it off to the latest possible moment.

But, sir, there is another question I should like to ask. Can medical men, who do their own dispensing, "afford" to give up the practice? What is to be said for those who contract for clubs, for parishes, for provident dispensaries, and those who emblazon their windows with: "Advice and medicine, 6*d*;" "A visit and medicine, 1*s*.?"

These are a numerous section, and in any compact entered into between the "faculty" and "chemists," these cannot be ignored or left out in the cold.

Again, are the profession (those who do it) ready to give up writing popular books, and publishing all kinds of remedies for the treatment of disease, whether in Encyclopædias, in monthly numbers or in newspaper form?

These, amongst others, are questions which must be faced and met in order to frame even a tangible scheme.

If I read the letter of your medical correspondent aright, we are asked to do an unlikely thing—to surrender our own "inalienable rights" in order that the pockets of the faculty may be recouped by any possible loss they may sustain by the transfer of dispensing to the legitimate dispenser. Why, the better class practitioners and physicians have already given up dispensing, and we do not hear that they suffer loss thereby.

With regard to chemists' charges, that does not concern medical men any more than medical fees concern the chemist; these matters would soon find their proper level, on the principle of supply and demand, and the existence of healthy competition.

I, for one, certainly do fail to see why the chemist should be asked to become a kind of "jackal" for the faculty, and to do a thing which would destroy self-respect and signally fail in its purpose, as it would become a kind of trades union to compel the public to call in the aid of a doctor upon all occasions when they ask us for a little guidance in a simple matter. I, for one, could not be a party to such a compact. Every honourable chemist is willing, nay, even desirous, to meet the profession on "fair" and "equitable" terms. There are difficulties to be faced and met on both sides, but they cannot be overcome by a policy so manifestly "one-sided" as that suggested.

Probably the following suggestion may not be altogether without value.

In some places where medical men wish to retain the supply of medicines to their patients in their own hands, a convenient arrangement might be made with two, three, or four chemists, according to extent of area, to dispense and send out the medicines of any medical man on a fair scale of charges, to be charged to him, and repeated only by his order. This would affect a great saving of time, be a relief to the prescriber, and in most cases satisfactory to the patient.

At any rate such a plan might be "tentative," and in the end might be so carried on, or it would pave the way to a general transference.

However desirable this change may be, it cannot be done by a "wrench;" it will need much mutual forbearance, and kindly consideration of the "rights" and "interests" of all parties concerned, and we must not forget that the public will come in—as a very large factor too—to pronounce upon any change, and especially so if it bears any semblance to monoply.

Brighton. G. G. HORNSBY.

Sir,—Replying to Dr. Williamson's question in his letter to your Journal of the 12th inst., as to whether chemists are prepared to discontinue the old but "reprehensible" practice of counter prescribing, conditionally with medical men ceasing to dispense their own medicines, I think that while there will be considerable difference of opinion in the trade as at present constituted, were a canvas made amongst those who have entered through the examinations of the Pharmaceutical Society, nineteen out of every twenty would be found in favour of discouraging that portion of their business, which as conscientious tradesmen they must feel least qualified to discharge.

That chemists are occasionally called upon to prescribe, and that they should be sufficiently expert to act in cases of emergency; none will deny, but that they should be compelled as many now are to make prescribing a leading feature of their business, is not at all satisfactory. Formerly, I thought little about prescribing. I had my labels printed in the orthodox fashion, notifying that physicians' prescriptions were accurately dispensed. I purchased a book to retain copies of all such work passing through my hands, and although the volume became very dusty between such times as I found it necessary to make entries, I still valued it in somewhat the same fashion as the man who bought and stored up crutches thinking they might be useful in days to come, content to feel I was doing a sufficiently large and remunerative business in patent medicines, proprietary articles and general drug trade to provide for the modest requirements of a small family. In later years, however, the profits were so seriously reduced in these things, that it became absolutely a loss to deal in some of them, and what with an increasing family and consequent expense, the necessity of otherwise providing gradually forced itself home. A tea or a wine and spirit agency, a petty wholesale, or a prescribing addition, all suggested themselves as a means to the end, the last being decided on for various reasons, but chiefly because it required comparatively little outlay. Old medical works were hunted up, a few new ones obtained, and the demand already existing was carefully nursed and attentively cultivated, and my much neglected prescription book at last proved useful and began to fill in at an astonishing pace, which may to all appearances be indefinitely developed. I do not feel qualified to do justice to my customers in every instance, but I do my best for them, and that my efforts are appreciated, and that I am in a certain sense successful I am aware, but I am not unmindful of the fact that my position is a false one and entails a heavy burden.

What is the alternative? Must we refuse our bread and butter, because the latter is salt? or will the medical men come forward and offer us their dispensing? If so, I for one would gladly surrender the responsibilities of

Hull. A PRESCRIBING CHEMIST.

CHEMISTS' CHARGES.

Sir,—Your readers must be nearly tired of the letters concerning chemists' charges, and the writers must have said nearly all that is worthy of consideration; it is therefore with great hesitation I intrude on your columns to take notice of "Beta's" remarks, especially the following one—"Do the advocates of this precious scheme object to buy books at *2d.* in the *1s.* discount? would they have any tolerance for a trades-union of booksellers, who should try to keep up their prices by such means as have lately been suggested?"

To this question, I reply, the chemists would be very pleased to see a trades union of booksellers for this purpose, as an action of this kind would tend to show that the present system of trading is bad political economy, and to be successful in business a fair profit must be reaped over and above mere working expenses by all who are engaged in commercial enterprises.

The suicidal custom of booksellers allowing *2d.* in the *1s.* has been to cause the retail trade in the country to hold a very small stock of books, many now even giving up the sale, keeping only stationery and fancy articles; they say that it does not pay them now to go into the book trade, the profits being too small to repay them even for the value of interest on stock, to say nothing of the depreciation they sustain, consequently authors find less sale, the public less choice, and the booksellers themselves suffer to a very great extent loss of income from the ruination of one of their principal sources of business. The public are beginning to see that the past and present system of undue and uncalled for competition is morally and socially bad (witness the long list of liquidations by arrangement in the *Bankruptcy Gazette*), and would gladly welcome a reaction of a better and sounder state of things.

I will not tire you longer with this weary subject, excepting to point out one thing which has been overlooked by all your correspondents and even by you, Mr. Editor. It is this:—The Society of Apothecaries, composed of eminent physicians, Fellows and Members of the Royal College of Surgeons, lecturers at hospitals, etc., etc., is a trading, as well as an examining body. Every week a committee—all medical men, remember,—sit to arrange matters, audit accounts, and balance profit and loss. Now their retail and dispensing prices are as high as any retail chemist's in London. Surely then we cannot do better than take the medical profession as our guide in these matters, and this fact may in some way settle the vexed question about chemists' charges. JAMES B. GUYER.

THE DETECTION OF STRYCHNINE IN THE BRAIN.

Sir,—In the last "Month," p. 714, there is a paragraph to the effect that, "Dragendorff, Husemann, and others have directed that strychnine, in cases of poisoning, should always be looked for in the liver, as its occurrence in the brain is not easily detected," a statement, in so far as the detection of strychnia in the brain is concerned, not in strict accordance with published facts.

That eminent toxicologist, Professor Dragendorff, in his 'Gerichtlich-Chemische Ermittelung von Giften,' 2nd edit., 1876, states that strychnine is retained by the liver, and very slowly passes from that organ into the general circulation, to be finally eliminated through the urine; and he instances the results of experiments made on animals, tending to prove that if death quickly follows the administration of strychnine, that poison is not necessarily found in any other organ than the liver, the time which had elapsed being insufficient to allow of its passing from the liver into the circulation. The agreement with Husemann is thus far, that strychnine should be looked for specially in the liver, and that this poison takes more or less time to pass into the circulation and present itself in other organs of the body or in the urinary secretion.

In the 'Beitrage zur gerichtliche Chemie,' by the same author, and published in 1872, four years earlier than the preceding work, will be found a series of results of experiments to determine the presence of strychnine in the different organs successively, and in one paragraph he remarks that the results of his researches establish the fact that the presence of strychnine in the stomach, liver, gall bladder, arterial blood, and *the brain can be easily determined.*

It is scarcely conceivable that Dragendorff, who could detect the presence of ·00015 grain of strychnine in 10 to 12 oz. of urine, should experience any difficulty with the same poison if it had in any appreciable quantity reached the brain.

The detection of strychnine, even in very minute quantity in the brain, in case of poisoning by that alkaloid, is not therefore new, neither does it present any special difficulty. The paragraph in question should therefore indicate, not that Dragendorff directs that strychnine should be looked for in the liver because its occurrence in the brain is not easy of detection, but rather that the poison in question is less frequently present in the brain. There was no difficulty in detecting the strychnine when it was there, but there would necessarily be considerable difficulty when the alkaloid was not present in that organ.

Another point on which the paragraph is somewhat hazy. Assuming the tincture to be that of the French Codex, which has a strength of one in five, or double that of the B.P. (a hint for the compilers of the International Pharmacopœia), there seems to be an error in the dose of the poison mentioned as having caused death. 2·05 grams of tincture would represent ·00478 gram strychnia, or ·0738 grain, not ·525 grain. 0·0738, or about $\frac{1}{14}$th grain, would scarcely represent a poisonous dose.

20, New Street, Dorset Sq. T. EDWARD GREENISH.

Erratum.—On p. 769, col. i., line 14 from bottom, for "hands or arms" *read* "bonds or arms."

A. Turner.—See an "erratum" above.

A Chemist (Marseilles).—We are not acquainted with a work on either of the subjects published in England.

Hymen.—By the admixture of carmine or some other suitable pigment.

"*Euonymin*" is referred to the rule as to anonymous communications.

"*Machaon.*"—(1) The provisions of the Act apply only to the weights and measures used for the purposes of trade.

Yelk will find the information he requires in Ure's 'Dictionary of Arts and Manufactures.'

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Illingworth, Mather, Austin, Martin, Snell, Shenstone, Anxious Inquirer, Sub Umbra Floresco, Bos, Beta, O. H. S., J. F. H,

"THE MONTH."

Notwithstanding the chilling north-west wind and the occasional snow showers that it has brought in its train, bursting buds and March flowers herald the coming of spring. Although for the Londoner it can hardly be said that the time of the singing of birds is come, yet violets, primroses and daffodils already greet him in almost every street, and the drooping catkins of the poplars and the green shoots of the lilac indicate that winter is actually over.

From Hitchin a correspondent writes that the pulsatilla has already lifted up its purple head on the chalky downs, while the coltsfoot, the periwinkle and golden celandine are coming into blossom, and the pink flowered thyrse of the butterbur (*Petasites vulgaris*), so easily overlooked at this time of year, decks the damp banks of streams where later on the enormous foliage will command attention even at a considerable distance.

From the Isle of Wight, a correspondent writes that the pretty moschatel, the whitlow grass, and the rare *Pulmonaria angustifolia* are now in blossom. He remarks further that although the number of flowers he has noticed in blossom this month are exactly the same as last year, yet they are not all the same species.

In Kew Gardens the Barbadoes aloes plant (*Aloe vulgaris*) may now be seen in blossom.

In the Cambridge Botanical Garden, Mr. R. J. Lynch writes, there is now a fine specimen of that curious atropaceous plant *Mandragora vernalis* in full blossom, the yellowish flowers, resembling those of belladonna in shape, nestling among the large radical leaves; indeed at a distance the plant presents more resemblance to a beet or turnip plant, than to the better known members of this family.

Probably most of the students who have visited the Botanical Gardens at Regent's Park have noticed a singular plant, a *Phyllanthus*, in which the flowers appear to be growing on the midrib of compound leaves. The apparent compound leaf, however, consists of alternate leaves with flowers in their axils. According to Fritz Muller the leaves of this plant assume an almost vertical position at noon on a summer's day when the sun is nearly in the zenith, returning at 3 p.m. to a horizontal position. This movement, called paraheliotropism by Mr. Darwin, by which plants when brightly illuminated direct their edges towards the light, has recently been the subject of some remarks by the last-named naturalist (*Nature*, March 3, p. 409), who considers that the movement is intended to prevent the full effect of radiation. In *Hedychium* the lateral halves of the leaves bend downwards apparently with the same object.

A correspondent of the *Gardeners' Chronicle* (p. 276, February 26), writes from St. Louis with regard to *Silphium laciniatum*, that he has often examined the plant, and that although the leaves are arranged at their base in a spiral position, yet during their development the petiole is twisted so that the blades face east and west and their edges point north and south. The stem leaves being sessile show at their base the original position, but their midrib is turned about the middle, or in the small upper leaves towards the tip, so that the upper part of the leaf assumes the meridional direction, while the lower part retains its original position. The large flower heads on short and very thick peduncles are almost invariably turned eastward. He confirms Sir J. Hooker's statement that in travelling by rail any alteration in the direction of the road becomes visible at once by the altered appearance of the leaves of the compass plant. The presence of stomata on both sides of the leaves distinguishes this species of *Silphium* from all others, *S. compositum* coming next to it, all the others having a larger number of stomata on the under surface. He remarks that other Compositæ with vertical leaf blades have a similar anatomical structure, notably *Lactuca Scariola*, whose leaves assume not only a vertical but a meridional direction, although a less pronounced one than that of the compass plant.

At a recent meeting of the Edinburgh Botanical Society, Professor Dickson exhibited some curious abnormal forms of the pitchers of *Cephalotus follicularis*, from which he concluded that the pitcher cavity is an excavation or pouching of the leaf-blade from the upper surface, that the leaf apex is represented by the apex of the middle dorsal wing of the pitcher, and that the pitcher lid is merely an excrescence or outgrowth from the upper surface of the leaf.

At the same meeting, Mr. Symington Grieve mentioned a remarkable case which he had observed of the power of *Fucus vesiculosus* and *F. nodosus* to buoy up large stones by the air contained in their frond vesicles. He was led to observe this power by noticing grooved tortuous tracks beginning or ending at a large stone, and at length detected a stone on the move, buoyed up by the seaweed. Others were afterwards observed, weighing from a few pounds to several hundredweights, floating in a similar manner.

In *Nature* for February 24, a curious experiment is recorded by Mr. W. Carter, which seems to indicate that an excessive amount of moisture plays some part in preventing the formation of chlorophyll. The experiment is as follows:—"If cress seed be grown for a few days in the dark on damp cotton wool and then beneath the surface of water introduced into an inverted glass jar filled with water, they may be exposed to daylight for an indefinite time without chlorophyll being developed. But the plants are not dead, for if, after a few days' exposure, the cotton wool on which they have been grown is cut in two beneath the surface of the water, and one half with its plants is restored to the inverted jar of water while the other is placed under an inverted jar containing air only, and then these two jars be exposed to full daylight, the plants in the jar containing air become rapidly green while the others never do so. The editor of *Nature* suggests that this may be due to the water keeping the temperature too low, since in ferns and conifers the chlorophyll is developed even in complete darkness if the temperature be sufficiently high (*Nature*, p. 388).

In the *Journal of Botany* this month there is a valuable paper by Mr. B. D. Jackson, on "Recent Tendencies in Botanical Nomenclature," which amateur botanists will do well to read before compiling local lists of plants. It may be hoped that the tendency to give bare scientific descriptions of plants in systematic works on botany may undergo similar scathing criticism before long. Either students of botany do not accurately understand botanical terms or else the loose manner in which such terms are used by different authors, as contrasted with lecturers on botany, lead to great uncertainty of meaning. Certainly persons of average intelligence are not unfrequently puzzled by the botanical descriptions in floras of the present day. During the present month *Œnanthe crocata* has been sent under the supposition of its being *Cicuta virosa*, while from a provincial museum a specimen of fruits, there labelled as *Cicuta virosa*, proves to consist of those of *Angelica sylvestris*. Although *Cicuta virosa* is rare or almost absent from some parts of the south and west of England, yet the descriptions in British floras should be sufficiently clear to prevent such an error. This is of the more importance, since in one of the cases above alluded to identification was necessary to settle by what plant some persons had been poisoned. It would appear not improbable that in this way various plants, such as fool's parsley, have been unfairly credited with poisonous properties. In the *Gardeners' Chronicle* a short time ago, Mr. A. W. Dod stated that he had seen cattle eat *Cicuta virosa* with impunity.

It will be remembered that towards the close of last year two deaths in Altona were attributed to poisoning by false star-anise. After the inquiry the stock of star-anise at the retail shop from which the suspected condiment had been obtained was seized by the police and handed over to Dr. Langfurth for examination. That expert now reports (*Pharm. Zeitung*, March 19,) that the sample contains 30 per cent. of Skimi fruit (? *Illicium religiosum*: see before, p. 489), one half of which agrees with the characters given by Professor Husemann (see before, p. 453), while the other half consists of more elongated carpels, which are almost always without seed and scarcely opened. The fruit stalk of the "Skimi" fruit examined is described as being mostly wrinkled, clavate towards the fruit, and without articulations, thus differing from those of star-anise, which are said to be uniform in thickness throughout their length (1 to 3 centimetres) and provided at each end with a prominent articulation. Dr. Langfurth recommends that a doubtful specimen should be crushed in an iron mortar or with a hammer, which causes the Skimi fruit to give a strong aromatic odour resembling a mixture of sassafras and cajeput oil and presenting no similarity to the odour of star-anise. Another good criterion is the amount of rancid oil contained in the Japanese fruit. It is mentioned that in Hamburg large parcels of adulterated anise have been impounded that are said to have found their way into the retail trade after the parcel from which the Altona sample was originally taken had been all given up by the importers.

The adulteration and admixture of crude drugs, especially among those imported from Germany, seems as frequent as ever. During the present month *Helleborus niger*, consisting principally of the root of *Actæa spicata*, has been noticed, and copalchi bark has been picked out of cusparia, while dried dulcamara has been offered in bundles under the name of chirata. Provincial museums, with collections of drugs, need to carefully compare their specimens with the descriptions in works on materia medica, lest errors in the specimens presented by wholesale houses mislead those who use such specimens for purposes of study. A specimen of so-called Winter's bark, recently received for identification, proved to be that of a species of *Croton*.

The French Minister of Agriculture and Commerce has issued, at the recommendation of the Consultative Committee for Public Hygiene, directions to the various prefects that the sale of any alimentary substance containing salicylic acid should be prohibited. This Committee reported that the acid is not only dangerous from the direct effects it may produce on the system, but is so also indirectly as favouring the fraudulent introduction of substances into alimentary articles, rendering them more of less injurious (*Union Médicale*, February 17, 1881).

In connection with this subject it may be remarked that quite a paternal interest in the eating and drinking of the community is becoming strikingly manifest in more than one foreign country. In Paris the municipality is about to set up a laboratory, to be attached to the prefecture of police, where any person may have a suspected sample of food examined qualitatively for nothing, or analysed quantitatively for a fee varying from five to twenty francs. When a sample is found to be adulterated an officer of the department will be sent to obtain another from the same source, which may form the basis of a prosecution. In Vienna, also, it is said that a chemical laboratory is to be set up by the local authorities, and the Stadtphysikus is to be assisted by a skilled chemist, whose business it will be to examine suspected samples of food, drink, perfumery, etc.

But the most startling report as to adulteration is one relating to the United States, where recently a committee appointed by the National Board of Trade felt warranted in declaring that "none of our staple articles of food or drink are so commonly adulterated as to be dangerous to health or life." As the subject is honoured with leaded type in a leading daily journal that has recently consecrated sulphuretted hydrogen to lighting and heating purposes and announced the revivifying power of sulphate of oxygen on a moribund emperor, it may be mentioned for what it is worth. According to the *Daily Telegraph* (March 21), in American stores "not only is every adulteration known to the comparatively unsophisticated British tradesman in vigorous employment, but improvements upon them all, deadly when poisonous, unwholesome when not, are constantly practised." The vinegar is poisoned with sugar of lead, the pickles with verdigris, the sugar with chloride of tin, syrups with calcium, hams with glucose, tea is *faced* with prussic acid, and "everything with something." "Oleomargarine" is "simply raw fat impregnated with trichinæ," containing besides such foreign matters as "corpuscles of cockroach, blood corpuscles of sheep, sprouting yeast, a dead *Hydra viridis*, portions of muscular fibre, the fatty cells and eggs of small parasites, the eggs of tapeworms," etc. Even the chemists are said to be adulterated, being retained at high salaries to invent new methods of adulteration and issue certificates of analysis that are not correct. If the article from which these quotations are made may not be described as a disgrace to journalism, as that phrase appears just now to be provocative of heart-burning, it is certainly one of the grandest specimens of the roaring of a young lion that has appeared even in the paper boasting of the largest circulation in the world.

Olive oil appears likely to increase in price. According to the *Gardeners' Chronicle*, the olive trees in Provence are menaced by a scourge which may ultimately prove as dangerous as the phylloxera. A grey fly, known as the *Dacus oleæ*, has made its appearance and has already devoured a large quantity of olives. It lays its eggs twice a year, in July and September. The small yellowish-white maggot eats its way into the pulp of the olives, forming galleries. When it has reached the adult stage it drops on the earth and seeks a crevice or hollow in which to pass the winter in the chrysalis state. Experience has shown that the first generation does not always spoil the olive, but that the ravages of the second lot are wholly destructive. It seems doubtful if the southern peasants will have the energy to meet the menacing evil in the only way known at present, viz:—to pick up the olives which, weakened by the parasite, fall to the ground, and remove the worms before they escape into the soil.

Buyers of olive oil will probably find it necessary ere long to carefully examine that imported from Italy. Cotton-seed oil is said by the United States Consul at Naples to have found its way into the remotest mountain villages in Italy where the sole production is olive oil, not merely as a substitute for, but as an adulterant of, olive oil. It has also found its way into Russia, one of the chief outlets for Italian olive oil. As the cotton-seed oil can be sold in Italy at half the value of olive oil, the inducement to use it as an adulterant is very great. The Government of Italy is endeavouring to impose a heavy tax on cotton-seed oil with the view of protecting the production of olive oil. It is obvious, however, that a good test to detect the presence of small quantities of cotton-seed oil would be a better preventive to adulteration. Cotton-seed oil is a drying oil, and if added in equal parts to olive oil its drying nature is still evidenced by its leaving sticky streaks near the mouth of the bottle when droppings become exposed to the air.

Another adulterant of olive oil, which is more likely to be met with in the American than in the European market, is mustard seed oil. In California the mustard plant grows in profusion and the seed is collected by Chinamen, and sold at two or three cents. per pound in San Francisco. The oil is sold in the same city at a dollar the gallon. As it is said not to turn rancid so quickly as olive or lard oil, it is preferred by many for cooking purposes, and has on this account, and because of its cheapness, been used extensively for adulterating olive oil.

Some very curious results, involving an element of perplexity for a much respected portion of the community, have been obtained by M. Muntz in the application of his very delicate test for the presence of minute quantities of alcohol, based upon the conversion of the alcohol into iodoform. M. Muntz claims that he is able to detect alcohol when diluted to one millionth, and having examined earth and air and water, rain and snow for it, he finds it (*Comptes Rendus*, vol. xcii., p. 499) to be almost omnipresent, since only the very purest spring water gives negative results. An incident that occurred not long ago in an important public office points in the same direction and may thus receive some elucidation. A considerable scandal and scare had arisen in consequence of the sanitary condition of this particular office, and amongst other things put under supervision, a bottle of the water in use in the building, duly verified with the official seal, was sent to an eminent water doctor for examination, and was found by him to contain an appreciable quantity of alcohol. In fact, it was reported to bear considerable resemblance to weak whisky toddy. The question now arises whether this characteristic is to be regarded as indicating the particular nature of the fermentation to which the universal diffusion of alcohol is due or whether it throws any light upon the habits of the clerks in the public office in question.

In view of the present enormous consumption of glucose, especially upon the Continent and in the United States, some experiments reported (*Scientific American*, February 26) to have been made by Dr. Nessler, of Baden, seem worthy of attention. If commercial glucose be subjected to fermentation by means of yeast, and the product be filtered and the alcohol driven off from it by heat, there always remains an unfermented portion which is bitter and turns the plane of polarization to the right. In a sample of glucose examined this unfermentable portion amounted to 26 per cent., and when this was taken in a concentrated form, and in quantities representing the residue from about 100 grams of glucose, it produced in two persons violent cold perspirations, severe persistent headaches and other disagreeable symptoms. Whether this bitter substance is formed during the fermentation or is originally present in the glucose, and if the former be the case whether or not its injurious effects are neutralized by the alcohol in which it is usually dissolved, are questions that have not yet been determined.

The study of the phenomena attending the aerial oxidation of moist phosphorus has given rise to much discussion, not always devoid of acridity. For a long time it was assumed that the principal product was ozone. Some two years since, Mr. Kingzett, who had previously proved that in several instances the name of ozone had usurped the place of that of peroxide of hydrogen, was induced to assert that no known process of slow oxidation had been established to produce ozone, and that the gaseous body obtained during the slow oxidation of phosphorus was altogether peroxide of hydrogen. It now appears to be established that both ozone and peroxide of hydrogen are formed. According to Dr. Leeds (*Chemical News*, March 4), they are produced approximately molecule for molecule, and both are evolved, the suspended peroxide of hydrogen passing through a series of wash-bottles without undergoing any but a slight absorption. He also states that together with these two bodies, and as a necessary part of the same series of reactions incident upon the setting free of nascent oxygen, a certain amount of ammonium nitrate is always produced and retained in the water. This part of the reaction is represented as follows:—

$$NN + 2H_2O + O = NH_4NO_3.$$

An alkaloid similar in physiological action to that obtained from *Sophora speciosa* has been extracted from *Sophora sericea*, a herbaceous perennial, common on the high plains of Colorado and Nebraska and extending into the lower hills of the Rocky Mountains.

During a stay in Hong Kong and Shanghai, Dr. P. Liborius observed that a tincture of an unknown fibrous root was successfully used as a remedy against ringworm. The root afterwards turned out to be that of the *Rhinacanthus communis*, N. ab E., the leaves of which, bruised and mixed with lime juice, are, according to Dymock (*Pharm. Journ.*, [3], vii., p. 190), used in India as a popular remedy for "Indian ringworm." Subsequently a chemical examination of the root was made by Dr. Liborius in the laboratory at Dorpat (*Pharm. Zeit. f. Russl.*, February 7), the principal result being the isolation of a quinone-like body, supposed to be the active constituent, resembling chrysophanic and frangulic acids in its antiseptic and antiparasitic properties, and phlobaphene in some of its decomposition products. Dr. Liborius calls this new substance "rhinacanthin," and represents it by the formula $xC_{14}H_{18}O_4$. Its presence in the plant is said to be limited to certain intercellular spaces occurring in the bark, the cellular tissue of this part appearing to be filled with an intensely red contents, supposed to consist of a compound of rhinacanthin with an alkali. It is obtained by exhaustion of the powdered root fibres with absolute alcohol. Rhinacanthin has the peculiarity of forming with bases beautiful red compounds, that are easily decomposed by certain neutral solvents, such as petroleum spirit, which dissolves the rhinacanthin and assumes a yellow colour.

The oil of the Australian sassafras (*Atherosperma moschata*) has recently attracted a little attention in this country. For some time past it has been used in the colonial hospitals in Australia as a sedative to the heart, it having a lowering influence upon the action of that organ. It is given in doses of one or two drops at intervals of six or eight hours. In smaller doses it is used as a diaphoretic and diuretic in asthma and other affections of the respiratory organs. The tree grows abundantly in the gullies in the mountains near the coast, both in Victoria and Tasmania.

In the *Archivos no Brazil* attention is directed to the oil of anda açu (*Anda Brasiliensis*, Raddi), for which it is claimed that it produces the same effect as castor oil in a less dose; that it has not the disagreeable odour of that oil, and is more fluid, and therefore easier to take. It is given in the doses of 10 grams, which quantity neither produces vomiting nor subsequent intestinal irritation, and is sufficient to produce three or four alvine evacuations. It is stated, however, that before expressing the oil the embryo and the episperm must be removed, as they contain a principle which produces colic. The removal of these parts is not, however, difficult, as the seed is at least ten times larger than that of the castor oil plant.

The oil of eucalyptus appears to be gradually coming into favour as an antiseptic dressing. Dr. Siegen recommends a solution of the strength of 3 grams of the oil to 15 grams of alcohol, and afterwards diluted with 150 grams of water. Ordinary gauze is wetted with this solution, and, covered with gutta percha tissue, kept in place by gauze bandages. It is said to be perfectly antiseptic, and to cause no irritation, even to very sensitive skins.

Another antiseptic appears to have been tried in America, and has been shown by Dr. Beach to be equal in antiseptic power to thymol. This is styrone or cinnyl alcohol, obtained from the styracine of balsam of Peru, or liquid storax, by treating it with alkali, which separates the cinnamic acid from the cinnyl alcohol. It is in the form of silky needles, has a sweet taste and an odour of hyacinths. It is soluble in twelve parts of water, and freely soluble in alcohol and ether. A saturated aqueous solution of the above strength was found to be a perfect deodorizer of a foul ulcerated surface and to cause no irritation. This explains to a certain extent the antiseptic and healing properties possessed by tincture of benzoin, a common domestic remedy for cuts, and in which liquid storax forms an ingredient.

A new method of applying croton oil to ringworm, etc., has been described by Dr. Ladreit de Lacharrière. He uses a mixture of 100 parts of croton oil with 50 parts of wax and 50 of cacao butter, and makes it into sticks like cosmetique by the aid of a mould so as to apply it with great accuracy, both as to extent and depth (*British Medical Journal*, p. 303).

Professor Fraser, of Edinburgh, has shown that as atropine is a useful cardiac stimulant, it is beneficial to give it by hypodermic injection fifteen or twenty minutes before the administration of chloroform. The strength of the injection he recommends is $\frac{1}{100}$ to $\frac{1}{50}$ of a grain of sulphate of atropine, combined with $\frac{1}{12}$ or $\frac{1}{6}$ of a grain of acetate or hydrochlorate of morphia. By this means the patient is said to be less nervous, less chloroform is required, and the vomiting, which is apt to occur with chloroform, is got rid of or ameliorated.

Dr. Wainwright, of Milltown, New Jersey, states that malarial fevers have been treated of late with success by picrate of ammonium given as a pill, in doses of 1 grain to 1½ grain, daily increasing, if required, to 2 grains. It is stated that few cases had to be treated longer than a week, and that if the picrate was administered at the first appearance of the attack it invariably put an end to the progress of the fever. Although it stains the white of the eye, the skin and the urine of a yellow colour, this disappears in a fortnight after the remedy has been discontinued. It is said to possess the advantage over quinine of not causing nausea or *tinnitus aurium*.

Dr. Macewan, of the Dundee Royal Infirmary (*British Medical Journal*, March 5, p. 337), recommends benzoate of sodium as a substitute for the salicylate, in the treatment of acute rheumatism. He states that he has found it to be a remedy of considerable efficacy in the treatment of rheumatic fever, while possessing the advantage that it does not give rise to the nausea and depression or the unpleasant head phenomena which the salicylate frequently produces. The dose given is 15 to 20 grains every two or three hours, preferably in the form of mixture. Its use has to be continued for twenty-four or forty-eight hours after the rheumatic symptoms have disappeared.

Small pox seems very prevalent in London, the hospitals, according to recent accounts, being filled. Various appliances to prevent the pitting caused by this disease have been recommended at different times, with apparently indifferent success. Dr. Schwimmer, in the *Gazette des Hôpitaux*, advises a mask of pliant linen cloth, smeared inside with a mixture of carbolic acid, olive oil, and chalk or starch, in the proportion of 4–10 per cent. of the acid, or of thymol, 2 per cent., with linseed oil and chalk, the mask being removed every twelve hours. One of the most simple means to prevent pitting, and a very successful one, is simply to exclude light by hanging a rug or other opaque object in front of the window, the light apparently having an irritating action, that stimulates the formation of pus and causes the eruption to eat deeper into the skin.

Since vitriol throwing has become such a common offence, it may be well to point out that in a case which occurred during a chemical lecture, described in the *Bulletin de Thérapeutique*, in which two students were seriously injured in the face by the explosion of a flask containing boiling sulphuric acid, the intense suffering at first experienced ceased entirely about a quarter of an hour after the application of a soft paste of calcined magnesia and water in a layer about 2 millimetres in thickness. M. Alande states that the magnesia requires to be renewed in twenty-four hours, but that patients, after recovery, retain no marks of the accident.

In the *American Journal of Pharmacy*, Mr. R. B. Fairthorne, under the heading of "Practical Notes," recommends the use of a solution of hypochlorite of zinc in preference to that of soda, as being free from alkalinity, and consequently capable of being used in a more concentrated state if desired, as well as having the advantage of the astringent and antiseptic properties of the zinc compounds. The solution is made as follows:—Chlorinated lime, 12 troy ounces; sulphate of zinc, 24 troy ounces; water 12 pints. The chlorinated lime is triturated a little at a time with 8 pints of water, and the decanted clear liquid is mixed with the sulphate of zinc, previously dissolved in 3 pints of the water, and set aside for twelve hours; the clear liquid, after straining the precipitate, is then made up with water to 11½ pints of the finished product.

Mr. Fairthorne also suggests a new method of taking cod liver oil, which consists of adding ʒij of tomato or walnut catsup to each ounce of the oil, the mixture being shaken before taken. He very pertinently remarks that taking an ordinary emulsion of cod liver oil is like eating codfish or lobster with a dressing of sugar and gum. He has found the mixture of catsup and cod liver oil to agree with many persons much better than any other form in which cod liver oil had been taken, and this he attributes to the association of substances generally employed as additions to food bringing into operation those digestive faculties of the stomach which might otherwise remain dormant when such incongruous substances as sugar and one of the principal ingredients of fish are introduced together into the stomach. Some years ago a paper was published in one of the scientific journals showing that the condiments usually employed with particular kinds of food were the most appropriate ones, since they developed an electrical current, a phenomenon which did not appear to be indicated by the galvanometer when what would be considered by epicures to be incongruous articles of food were experimented with. Possibly the action of different adjuncts to food on the nervous system, and through it on the digestion, may deserve more attention than is generally devoted to that subject. Mr. Fairthorne, also states that the following mixture is readily taken by the patient:—Liebig's extract, ½ ounce; extract of celery seed, ½ fluid drachm; vinegar, 1 fluid ounce; water, 2 fluid ounces; cod liver oil, 5 ounces. The extract of beef is dissolved in the water, the vinegar and oil added, and the whole shaken with the extract of celery.

In the pharmacies in many parts of Italy are to be found small bottles containing single doses of kusso powder (about 20 grams) elegantly done up and labelled as a specialty. It has been disputed, however, whether these preparations correspond in activity as a vermifuge with the powder prepared from fresh kusso. This has led Professor Arena, of Naples, to recall (*Giorn. Int. della Sc. Med.*, vol. i., p. 542), the long known fact that kusso after being kept some time loses its activity through a change that takes place in the resin to which it owes its properties. If this resin be extracted from fresh kusso it is green, without special odour, with slightly bitter disagreeable taste, and easily soluble in alcohol and ether. The resin prepared from old pulverized kusso, whilst it retains its solubility, is yellow and shows no trace of bitterness. If the green resin from fresh kusso be exposed for some time to the air it also assumes a yellow colour and loses its bitter taste.

A method of coating pills with cacao butter and starch is recommended by M. Ditten (*Journ. Pharm. d'Alsace-Lorraine*, vol. viii., p. 53). The cacao butter is melted at a gentle heat in a flat-bottomed capsule or plate; in this the pills are rolled energetically. A considerable quantity of starch powder is then thrown in, and the pills are again shaken and left to cool. The cacao butter in solidifying forms with the starch powder a coating described as being impervious to the air, not cracking, and preserving the mass from alteration or evaporation. Pills so coated are said to be taken without repugnance and to be disintegrated promptly in the stomach.

In referring to the questions asked in the "Dispensing Memoranda," the correct method of dispensing a prescription will, so far as it is possible, be given with a view of assisting the dispenser generally, or where any special difficulty presents itself, the best means will be suggested for surmounting the difficulty; but it would be undesirable to aim at producing a particular colour in a medicine, which could be of no general benefit, and the investigation necessary for that purpose may occupy much valuable time.

In the mixture, No. 507, the aim of the dispenser should be, in the first place, to dissolve the quinine, which may be done by adding it to the lemon juice and diluting it with the remainder of the ingredients dissolved in the water. The colour will be yellowish brown, but a considerable sediment will form on standing, which is probably a deposit of iron, leaving the clear fluid green.

The prescription, No. 508, cannot be dispensed as written, but by a little deviation in the solvent it may be accomplished. The aim of the dispenser should be to send out these drops with the full quantity of iodine and iodide of potassium, but here the quantity of iodide ordered is insoluble in the tincture of iodine. If, however, the proper quantity of iodine for ʒij of tincture be rubbed with the ʒij of iodide of potassium they may be dissolved in ʒij of a solution of about three parts of water to one of spirit, which would probably be carrying out the intentions of the prescriber. The solution will contain the full quantity of iodine and iodide of potassium ordered in the prescription, the menstruum only being modified. Before this is done, however, it would be proper, if practicable, to bring the prescription under the notice of the writer, and most medical practitioners receive favourably suggestions in pharmacy from those trained to that department of medicine.

In making the mixture, No. 509, it appears from W. G. T.'s report that the ingredients on being rubbed together with a small quantity of water became gelatinous after standing for a minute or two. In the first place to rub two salts differing in their character as much as sodæ salicylas and ammon. carb. was an error in practical dispensing. The two salts should be separately dissolved in water and then mixed together, finally adding the sp. chloroform. But it is difficult to understand how the appearance mentioned could have occurred, as these two salts may be rubbed together without apparent change, and yield subsequently a satisfactory solution. The gelatinization cannot be explained as it does not seem to take place, but on the surface of such a concentrated solution a pellicle will form, which, on further standing, assumes a crystalline appearance. The jelly referred to seems nothing more than is commonly seen in saturated saline solutions, and there is no apparent decomposition calling for further remark. This memorandum, as originally printed on p. 729, was incorrect; it has therefore been repeated at p. 810.

When liq. cinch. cord. appears in a prescription, as in No. 510, the dispenser will of course use ext. cinch. flav. liq., B.P. The cort. cinch. flav. is the cinch. calisaya, formerly called cordifolia. Liquor and fluid extract being equivalent terms, the preparation of the B.P. may be equally written liq. cinch. cord. or ext. cinch. flav. liq., and so long as there is an official formula for a preparation, that of a private one should not be employed in medicine unless the prescriber attaches a name to it as giving a preference to the make of a particular house. Mr. Nichol in his communication has fully explained this matter.

The ol. menth. pip. and camphor, of prescription No. 511, will be quite soluble in the sp. vini rect., but on being added to the water containing the tr. ferri there will be more or less separation and ultimate deposition. The question then arises, how is a diffused oil with camphor to be held in suspension. This may be done by means of a little mucilage, the chloroform being mixed with one half the sp. vini rect., and the oil of peppermint with the camphor dissolved in it should then be emulsified with a little mucilage and added to the other ingredients. A very satisfactory mixture may thus be made, which will be permanent, and admit of the most important ingredient being taken in divided doses.

In making the pills of prescription, No. 512, some excipient must be used which will retard the decomposition of the two ingredients. The usual excipients being more or less solvents will admit of decomposition, and the evolution of carbonic acid will necessarily make the pills large and crumbly; such an excipient as cacao butter would be preferable, and the decomposition with the formation of protocarbonate of iron could not take place until the pills were in the stomach of the patient. With this excipient and a little vaseline, pills may be made that will retain their shape and not be in excess of the ordinary size.

In prescription, No. 513, the quinine is thrown out of solution on the addition of the ammonia. To make this mixture the solution of the citrate of iron and quinine should be largely diluted with the water, say one half, and have in addition a little mucilage added to it, and the carbonate of ammonia and sp. am. arom. being diluted with the other half should be carefully added, with frequent shaking, so that the separated quinine may be finely divided and suspended by means of the mucilage which had been previously added to the solution. Mixtures containing quinine in its various forms with ammonia have been so frequently treated in these columns that future inquiries will be referred to the back numbers of the Journal.

When ext. sarsæ co. liq. is prescribed, No. 514, that preparation should be used. The formula is not official, but it is made after the formula for ext. sarsæ liq. with the addition to the sarsaparilla of sassafras, liquorice root, guaiacum and mezereon. There is the same difference between the formula for that and ext. sarsæ liq. as there is between the official formula for dec. sarsæ and dec. sarsæ co. The ext. sarsæ co. liq. is a favourite preparation with some practitioners, and illustrates a difficulty in the abrupt exclusion of old preparations from a new edition of the national pharmacopœia.

The elixir picis liq. of No. 515 will be found in Dorvault's 'L'Officine' as elixir de goudron. The formula is given by 'Eardley,' p. 789. This inquiry exemplifies an observation in the last "Month," that dispensers, in addition to the British Pharmacopœia, should also have in the pharmacy works of reference for foreign formulæ, and this will become the more desirable, and even necessary, as intercourse between the different nationalities becomes more intimate. The pharmacopœia of every European nation, save England, has on its committee of revision pharmacists, the most eminent that the several countries can produce, and the results of their deliberations may be studied with great advantage in the formulæ of the several pharmacopœias. That day has long since passed away when the pharmacists of Great Britain could isolate themselves from the proceedings of their continental colleagues without detriment to their own advancement.

Iodine cannot be satisfactorily combined with carbolic acid, as in No. 516. Such a prescription should be brought under the notice of the writer. Probably a strong tincture of iodine, which could be mixed with the carbolic acid, would fully answer the purpose of the writer.

The prescription, No. 517, should also be brought under the notice of the prescriber. He may not be aware that when camphor and chloral are brought together, a combination takes place, resulting in a liquid which cannot be formed into pills of ordinary size.

In No. 518, "Sanitas" inquires what is tincture of tar? It is mentioned by Van Mons in the 'Universal Pharmacopœia,' but no formula is given. Tar is soluble in alcohol, and probably a suitable tincture may be made of 1 ounce in 20 of proof spirit.

The prescription, No. 519, contains nitrite of amyl, and that therapeutic agent is usually found in a more or less acid condition. When there is free acid present the pot. iodid. is decomposed and iodine liberated, which gives the blue colour in contact with starch from the formation of iodide of starch. The addition of potass. bicarb. would, of course, neutralize the acid present in the nitrite of amyl, and obviate the decomposition of the iodide; but if the nitrite were in a proper condition for internal use it would be free from acid. However neutral it may be when prepared, it soon acquires acidity. The best plan is to use pure nitrite of amyl; the next best to neutralize the acid previous to its use. If the prescription were sent out of a dark purple colour, it was an error of judgment on the part of the dispenser. Such a decomposition should at once have attracted his attention; the mixture dispensed of a purple colour would lower him in the estimation both of the medical man and of the patient.

Nitrate of silver in the proportion of 20 grains to the ounce, as in No. 520, would most probably be used as an application. As generally understood by dispensers, the term "drops" would not apply to such a solution, as it never could be intended for internal administration. It may, however, have been prescribed in drops for the eye. A very strong solution is sometimes used as a vaginal injection. A label, "the solution," would have been very applicable, leaving it to the patient to use it, presuming that private instructions had been given by the writer. It was very properly put into a blue bottle to indicate that it was not to be taken internally.

In reply to "Junior," No. 521, pil. quinæ, B.P., can be made according to the formula; but it must be borne in mind that confection of hips, as usually met with, is very dry and in a more or less crystallized condition. Confection of hips, B.P., is no longer confection of hips when through keeping it has changed its normal character, and to judge of its capabilities of forming a mass with quinine in the B.P. proportion it should be used in its proper condition.

The prescription, No. 522, is obscure, in so far as regards the "hydrocyanici acidi (W.'s)." The first question that occurred to the dispenser would probably be, who is this authority "W.," indicated by the letter between the brackets? Being for a club patient it is very probable that it was of a strength known to the chemist who usually dispensed the prescriber's club prescriptions; but assuming it to be acid. hydrocyan. dil., B.P., the dose thoroughly diffused in the mixture could be borne by a child of the age indicated, and if "Ferrum" had any right to dispense the prescription at all, he might have safely used acid. hydrocyan. dil., B.P. "Ferrum," being on the spot, should be in a better position to judge whether the writer intended it as a prescription to be dispensed by any chemist, or whether he intended that it should be done by a particular chemist only. If by any particular chemist it may be presumed that that special hydrocyanic acid was known to him, and any other chemist with the surroundings of the case present to him would assume a grave responsibility in dispensing a prescription with so powerful an agent as hydrocyanic acid of unknown strength as one of its ingredients, if he knew that some other chemist was the one to whom the writer intended the prescription to be sent, which being a club prescription, paid for by the medical man, and supplied to club patients, free of charge, he was perfectly justified in doing.

NOTES ON VARIOUS FORMS OF LIQUOR OPII SEDATIVUS.[*]

BY E. B. SHUTTLEWORTH.

It is needless to assert the necessity for a liquid preparation of opium other than the tincture. The extensive use of Battley's solution is, in itself, a sufficient indication of the fact that such a preparation possesses advantages which are not shared by the tincture. Even when therapeutical differences are set aside, there is sufficient reason for the abandonment of laudanum in all cases where nicety of dose is a consideration. It has become an article of too general use with the public to hold its place as a reliable pharmaceutical preparation. Not only is it open to competition in price, but, at the best, the trade standard has been sensibly lowered, so that it is not in accordance with the requirements of the B.P. The tincture is now almost universally made with the moist opium of commerce, which contains from 10 to 20 per cent. of water, while the Pharmacopœia directs dry opium to be used. It will be seen that the strength of the preparation will vary in like proportion, and that in no case will it come up to the official standard. In this connection the fact may be mentioned that analyses of laudanum made in England and on this side of the Atlantic show the variation in morphia strength to vary as much as 300 per cent.[*]

The aqueous preparations of opium in use in Canada, and more particularly in this city, are:—Battley's solution; various fluid extracts made by manufacturing firms; solutions made after the model of the tinct. opii deodorata, U.S.P.; ext. opii liquid, B.P.; and a so-called liquor opii sedativus, originating in a recipe of an old Toronto druggist, which is made and largely used by leading pharmacists. When reduced to a tabular form the comparative strengths of these preparations will be more easily seen. The standard I have selected is tinct. opii, B.P., and fractional parts of the minim are omitted:—

Tinct. opii, B.P., contains 1 grain of dry opium in 15 minims.

Ext. opii liquid., B.P., contains 1 grain of dry opium in 11 minims.

Liquor opii sedativus (Battley) contains 1 grain of dry opium in 11 minims.

Liquor opii sedativus (Toronto) contains 1 grain of dry opium in 4–8 minims.

Tinct. opii deodorata, U.S.P., contains 1 grain of dry opium in 13 minims.

Various fluid extracts contain 1 grain of dry opium in about 18 minims.

These various strengths, ranging very widely, occasion much confusion to the dispenser, and, doubtless, mistakes frequently occur, as also from the fact that prescriptions directed to certain druggists, whose liquor opii sedativus is known to the prescriber, often get astray, and are dispensed at establishments where preparations of different strengths are used. Physicians are, therefore, often disappointed in the results anticipated, and not unfrequently effects are produced of a still more serious character. Uniformity of strength in such a remedy as this is of paramount importance, and I am glad that this Society has taken the initiatory step to bring about such a result.

The question as to what the standard of strength should be is one which does not require much discussion. The British Pharmacopœia, an authority which, in these matters, physician and pharmacist are alike bound to respect, has already regulated this matter, and the selection is in all respects a wise one. The liquid extract of opium, B.P., is in strength identical with Battley's solution; the dose, 10 to 30 minims, is one easily remembered, and is not so large as to add unnecessary bulk to mixtures of which it may form a part; nor so small that it cannot be apportioned and calculated with accuracy, and dispensed with ease and safety.

The next point that arises is whether the liquid extract of opium can be accepted as an efficient substitute for Battley's solution, and other proprietary preparations of a kindred character. This is a question not so easily disposed of as that of strength, and as it involves therapeutical considerations, must be left to the decision of the physician. I may, however, perhaps be permitted to make a few observations from a pharmaceutical standpoint, and in order to do this with clearness it will be necessary to allude, however briefly, to the chief constituents of opium, omitting those which are mere chemical curiosities, and presenting the others in the order of their therapeutical importance.

First, then, is *Morphia*, which, in good opium, is present in the proportion of about 10 per cent., and is in combination with meconic acid, forming a salt that is soluble in water. (2) *Codeia.*—According to Bouchert,[†] this alkaloid has about one-third the narcotic power of morphia, but is feeble and transient in its effects. It is also soluble in water. (3) *Narceine.*—This is stated to be about one-eighth the strength of morphia, but Farquharson speaks of it as of little importance except for its anæsthetic properties. It dissolves in water, though not so readily as the foregoing. (4) *Cryptopia.*—Not used in medicine, and has not been much studied, but is stated to be one-fourth as strong as morphia. (5) *Thebaine.*—Excitant, anæsthetic, not soporific, no effect in doses of 7 grains; slightly soluble in water. (6) *Papaverine.*—Has no effect in doses of 15 grains. (7) *Narcotine.* (8) *Meconine.* (9) *Meconic Acid.*—These three constituents are not used in medicine, and according to the authority above quoted, as also Rabuteau and Claude-Bernard, are inert in small doses. Narcotine is insoluble in water. (10) *Resinous and odorous principles.*—These are generally believed to produce unpleasant effects. They are only partially soluble in water, and may be modified and partially dissipated by boiling. Soubeiran* has shown that the proportion of water put in contact with crude opium exercises an influence on the solution of the resinoid principles, odorous oil and narcotine. Perier† points out the fact that the quantity of water has an effect on the solution of these principles, a large quantity precipitating the resinous matters, and a concentrated solution having the opposite effect.

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[*] Read at a meeting of the Toronto Medical Society. From the *Canadian Pharm. Journ.*, February, 1881.

[*] *Canadian Pharm. Jour.*, vol. x., 162, and vol. xi. 165.

[†] 'Transactions French Academy,' 1872. *Can. Pharm. Journ.*, vol. vi., p. 130.

From these statements the conclusion may be drawn that a liquor opii tolerably free from obnoxious principles may be made by preparing an aqueous solution of opium, concentrating the liquor by boiling, and redissolving the resulting extract. Such is the liquid extract of the B.P., but in order to effect a more thorough separation of narcotine, meconine, meconic acid, resinous, odorous and extractive matters, I would recommend that the process be repeated several times, and that the resulting liquor be assayed for morphia, and brought finally to such a measure that it shall show, by the pharmacopœial test, a morphia strength of 3 grains to the ounce, a small proportion of spirit being added to preserve the solution from mould and deterioration by age.

That a liquor so prepared will be identical with Battley's solution we have the assertion of Mr. Battley himself, who assured the late Mr. Pereira‡ that "the only ingredients employed in the preparation of his liquor opii sedativus were opium, water and heat." From my own experience I feel justified in affirming that, with careful manipulation, it is possible to produce a preparation identical with that of Battley, by simply following the process above indicated, but the estimation of the morphia should be particularly insisted on. For the assay of the solution most of the published processes will afford satisfactory results, provided the performer has sufficient experience; the B.P. method, is perhaps, as good as any. As the morphia strength of commercial opium varies to the extent of some 200 per cent., the necessity for the assay need not be further urged.

The obnoxious principles are, in the U.S.P. process for tinct. opii deodorata, removed by treating the opium solution with ether, but the process is wasteful and troublesome, and gives no better product than that above indicated.

In conclusion, I would say that, by the modifications proposed, the B.P. process will furnish a preparation which is in every way satisfactory, and, by adopting the liquid extract, a uniform, legitimate, and comparatively low-priced preparation may be substituted for one which, though reliable, is very expensive, and belongs to a class of remedies which should be discountenanced.

PREPARATION OF SYRUPS BY PERCOLATION.§

BY G. H. CHAS. KLIE.

The U. S. Pharmacopœia gives formulæ for twenty-three syrups. They are not all finished by the same process, but to dissolve the sugar different degrees of temperature are used. A few are finished by dissolving the sugar at a boiling heat, a portion by effecting solution with a gentle heat (90° to 100° F.), another portion by agitating a previously prepared tincture, from which the alcohol has been evaporated, with the sugar occasionally until solution is effected, and still another portion by mixing a fluid extract, solution or tincture with simple syrup. So we see that four different methods are directed, and it is striking that, except in a few only, the use of a high temperature appears to be avoided as much as possible. It seems that in these preparations the Pharmacopœia would have dispensed with heat altogether, if it had been sure that by adopting the cold process for all unexceptionable products would be obtained.

In the following the writer proposes to give some of his experience in regard to percolation (cold) of syrups, which has been practised in his establishment for about nine years with uniform good results.

Percolation, fifteen or twenty years ago, was among pharmacists a comparatively novel process; a good many even to this day regard it with aversion and suspicion because they think it more troublesome than the old process, and because they do not believe that by it as good and strong a product can be obtained. It is doubtful whether percolation was practised by half a dozen pharmacists of our city at the time mentioned above. Still, since its adoption by the Pharmacopœia, it has gained ground steadily, and those who practise it sufficiently long to find out its merits, especially for the preparation of fluid extracts, will not return to the old process for any consideration. To make a fluid extract the Pharmacopœia directs to exhaust some root, herb, etc., of a prescribed degree of fineness, by percolation. To accomplish this so as to secure an unexceptional preparation requires not only the careful and judicious selection of the drug, but also due care in manipulation; in fact, it requires a considerable amount of experience. To make syrups by percolation successfully requires not nearly so much experience. If certain conditions in the construction of the apparatus are attended to the rapidity of the solution of sugar by the process varies only in so much as the menstruum may be more or less viscid. Since the Pharmacopœia directs to exhaust roots, herbs, gums, etc., by percolation, requiring quite an amount of care, attention and experience, why should not the simple solution of sugar be effected by the same process, since this, in comparison, requires little attention, furnishes a product unexceptional in appearance and superior in flavour (in such as have volatile ingredients) to those made by heat? Syrups are also made by agitating or shaking together the sugar and menstruum. But, in the first place, it takes longer to dissolve sugar by this process than by percolation, and, secondly, if any quantity of air is incorporated the tendency to spoil is accelerated. When syrups are prepared by boiling they, or at least quite a number, need constant supervision to prevent waste by boiling over; with ever so much attention to cleanliness, the straining cloths will still often be found defective, and when the hot syrup is strained into a glass vessel too much care can hardly be exercised to prevent breakage. Straining through even close cloth does not furnish an absolutely clear syrup. In percolation breakage of vessels by heat is out of the question, and the product has (when the process has been properly conducted) the perfect clearness attained by filtering through paper. When the simplicity and cleanliness of the process is contemplated, the conclusion is irresistible that it ought to have been adopted by the Pharmacopœia. Furthermore, it would be but consistent to direct the process by which the soluble parts of substances, apparently difficult of solution, are extracted, for the mere solution of sugar, which is not at all difficult to dissolve. Percolation is also illustrated to perfection when sugar is dissolved by the process.

Percolation of roots, herbs, etc., with an aqueous, spirituous or ethereal menstruum, and that of sugar by water, an infusion, decoction, a partly spirituous or otherwise tincture, cannot be conducted in the same manner in every particular. Undoubtedly, because this has often been attempted failure was the result. The writer of this, about nine years ago, read in some pharmaceutical journal (I believe it was the *Pharmacist*, of Chicago) about the preparation of syrups by percolation, and thought the idea capital. The process was tried at the first opportunity with simple syrup. The percolator was charged, as usual, with a wad of cotton in the neck, a cork in the orifice, loaf sugar and water, adjusted on a filtering stand, and set aside until the sugar had all been disintegrated and settled. The cork was then removed, and it was expected that percolation would proceed without any trouble; but it did not. Having obtained 2 fluid ounces of syrup in twelve hours, the process was discontinued and the syrup finished by boiling. Using cotton wads for the percolation of syrups was found an utter failure. In subsequent operations sponge wads were substituted, and with entire success. A piece of common close soft sponge is trimmed to a cone shape, ½, 1 inch or longer, and ½, 1, 2 or more inches diameter. The sponge is thoroughly washed, and while still moist placed in position in the neck of a percolator, funnel or other suitable vessel by slightly compressing it. Sponges with small pores need little and such with large pores need more compression in adjusting. If it is placed too loose the syrup will pass too fast and not sufficiently clear, if placed too tight the syrup will pass too slow or not at all. The proper amount of compression is reached when the pores of a close sponge 1 inch long and ½ inch in diameter are closed in such a manner by adjustment in a ⅜ inch necked common half-gallon glass percolator that one pint of syrup will percolate in an hour. According to the size of the sponge, its compression, the size of the neck of the percolator, and its capacity, less or a great deal more may be obtained. When definite quantities of syrups are made, towards the end of the process the sugar must be heaped towards the centre of the percolator, because, since the process of displacement progresses faster in the centre over the orifice than at the circumference of the percolator, the sugar is dissolved fastest there, and when dissolved down to the sponge allows the menstruum to pass without dissolving the balance. In a continuous process this precaution is unnecessary. By percolation, when properly conducted, syrups are obtained absolutely clear, just as if filtered through paper.

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* *Traité de Pharmacie*, i., 851.

† 'Bulletin des Travaux de la Société de Pharm. Bordeaux,' xiii., 245.

‡ Pereira, 'Mat. Med.,' vol. ii., part 2, p. 2135.

§ From the *American Journal of Pharmacy*.

Some of the syrups of the Pharmacopœia cannot be prepared by any other than the cold process, for instance syrupus allii, syrupus pruni virginianæ, and with these, as also with fruit syrups, percolation may be considered the *ne plus ultra* of perfection. In most of the syrups of the Pharmacopœia filtration can be combined with percolation. For instance: It is not necessary to filter the aqueous tincture of orange peel when syrupus aurantii corticis is prepared, but after adding water to the evaporated portion, as directed, the turbid liquid may be immediately percolated with the sugar; or, for syrupus ipecacuanhæ, two fluid ounces of fluid extract of ipecacuanha are diluted with 12 fluidounces of water and, without filtering, may be percolated with 26 troyounces of sugar for 32 fluidounces of syrup. In each case a transparent syrup results. Syrupus scillæ compositus may be prepared in two ways. The tincture of seneka and squill is prepared by percolation, then evaporated to half a pint and 14 ounces of water added, just as the Pharmacopœia directs. To this the tartrate of antimony and potassium is added, or the latter can also be dissolved in the water before mixing with the evaporated solution; the mixed solution is then percolated with 42 troyounces of sugar, and sufficient water is added through the percolator until the percolate measures three pints. Another method is, to use the fluid extract of squill and seneka, and proceed the same as above. Both methods furnish good products, only the latter contains some alcohol from the fluid extracts which the former does not.

Syrupus Ferri Iodidi.—The filtered solution of iodide of iron, prepared from 2 troyounces iodine, quant. sat. of iron and water, measuring 10 fluidounces, is percolated with 16 troyounces of sugar, and, if necessary, sufficient distilled water is added to make the product measure 20 fluidounces. In this instance a filtered solution is preferable, although one not filtered could be used.

The other syrups of the Pharmacopœia can be made in the same manner, using for each the tincture or aqueous solution, as directed, and then percolating with sugar, either the quantity prescribed or as much as the syrup ought to contain.

A goodly number of physicians prescribe *fruit syrups*, such as raspberry, strawberry, etc. The exquisite flavour of these is preserved to the possibly fullest degree by percolation. It is inexcusable for an apothecary to dispense, in prescriptions, the artificial preparations. During the respective seasons of the fruits any convenient quantity of fresh, ripe fruit is expressed, the expressed juice is allowed to ferment and percolated with sugar quant. sat. Strawberry syrup was prepared as follows: A gallon of fresh, plump fruit, after being pounded into a pulp of uniform consistency, in a porcelain mortar, was put into a glass covered vessel and allowed to ferment. This, according to the state of temperature, may take from three to five days. To accelerate and complete the process of fermentation the vessel ought to be shaken once or twice a day, to reincorporate the mass which gathers on the surface of the juice. When fermentation has been completed this mass will generally settle to the bottom of the vessel. When the expressed fruit juice is fermented no shaking is necessary; but the work of gaining the juice by pressure is exceedingly tedious, on account of the gelatinous consistence (pectin) of the fruit, which allows the pressure to be but very slowly and gradually applied. If the pressure is applied suddenly and powerfully, the press bag or cloth will be torn invariably. On account of this drawback it is more expedient to ferment the crushed fruit and then express. Fermentation can be observed and its cessation determined to a nicety if a glass bent tube inserted air tight in the cork of the vessel containing the fruit and its free arm is made to dip about one-half inch into water contained in a small glass vial, when the finishing of fermentation is indicated by cessation of evolution of carbonic acid gas escaping through the glass tube under water in small bubbles. The expressed, fermented juice from the gallon of strawberries measured 2¾ pints. This was percolated with 72 troyounces loaf sugar. The resulting syrup measured 5 pints. Raspberry syrup was prepared in the same manner. Of both syrups prepared in the summers of '78 and '79, I have some on hand now, which, in the summer gone by, was exposed to a temperature of between 80° and 85° Fahr. without spoiling. To insure the keeping qualities of syrups prepared by percolation from fermented fruit juices, it is of paramount necessity to use only such juices in which fermentation has been complete. They (the syrups) ought also to hold in solution a sufficient quantity of sugar. Percolation regulates this to a nicety; by it as much sugar will pass into solution as can be conveniently held, and this is the best criterion of how much sugar a syrup ought to contain. Percolated syrups will not deposit any crystallized sugar in the bottles, except if they are exposed to a continuous low temperature.

The German Pharmacopœia directs heating to the boiling point for most of its syrups. It is asserted by some that syrups ought to be boiled, or heated to the boiling point, to effect precipitation of impurities. Our Pharmacopœia does not seem to be of the same opinion, since, with the exception of only a few, it either employs a gentle heat (90° to 100° F.) or none at all. Furthermore, it is obvious that the use of heat would, in some of the syrups, totally destroy the medicinal properties for which they are generally prescribed, and in some which have flavours of extreme volatility these would be more or less impaired.

PAPAINE; A NEW CONTRIBUTION TO THE HISTORY OF SOLUBLE FERMENTS.*

BY AD. WURTZ.

The author had established some time ago (*American Journal of Pharmacy*, November 1880, p. 568) that papaine, the soluble ferment of *Carica papaya*, is closely connected with the albuminoid substances, both in its composition and chemical properties; and, the researches having been continued, he is now able to give some details regarding its digestive power, and to express an idea as to its mode of action. In order to appreciate the energy of its digestive power, a product which had been purified by means of subacetate of lead was operated with, and the analysis of which has been previously communicated.

In one experiment 0·1 gram of the papaine was digested with 100 grams of moist fibrin, mixed with 500 cubic centimetres of distilled water, to which some drops of prussic acid were added. At the end of thirty-six hours the mixture was filtered, and an insoluble residue of dyspeptone collected, weighing when dry 2·5 grams. The peptonic solution, which was precipitated by nitric acid to which 500 grams of alcohol were added, furnished an abundant precipitate of parapeptone, which weighed after drying 8·9 grams, while the alcoholic solution left upon evaporation and drying a brown residue weighing 10·3 grams. The residue, having been taken up again with water, the solution ceased to give a precipitate with nitric acid, and when evaporated left a heavy brown coloured syrup, which deposited crystals; the latter, after being purified by several crystallizations from water, with the addition of animal charcoal, was obtained in the form of colourless crystalline plates, presenting the appearance of leucin.

It results from this experiment that the papaine had dissolved 1000 times its weight of moist fibrin, of which the largest portion had been transformed into peptone not precipitable by nitric acid, and that, in consequence of the complete hydration of the fibrin, it had even formed a small quantity of a crystallizable amide body, it being known that the same occurs in the process of good peptic digestion.

In another experiment 0·05 gram of the same papaine liquefied 100 grams, that is to say two thousand times its weight, of moist fibrin, with the exception of a residue of dyspeptone, weighing after drying 4·2 grams; and regarding the latter it may be stated that it is always mixed with some impurities, such as hair, straw, etc.

The energy of this digestive action has inclined me to think that in time the ferment, being of an albuminoid nature, would be able to act upon itself in such a way as to cause its hydration, and experience has verified this prevision. When an aqueous solution of papaine, contained in a sealed tube, is allowed to remain at 50° C. for several weeks, it becomes slightly turbid, and contains then in solution a product more hydrated than the original, as shown by the following experiments.

Three grams of purified papaine, containing, a deduction being made for the ash, C 52·19, H 7·12, N 16·4, were dissolved in 20 cubic centimetres of water and heated for fifteen days to 50° C.; the solution became turbid and deposited 0·064 gram of a substance containing 0·007 gram of ash. The filtered solution evaporated *in vacuo*, and precipitated by alcohol, furnished 1·8 gram of colourless papaine, which gave on analysis, deduction being made for the ash, C 51·29, H 7·02. The alcoholic mother liquid furnished 0·65 gram of a residue in which crystals were slowly formed, apparently identical with the crystallized nitrogenous matter separated from the juice of the papaya, and which will be referred to later. 1·5 gram of papaine, already modified by the action of water, was redissolved in 20 cubic centimetres of water and the solution again heated for fifteen days to 50° C. The solution precipitated by alcohol then gave a product containing, deduction being made for the ash, C. 50·46, 50·42, H 7·38, and the alcoholic mother liquid on evaporation left an uncrystallizable residue weighing 0·16 gram. It is thus seen that by simple digestion with water at 50° C. the composition of the papaine becomes so modified as to cause a decrease of 2 per cent. of carbon.

This conclusion has been strengthened by a new experiment, in which 5 grams of papaine, containing C 51·8, H 7·2, having been heated for two months with 20 cubic centimetres of water at 50° C., furnished a papaine containing C. 49·8, 50·3, H 7·3, 7·4. At 100° C., the action of water on the papaine is still more pronounced. 4 grams of papaine, dissolved in 45 cubic centimetres of water, were heated in a closed vessel for ten days at 100° C., the liquid depositing 0·084 gram of a precipitate which contained but 0·0015 of ash. Precipitated by alcohol, this solution gave a brown deposit containing, a deduction being made for the ash, C 47·66, H 8·14, and the mother liquor left on evaporation an amorphous residue weighing 1·114 gram. Some experiments may be finally mentioned, which will, perhaps, throw some light on the mode of action of the papaine.

0·3 gram of papaine was dissolved in 50 cubic centimetres of water, and 10 grams of fibrin digested with this solution; and at the end of twenty minutes the liquid was expressed and the fibrin subjected to prolonged washing with cold water. In the liquid obtained by the expression of the fibrin a new portion of 15 grams was digested, and at the expiration of half an hour this second portion of fibrin was expressed, and washed as the first. Both portions (the first reduced to 7 grams by the commencement of digestion, the second to 14 grams) were digested at 40° C. with pure water, when both becamce dissolved, the second leaving a residue of 4 grams of moist dyspeptone.

In these two experiments the washings had certainly removed the dissolved ferment, and the washed fibrin would not have been able to dissolve except by the action of a portion of ferment fixed upon it, or perhaps combined with it; the ferment fixed upon the fibrin in an insoluble state had then redissolved it in consequence of the hydration of the fibrin.

The objection could be made that the ferment is retained by the fibrin in consequence of the difficulty of causing the water to penetrate in the flocks, and in response to this objection the following experiment has been made.

Seventeen grams of fibrin were cut as finely as possible with the scissors, then put in contact with a weak solution of papaine for ten minutes at ordinary temperatures, then expressed and washed for half an hour under a strong stream of water; finally, ten times in succession, and with expression, with distilled water. The last wash water, put in contact at 40° C. with the fibrin, did not dissolve from one day to the next the least trace of these substances. The fibrin thus treated and washed was digested at 40° C. with 75 cubic centimetres of pure water, when the following day the solution was complete, with the exception of a residue of 0·17 gram of dry dyspeptone.

It is, then, established that the papaine commences by fixing itself upon the fibrin, and that the insoluble product, perhaps a combination of the fibrin and the papaine, gives by the action of water the soluble products of hydration of the fibrin, at the same time the ferment being again set free can exercise its action on a new portion of fibrin.

This action will thus be found to recall that of the chemical agents, properly speaking,—sulphuric acid, for example,—small quantities of which can exercise a hydrating action, in consequence of the ephemeral formation of combinations which are produced and resolved without cessation.

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The Pharmaceutical Journal.

SATURDAY, MARCH 26, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PROPOSED AMENDMENT OF THE ALKALI ACTS.

ALTHOUGH two years and a half have now elapsed since the Royal Commission appointed to inquire into the working and management of works from which sulphurous, ammoniacal and other noxious vapours are given off, and as to the effect produced by such vapours upon animal and vegetable life, presented its report, and although that report disclosed a state of affairs urgently demanding strict and judicious regulation, no legislation has yet been effected upon the subject. This delay has, however, not been due to an ignoring of the necessity, for both last year and the year before a Government Bill dealing with the subject was introduced into the House of Commons, but towards the end of each session was eventually sacrificed in favour of other legislation that was considered more pressing. This year a fresh experiment has been made, but it has been commenced in the House of Lords, and a Bill to consolidate the Alkali Acts of 1863 and 1874, and to make further provision for regulating alkali and certain other works in which noxious or offensive gases are involved, having passed safely through the ordeal of the upper House, now awaits a second reading in the House of Commons. Whether it will be more successful than its predecessors may well be doubted, but it is very desirable that a question so largely affecting the health and property of the public in many localities should be disposed of without further delay.

The present Bill is divided into three parts, the first relating to alkali works, the second to sulphuric acid works and other specified works, and the third to registration, inspection, methods of procedure, etc. It is proposed that the Act, if passed, shall come into operation on January 1, 1882, and it being a consolidating Act, provision is made for the repeal of the Alkali Acts of 1863 and 1874, except as to the liabilities incurred under them previous to the passing of the present Bill.

The Bill provides that every alkali work shall be so carried on as to secure the condensation, to the satisfaction of the inspector, of the muriatic acid evolved in such work to such an extent that each cubic foot of air, smoke or chimney gas escaping into the atmosphere shall not contain more than one-fifth of a grain of muriatic acid. Further the acid gases evolved in the manufacture of sulphuric acid or sulphates in such a work are to be so condensed that the gases escaping into the atmosphere shall not contain in each cubic foot more than is equivalent to four grains of sulphuric anhydride. This is a less stringent provision than was recommended in the Report of the Royal Commission, where a maximum containing equal to one grain of sulphur per cubic foot was suggested, which calculated to sulphuric anhydride would be equal to two and a half grains per cubic foot. But the fact that legislation is still required for restriction even to the larger quantity evidences the great desirability for carrying it out without further delay.

Alkali waste is another subject that the Bill proposes to regulate not an hour too soon. Every work in which alkali waste is produced is to be so conducted that neither waste nor drainage from it, so long as it contains sulphide, shall come into contact with acid liquid, and in a like manner, where acid is produced it is to be prevented from coming into contact with alkali waste containing sulphide. The penalties under which these provisions are to be enforced are fifty pounds for a first and one hundred pounds for a second offence.

Sulphuric acid works are likewise proposed to be restricted to an escape equal to four grains of sulphuric anhydride per cubic foot, and into the same category come a number of manufactures referred to in the Bill as "scheduled works." These include cement works, where aluminous deposits are treated for the purpose of making cement; chemical manure works; gas liquor works; nitric acid works; sulphate and muriate of ammonia works; and chlorine works, where the manufacture of chlorine, bleaching powder or bleaching liquor is carried on.

In addition to the condensation of the gases specifically mentioned there are general provisions that the owners of such works shall use the best practicable means of preventing the discharge into the atmosphere of all noxious and offensive gases and for rendering such gases harmless and inoffensive when discharged. In the event of a failure, in the opinion of the Court having cognizance of the matter, to use such means, the owner will be liable to a penalty of twenty pounds for a first offence, fifty for a second, and five pounds for every subsequent day during which the offence is continued.

In order to facilitate the carrying out of the inspection it is provided that after the 1st of April, 1882, no alkali or scheduled work shall be carried on unless it is certified to be registered. The certificates are to last for one year and are to be taken out at the commencement of each year, a duty of five pounds in respect to alkali works and of three pounds in respect to a scheduled work being paid for each certificate.

It is intended that the inspectors shall be appointed by, and the Act carried out under the supervision of the Local Government Board, and that Body would be entrusted with the power of making such modifications, subject to the approval of Parliament, as may be deemed to be warranted in consequence of improvements in apparatus.

THE ANNUAL DINNER.

In accordance with an announcement made in these columns and by advertisement, a public meeting was held at 17, Bloomsbury Square, on Wednesday, the 9th inst., to make preliminary arrangements for the Tenth Annual Dinner of the Members of the Pharmaceutical Society and their friends. At this meeting two resolutions were passed, the first to the effect that the Dinner should be held at Willis's Rooms, on Tuesday, May 17, and the second fixing the price of the tickets at 30*s.* each and deciding that they should be obtainable only from the Honorary Secretary. The following gentlemen were appointed a Committee to carry out the necessary arrangements:—The **President**, and Messrs. **Attfield**, **Butt**, **Carteighe**, **Paul** and **Robbins**. Mr. **Richard Bremridge** was appointed Honorary Secretary.

PHARMACY AT THE ANTIPODES.

At a meeting of chemists and druggists held last October in Brisbane, for the purpose of "considering the advisability of forming an Association for the conservation of the interests of the profession in the colony of Queensland," resolutions were adopted inaugurating a Pharmaceutical Society of Queensland, and a committee was appointed to draw up a Constitution and Code of Rules. This work was promptly carried out and on the 22nd of November twelve gentlemen were elected to form the first Council. A ballot resulted in the election of Mr. **Edward Taylor** as President, Mr. **J. H. Fitzgibbon** as Vice-President, Mr. **M. Ward** as Treasurer, and Mr. **C. H. F. Yeo** as Secretary.

In the twenty-fourth Annual Report of the Pharmaceutical Society of Victoria, a copy of which has just been received, reference is made to an unsuccessful attempt to induce the authorities of the Melbourne University to include pharmacy in their courses of lectures, and a hope is expressed that a satisfactory arrangement for giving instruction in pharmacy will shortly be made with the trustees of the local Technological Museum.

PERSIAN OPIUM.

In a recent report from Mr. Consul-General Ross on the trade and commerce of the Persian Gulf, he states that the cultivation of the poppy in Persia is yearly extending to fresh districts, and that now about Shiraz and in Behbehan it is occupying much of the land. This industry is generally regarded in Persia as being highly beneficial to the country, by increasing the revenue, and affording employment to a large number of labourers.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting will be held at the rooms, 32a, George Street, Hanover Square, on Wednesday, March 30, when Mr. G. **Brownen**, F.C.S., will read a paper on 'Phosphoric Acid and some of its Combinations."

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The fifth meeting of the twenty-seventh session was held on the 16th inst., in the rooms of the Society, 119a, George Street, Edinburgh, Mr. J. B. Stephenson, President of the Branch, in the chair.

The minutes of the previous meeting were read and confirmed.

The Honorary Secretary announced the following donations:—

To the Library.—(1) *The Pharmacist and Chemist*, for February, from the Chicago College of Pharmacy; (2) The 24th 'Annual Report' of the Council of the Pharmaceutical Society of Victoria for 1881; from the Council; (3) The Supplement to the *Chemist and Druggist*, for November and December, 1880 (Australasian supplements only), from the Pharmaceutical Society of Victoria.

The Museum.—A few of the more important specimens received from the Society in London, as announced at previous meeting, were exhibited.

Mr. William Hume, Technical Chemist, Edinburgh, delivered an address on the "Rise and Progress of Photography." The descriptive sketch which he gave of this art, especially of the progress made in recent years, was very interesting, illustrated as it was by a number of experiments showing how the different processes now practised by professional photographers had been developed. Many beautiful examples of some of the processes adorned the walls of the Lecture Room.

The following is a *résumé* of Mr. Hume's address:—

The Rise and Progress of Photography.

After some preliminary remarks, Mr. Hume said, although it is impossible to draw any hard lines of distinction, I shall find it convenient to divide my subject into four sections; 1st, I shall endeavour to give you a brief historical sketch, together with the leading optical and chemical principles of photography, and this will lead me gradually, in the second place, to speak of the methods of obtaining photographs direct from natural and other objects. I shall then describe some of the principal methods of reproducing photographs, and, lastly, mention some of the many applications of photography. After observing that there must be some present who remembered when there was no sun painting, Mr. Hume referred to the black profiles and delicate minature pictures common before the introduction of photography and handed round specimens of these. He referred next to the general action of light and its effect upon many things, colours fading, old coats turning green, mahogany darkened, oil bleached, skin tanned, and quoted Sir Walter Scott,—

> "What though the sun, with ardent frown,
> Had slightly tinged her cheek with brown."

He next came from the general to the particular, and spoke of the alchemist's knowledge of silver chloride and its property of darkening upon exposure to light as remaining with them an isolated fact too insignificant for men in search of the philosopher's stone, etc. Scheele, in 1777, was the first to investigate this phenomenon, even his researches leading to nothing directly bearing on the subject. Ritter, of Jena, a few years later discovered the important fact that silver chloride darkened most rapidly under the violet and ultra-violet end of the spectrum. Thomas Wedgwood, associated with Sir H. Davy, was the first to produce photographic impressions of ferns, lace, and paintings on glass, etc., by coating paper with nitrate of silver solution. (Here fern prints, positive and negative, were shown.) He afterwards found silver chloride answered better. (Expt. Paper, prepared by floating it on solution of sodium chloride and when dry brushing it over with solution of silver nitrate, was taken, a dried fern pinned on, and a piece of magnesium wire burned before it; on removing the fern a distinct impression of it was seen.) These great chemists ransacked their laboratories in vain for some fixing agent. Nièpce, of Chalon, in France, 1814, was the first to produce permanent photographs upon a metal plate coated with solution of asphaltum in oil of lavender, the light bleaching the bitumen and rendering it insoluble in oil of lavender. The plate was afterwards etched with acid; this process was called heliography.

Daguerre, a clever French painter, inventor of the Diorama, began a series of experiments in 1824 with the view of fixing the image obtained in his camera obscura, that beautiful invention of Baptista Porta's. He worked away with little success, and entered into partnership with Nièpce in 1829. He observed how sensitive to light is a silver plate which has been subjected to the vapours of iodine. After fifteen years of incessant toil he published the daguerrotype process, and was afterwards awarded a pension from the French Government. (Here the daguerrotype process was described and specimens shown.)

In 1839, Henry Fox Talbot, six months previous to publication of Daguerre's process, had read a paper before the Royal Society on photogenic drawings taken on paper coated with silver chloride. He found silver iodide more sensitive. He was even able to obtain instantaneous pictures. The Rev. J. B. Reade discovered the accelerating power of gallic acid. (Here expt. Silver iodide paper with fern pinned on was exposed to magnesium light and the latent image referred to and developed by immersion in a solution of gallic acid.) Fox Talbot's calotype process was referred to as a process by which any number of copies can be produced, showing a superiority over daguerrotype, which can only yield one at a time. All these early workers had the utmost difficulty in finding a suitable fixing agent, and it was not until Sir John Herschel suggested the use of sodium hyposulphite that this desirable object was attained. The great astronomer also suggested the use of glass as a supporting medium for the vehicles holding the sensitive salts of silver. Nièpce de St. Victor, of Paris, obtained excellent results by coating plates with a solution of albumen containing alkaline iodides and immersing these in a bath of silver nitrate, thus forming a film of silver iodide. At this stage in the history of photography the new explosive, gun cotton, was occupying some attention and from its property of dissolving in ether, Le Gray suggested its use in photography. In 1851 Scott Archer published the collodion process which reduced the art to the last degree of simplicity. This process, modified in various ways to suit different applications, has answered all the purposes of the amateur and professional photographer, until within recent years the gelatino-bromide process threatens to supplant it altogether.

A glass plate was now coated with collodion and immersed in a bath of silver nitrate. While there, the camera and lens were shown, and their use explained. Taking the plate from the bath the creamy like film of silver iodide was shown; with a diamond the plate was cut in two, one portion plunged in a solution of sodium hyposulphite and the other in a solution of potassium cyanide, when in both cases the silver iodide was dissolved out of the collodion film, thus showing the action of those two useful fixing agents.

The gas was then turned out and a ruby lamp lit, when another plate was prepared and exposed for a few seconds under a negative before a gas flame. The development of the latent image was then shown on the screen by immersing the plate in the developing solution held in a glass trough on the stage of a magic lantern, when the image gradually made its appearance; after rinsing with water, a trough containing the fixing solution was placed in the lantern and the plate immersed in this, when the picture became clearer as the iodide of silver was dissolved out of the film.

Before relighting the gas the gelatino-bromide was referred to and the rapidity with which pictures could be obtained by it was shown, first by the exhibition of an instantaneous picture of a steam tug, taken while going full speed, the cordage even being sharply defined as well as the action of the waves. This picture was allowed to remain in the lantern while the spring shutter with which it was taken was fitted on, and on the trigger being pulled at a given signal the picture was seen for a moment or less, thus giving an idea of the extremely short exposure required with these very sensitive plates.

The gas being relit the difference between a positive and a negative was pointed out and examples of each shown.

In coming to the reproduction of photographs, the process of silver printing on albumenized paper was first described and the toning and fixing of the prints explained; also the difference between a plain and vignetted print.

Leaving the silver process, the speaker next turned to another department of photographic printing, based on Ponton's discovery, in 1843, that potassium bichromate in combination with gelatine or other organic substances became insoluble when exposed to light. The carbon process, woodburytype, collotype, lichtdruck, photolithography, photogravure, etc., etc., were all briefly explained and shown to be based on Ponton's discovery.

A very fine life-size enlargement in carbon from a carte-de-visite negative was hung on the wall, together with carbon prints in various tints, very beautiful examples of silver prints, woodburytype and other processes mentioned above.

A photolithograph nearly 40 feet long was shown. A frame containing some exquisite platinum prints was shown and their permanency mentioned.

After referring to photo enamels or burnt-in photographs on opal glass and photo-sculpture, as practised in Paris, several specimens of a process for reproducing engineers' and architects' plans were exhibited, the lines being white upon a blue ground (cyanotype).

Referring to the applications of photography, Mr. Hume, quoting Shakspere, said "Nature never lends the smallest scruple of her excellence but she determines to herself the glory of a creditor both thanks and use." As must have been seen, photography borrows largely from the physical sciences, so she repays with good interest, for she willingly lends her aid to all the arts and sciences. Amongst those mentioned were its application in meteorology to the automatic registering of thermometric and barometric readings, and the variations in the earth's magnetism, application to microscopy, astro- and spectro-photography, repression of crime, military experiments, torpedoes, etc., progress of engineering work, official photos of the Tay Bridge disaster, surgical operations, impressions on wood blocks for engravers, on canvas for artists, photography by artificial light, gas, magnesium, electric light, pyrotechnic mixtures in caves, pyramids, catacombs, etc.

On the motion of the President, who was supported by Mr. Mackay, a most hearty vote of thanks was given to Mr. Hume, by a large and appreciative audience.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

Assistants' Section.

The fifth meeting of the session was held in Anderson's College, George Street, on Wednesday, March 16, at 9 p.m., Mr. Lees, Vice-President, in the chair.

The minutes of the previous meeting having been read and adopted,

Mr. J. Laing introduced a very interesting discussion upon the Pharmacy Act and the proposed amendments.

In treating consecutively the various clauses of the proposed amendments, he contended that the widow's clause had a special claim for the sympathy and support of the trade, as widows possessed a certain interest and moral right to be allowed to carry on business by means of a qualified assistant, which right a corporate body could not claim, upon the ground that corporations assumed the calling, not necessarily for their support, but upon mere speculative anticipations.

Messrs. Lees and Adams agreed that the amendments called more for the protection of the chemist than the public, and were of opinion that that would not escape the vigilant eye of Parliament.

Mr. Lees, referring to the widow's clause, said that the sympathy herein expressed would not make the least impression upon the policy or decision of Government.

Mr. G. S. Illingworth remarked that the safety which the public at present enjoyed depended entirely upon the poisons clause, and if any additional protection was to be obtained from an amendment, it could only arise from every shop or dispensary being compelled to engage a qualified assistant or manager.

The discussion was continued till a late hour, when on the motion of Mr. Lees, seconded by Mr. Illingworth, a hearty vote of thanks was accorded to Mr. Laing.

PRESTON PHARMACEUTICAL STUDENTS' SOCIETY.

The first annual general meeting of the above Society was held on Tuesday night, March 22, at the rooms, 41, Avenham Street, Mr. T. H. Greenall, President, in the chair. The following report was read and passed:—

"Your Committee have pleasure in bringing before you the balance sheet for the year, showing a nett balance in Treasurer's hands of £2 18*s*. 1*d*.

Balance Sheet.

Cr.	£	*s*.	*d*.
By members' subscriptions from March, 1880, to March, 1881	4	10	0
„ members' subscriptions from September, 1880, to September, 1881	1	17	6
„ fees of outside students to science classes	1	7	6
„ donations	1	15	3
	9	10	3

Dr.	£	*s*.	*d*.
To rent of room	3	14	0
„ coal and gas	0	4	7
„ stationary and printing	0	12	11
„ incidental expenses	2	0	8
Balance in hand	2	18	1
	9	10	3

"In presenting their first annual report your Committee congratulate the members on the successful result of your undertaking in March last.

"During the year the Society has increased from 11 to 18 members. The room being found too small has been considerably enlarged.

"In the summer months a class in botany was conducted by Mr. T. H. Greenall; also one in pharmacy by Mr. S. J. Elliott, both of which were well attended.

"A series of papers on materia medica have been read during the year, the most prominent being 'Chloroform and Ethyl Bromide,' by Mr. J. W. Miller; 'Preservation of Herbs,' by Mr. Thistleton; 'Opium,' by Mr. A. Wilson; 'Cinchona,' by Mr. A. S. Denham; 'Aloes,' by Mr. S. J. Elliott; 'Rhubarb,' by Mr. W. A. Parkinson.

"Classes in connection with the South Kensington Science Department, conducted by Mr. Greenall, were commenced in September, when 18 members enrolled themselves for botany and chemistry.

"At Christmas, an examination was held in botany, Mr. S. J. Elliott taking the first prize (senior), Mr. Parker first prize (junior).

"The Committee take this opportunity of thanking the following gentlemen for their kindness in helping them by the loan of herbaria, materia medica, cabinets, etc.:—Messrs. R. Singleton, W. A. Parkinson and L. Todd; and by donations of books, etc., Messrs. Case (Clay, Dod and Case), Poulson (Cox, Poulson and Co.), L. Todd, Preston, Oldfield (Oldfield, Pattinson and Co.), Clarke (Langton, Eddon, Hicks and Clarke)."

After the President's address, the following resolution was passed:—"That thanks be forwarded to Messrs. Maw, Son and Thompson and Barron, Harvey and Co., for donations, and Messrs. Evans, Sons and Co., for materia medica cabinet."

Thanks were given to the retiring Committee, and the following were appointed to serve the next half-year:—President, Mr. T. H. Greenall; Vice-President, Mr. S. J. Elliott; Messrs. Thistleton, Wilson, Norris and Livesey; Treasurer, Mr. R. Singleton; Secretary, Mr. A. S. Denham, 8, Regent Street.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, March 17, Professor Roscoe, President, in the chair.

The minutes of the previous meeting were read and confirmed.

The following certificates were read for the first time:—A. J. Anderson, B. Browning, T. R. Ord, G. C. Robinson, W. R. Smith.

During the evening the following gentlemen were balloted for, and declared duly elected Fellows of the Society, the Scrutators being Dr. Japp and Mr. J. Spiller:—W. E. Adeney, H. Borras, J. F. Braga, T. C. Day, R. A. Edgell, E. T. G. Gill, M. Hiddingh, O. B. Mills, O. V. Pisani, L. F. O'Shea, F. Tiemann, G. Valentine, A. Walker.

The following papers were read—

On the Volume of Mixed Liquids. By F. D. BROWN.—The author was led to make the experiments recorded in his paper by the necessity of ascertaining with perfect certainty and tolerable facility the composition of any given mixture of two liquids. This necessity arose in some other researches in which the author was engaged. He determined to make use of density as the most readily accessible property. On mixing several liquids in pairs he found that in most cases a considerable expansion took place, in a few cases a contraction, whilst in only one case did the volume remain unaltered. Similar facts had been observed by MM. Bussy and Buignet. The author proceeded to measure these changes of volumes with great exactness. Special precautions were taken regarding the temperature, the volume and the weight of the liquid. A very carefully prepared thermometer was very carefully used. The tubes used for containing the liquid were of the form suggested by Dr. Sprengel. The mixtures first tried were carbon disulphide and benzene, carbon disulphide and carbon tetrachloride, carbon tetrachloride and benzene. Curves and tables are given representing the difference between the observed and calculated volumes. These liquids had no apparent action on each other. The two first pairs expanded considerably, the third slightly contracted. The author thought that perhaps liquids having the same boiling point might mix without change of volume. This hypothesis was found to be false in the case of dichlorethane, b.p. 84°, and benzene, b.p. 80°. Similarly, the idea that substances whose molecular volumes were the same would mix without change of volume was proved to be untrue in the case of dibromethane, m.v. 88·6, and benzene, m.v. 86·6, which substances expand when mixed. Finally the author was led to the conclusion that these changes of volume are dependent on the chemical character of the molecules and are entirely independent of such physical properties as the vapour tension, molecular volume, etc., similar curves being obtained with mixtures of carbon tetrachloride and benzene and carbon tetrachloride and toluene. All the above experiments were made at 20° C. From the experiments of Mendeljeff and Dupré and Page it would seem that the change of volume would be less marked at higher temperatures.

Professor McLeod asked if in every case, whether expansion or contraction took place, heat was evolved on mixing.

Dr. Debus asked whether at the point of maximum expansion of a mixture the proportion of liquids in that mixture indicated a simple molecular relation, and whether expansion was always accompanied by absorption and contraction by liberation of heat.

Mr. Brown said that it was very difficult to say, as the curve was nearly horizontal, where the point of maximum expansion really occurred, but in the case of alcohol and water the greatest contraction seemed to take place when 1 molecule of alcohol was mixed with three of water. Expansion was not always accompanied by absorption of heat.

The next paper was read by Mr. R. Cowper—

On the Action of Alcohol on Mercuric Nitrate.—With the intention of preparing some fulminate of mercury, the author had dissolved some mercury in nitric acid, and from accidental circumstances had left the solution standing some days before adding alcohol. On the addition of this substance and heating, a precipitate formed which was not fulminate of mercury. The investigation of this body is given in the present paper. Its formation was first observed by Soluro and Selmi, and afterwards investigated by Gerhardt, who describes it as a nitrate of ethyl, the hydrogen of which is entirely replaced by mercury, crystallized with a molecule of mercuric nitrate and 2 molecules of water,

$$C_4Hg_5(NO_3)_2Hg(NO_3)_2 2H_2O:$$

this substance was not recrystallized and was probably impure. Mercury is dissolved in twelve times its weight of nitric acid (1·3), the solution is allowed to stand until all nitrous fumes have escaped and the liquid is colourless; twelve parts by weight of pure alcohol, sp. gr. ·80, are added and the mixture heated. As soon as a precipitate forms, the source of heat is withdrawn. The crystalline precipitate is washed with alcohol and then with water. It was recrystallized from dilute nitric acid (1 vol. in 4) and gave on analysis the formula $(C_2H_2Hg_3O_2)''(NO_3)_2$. It detonates when mixed with sand, and struck. If its temperature be raised rapidly it explodes at 129°—130°. If the temperature be raised very slowly it decomposes quietly, leaving oxide and nitrate of mercury. This substance can be prepared without heat. Treated with fuming nitric acid and alcohol it yields fulminate. It may be regarded as the nitrate of a dyad radical consisting of acetylene combined with mercury and mercuric oxide. By treatment with potash a hydrate was obtained $(C_2H_2Hg_3O_2)\ (HO)_2$. By treatment with potassic oxalate an oxalate was obtained from the nitrate with the formula $(C_2H_2Hg_3O_2)\ C_2O_4$. Sulphuretted hydrogen decomposes the nitrate, forming mercaptan and mercury sulphide. In a note appended to the paper Dr. Debus looks upon this new base as belonging to the type glycol, $C_2H_4(HO)_2$, new base, $(C_2H_2Hg_2O_2)(HO)_2$.

Dr. Debus referred to the interesting nature of the paper just read. This substance was interesting in two ways, first, because it was a step towards fulminate of mercury from alcohol and mercury nitrate, and secondly, because of its constitution. He was at first inclined to view the substance as a compound of acetylene, C_2H_2, with orthonitrate of mercury, $C_2H_2.Hg_3(NO_4)_2$, but it was evident from its behaviour that we had really to do with an organic base containing mercury. In answer to a question of Dr. Armstrong, he stated that free nitric acid was in all probability always present as well as mercury nitrate.

On Boron Hydride.—By F. Jones and R. L. Taylor.—The authors found that magnesium boride could not be formed by acting on borofluoride of potassium with potassium. They give three methods for the preparation of this substance. The first consists in acting on boric anhydride with magnesium. Boric anhydride, which has been recently and thoroughly ignited, is mixed with twice its weight of magnesium dust, placed in a crucible, the lid of which is firmly wired down, and heated in an ordinary fire. The reaction is violent; as soon as it is completed the crucible is removed from the fire and allowed to cool. The residue in the crucible is chiefly a grey friable mass, containing boride, nitride and oxide of magnesium, also boron and magnesium. The second method consists in heating amorphous boron to a dull red heat with magnesium dust in a current of hydrogen. In the third method the vapour of boron trichloride is passed over heated magnesium dust in an atmosphere of hydrogen. The first method is the most convenient for obtaining the magnesium boride in quantity. The boron hydride is obtained by treating magnesium boride with hydrochloric acid, but has not been obtained in a pure state, being always mixed with a large excess of hydrogen. The gas is colourless, with a most disagreeable odour, exciting nausea and headache, and is but little soluble in water. It burns with a green flame, which gives a brown stain on porcelain; it is decomposed by heat with separation of boron, and gives a black precipitate with silver nitrate, containing silver and boron. It combines with ammonia, yielding a compound which is decomposed by acids. The composition of the hydride, as far as could be ascertained by combustion of the mixture of hydride and hydrogen with copper oxide, is represented by the formula BH_3.

On the Action of Aldehydes on Phenanthraquinone in presence of Ammonia. By Dr. F. R. Japp and Mr. E. Wilcock.—In a previous paper the authors described the preparation of a benzenylamidophenanthrol by the action of benzaldehyde containing hydrocyanic acid on phenanthraquinone. This same compound can be obtained with greater facility by treating phenanthraquinone, benzaldehyde and aqueous ammonia at 100° in an open flask on a water-bath. The substance, when purified, crystallizes in tufts of colourless silky needles, fusing at 202°. Similar compounds have been prepared and studied by substituting cuminaldehyde or furfuraldehyde for benzaldehyde. Acetaldehyde has no action on phenanthraquinone in presence of ammonia. If, however, phenanthraquinone is heated with aldehyde ammonia, a product was obtained which could not be purified, and so its investigation was abandoned. By the action of salicyl aldehyde on phenanthraquinone a new compound, $C_{21}H_{14}N_2O$, was obtained, a further investigation of which is promised.

On the Action of Benzoic Acid on Naphthaquinone. By Dr. Japp and Mr. N. H. J. Miller.—When naphthaquinone is heated with benzoic acid to about 160°, the liquefied mass almost solidifies from the separation of minute crystalline needles. Water is eliminated during the reaction. The product is purified by boiling first with alcohol to remove the excess of benzoic acid, then with anilin, and finally with alcohol again. The new compound is thus obtained in microscopic ramiform needles, fusing above the range of the mercurial thermometer, and insoluble in all solvents yet tried. Analysis gave results indicating the formula C_9H_4O. Its formation may be expressed thus—

$$\underset{\text{Naphthaquinone.}}{2\,C_{10}H_6O_2} + \underset{\text{Benzoic acid.}}{C_7H_6O_2} = C_{27}H_{12}O_3 + 3\,H_2O.$$

This compound is exceedingly stable. By oxidation with potassium permanganate in aqueous solution phthalic but no benzoic acid is obtained. The authors find that naphthaquinone also reacts with various other acids, both monobasic and dibasic, yielding crystallized compounds which are still under examination.

In answer to Dr. Armstrong, who criticized the nomenclature employed in the first paper, and thought it was misleading, Dr. Japp stated that he had only followed the precedent of Ladenburg, who first prepared bodies of this class.

Note on the Appearance of Nitrous Acid during the Evaporation of Water. By R. WARINGTON.—Schönbein stated some time ago that whenever pure water or an alkaline solution is evaporated ammonium nitrite is produced, and that the same salt is formed during ordinary combustion in the air. It has been, however, since shown by Wright, Carius, etc., that this occurrence of nitrites is due to impurities in the materials used or in the atmosphere in which the experiments were conducted. The fact, however, still remains that pure water evaporated to a small bulk under ordinary conditions will generally contain nitrous acid. The author has endeavoured to determine the conditions under which this occurs. He finds that pure water when evaporated over a gas or even a spirit flame always contains nitrites, 1 litre of water in four hours contained 0·05 mm. of N, but that by using steam this quantity is diminished to one-twelfth, and by evaporating the water in a retort the introduction of nitrites could be altogether avoided. He proves also that distilled water when exposed to the ordinary atmosphere of a room in an evaporating dish absorbs in a few hours sufficient nitrous acid to be detected. Less nitrous acid is obtained when the water is exposed in the country; thus after twenty-seven days' exposure in fields, water contained nitrous acid equal to 1 part of nitrogen in 15,000,000 of water. In conclusion, the author gave some account of the marvellously delicate test proposed by Griess, which far surpasses the delicate metaphenylendiamine test. The latter can detect only 1 part of nitrogen as nitrous acid in 10,000,000 of water, the former gives a distinct reaction with 1 part in 1,000,000,000. The test is described in *Deut. Chem. Ges. Ber.*, 1879, 427. The solution to be tested is acidified with hydrochloric acid, a few drops of sulphanilic acid, and a few drops of an aqueous solution of hydrochlorate of naphthylamine added; if nitrous acid is present a rose colour is developed; in strong solutions a dark red precipitate falls. The author expresses his obligation to Dr. Witt, for calling his attention to the test, and furnishing him with the necessary materials. The author exhibited the delicacy of this test, and the absorption of nitrous acid from the atmosphere of the meeting room by a dish of water which had been exposed since six in the evening. The water immediately turned rose-red on the addition of the solutions.

Dr. Gilbert said that Mr. Warington had proved that the evaporation of water did not cause the oxidation of nitrogen, but that the nitrous acid which was found in water which had been evaporated was derived from combined nitrogen existing in the fuel or in the air. It was not, however, so clearly proved that the nitrous acid in the atmosphere was not produced by the oxidation of nitrogen.

Mr. J. Spiller had used the metaphenylendiamine test and had reached the same limit of delicacy as that mentioned by Mr. Warington, 1 in 10,000,000.

Dr. WRIGHT then read a paper by Mr. RENNIE and himself—

On the Sweet Principle of Smilax Glycophylla.—The leaves of this plant have long been used in Australia as a remedy for scurvy, etc., but no investigation of the sweet principle seems to have been hitherto made. The aqueous extract of the leaves was first treated with alcohol to precipitate albuminous bodies, filtered and the alcohol distilled off; after filtration the residue was then shaken up with ether two or three times; the ethereal extract on evaporation yielded a yellowish crystalline mass readily soluble in boiling water. This substance on purification yielded a body, $C_{13}H_{14}O_6+2$ or $3H_2O$. Its molecular weight could not be determined. On fusion with potash at 250°, acidifying, etc., an acid, $C_9H_{10}O_3$, m.p. 127° to 128°, was obtained, giving no coloration with ferric chloride and an odour of a phenol when heated with soda lime. As the original substance extracted from the smilax seems to have properties distinct from the active principle of ordinary sarsaparilla and from glycyrrhizin, the authors suggest provisionally the name glycyphyllin.

Note on Usnic Acid and some Products of its Decomposition. By the late J. STENHOUSE and C. E. GROVES.—Pure usnic acid can be prepared from the crude acid, extracted from *Usnea barbata* by treatment with lime and water, by first converting it into an insoluble basic compound (*Chem. Soc. Journ.*, 1880). This compound is then washed, decomposed by boiling with dilute hydrochloric acid and the precipitate collected and washed: the precipitate is stirred up with a considerable excess of soda and hydrogen sodium carbonate added in excess; nearly pure sodium usnate is thus precipitated. This is purified by resolution and reprecipitation. The pure sodium usnate is then dissolved in hot spirit containing soda, and acetic or hydrochloric acid added: pure usnic acid is thus thrown down in a crystalline state. If pure sodium usnate be boiled with dilute hydrogen sodium carbonate for some hours, air being excluded, a yellow solution is obtained, turning black on exposure to the air. When 1 part of usnic acid is dissolved in 3 parts by weight of strong H_2SO_4, the solution heated for three hours to 60° C., and then cooled and poured into 15 parts of water, a flocculent precipitate of usnolic acid, $C_{27}H_{24}O_{10}$, is formed. This substance after purification crystallizes from hot spirit in small yellowish prisms, insoluble in benzene, carbon disulphide and ether, readily soluble in dilute alkalies. From the formation of this substance the authors suggest the formula $C_{54}H_{50}O_{21}$ for usnic acid, which also agrees well with the analytical numbers. The molecular weight of usnolic acid could not be fixed.

The next three papers were taken as read.

On the Absorption of Solar Rays by Atmospheric Ozone, and on the Blue Tint of the Atmosphere. Part II. By W. N. HARTLEY.—The author has adopted for the estimation of ozone the process in use at the Observatory of Montsouris. The ozone is absorbed in a solution of arsenious acid to which a little neutral potassium iodide has been added. The excess of arsenious acid is estimated with standard iodine solution. The following are the author's conclusions:—1. Ozone is a constituent of the higher atmosphere to a much larger extent than near the earth's surface. 2. Ozone is destroyed by contact with gases and organic matter in a moist atmosphere, as near the earth's surface, and that the collection of ozone from the air is attended by the destruction of it to a large extent. 3. The absorptive power of the ozone in the air is quite sufficient to account for the limitation of the solar spectrum. 4. The blue tint of the atmosphere is largely due to ozone.

On the Nature of certain Volatile Products contained in Crude Coal-tar Benzenes. By WATSON SMITH.—The author has examined a sample of benzene from a London tar, from the so-called "first runnings" of the still. After some weeks of continued fractional distillation the author split up the product into three main portions:—(1). Boiling 40° to 53°; (2). 81° to 82°; (3). Above 82°. No. 1 contained carbon disulphide, equal to about 6 per cent. of the original crude benzene and by treatment with bromine furnished bibromanylene. No. 2 was pure benzene. The author looked carefully for alcohol and acetonitrile, but was unable to detect more than minute traces of either. It is stated by Vincent and Delachanal, and by Witt, that alcohol occurs in benzene distilled from coal tar; but as the products with which they worked were rectified, *i.e.*, treated with 3 per cent. of strong H_2SO_2, followed by agitation with alkaline lyes and subsequent distillation, the author considers that the vinic alcohol might have been formed during this rectification.

Contributions from the Laboratory of the Royal College *of Chemistry*:—*On New Zealand Kauri Gum*. By E. H. Rennie.—This resin, the produce of the coniferous tree *Dammara australis*, was first examined by R. D. Thomson, who obtained by distillation an amber-coloured oil, to which he gave the name dammarol. M. M. P. Muir also studied this substance, and by distillation obtained an oil boiling 155° to 156°, to which he gave the formula $C_{10}H_{20}O_7$. The author has re-examined the subject, he heated the gum in a copper vessel through which a rapid current of steam was passing. Fifteen pounds of the resin yielded 750 c.c. of oil; by redistillation a large portion was obtained boiling at 157° to 158°, colourless, with a strong odour of turpentine. On analysis it gave numbers indicating $C_{10}H_{16}$. It had a very slight action on polarized light. By the action of phosphorus pentasulphide, etc., some cymene was obtained. On oxidation it yielded terephthalic and acetic acids. It, therefore, appears that the oil produced by the distillation of kauri gum consists almost entirely of a terpene resembling the other members of the family.

The Society then adjourned.

The anniversary meeting will take place on March 30, when the Longstaff medal will be presented to Dr. Thorpe.

The next ordinary meeting is on April 7, when a paper will be read "On the Estimation of Hydric Peroxide by means of Potassic Permanganate" by W. E. Adeney.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, March 10, Mr. R. H. Parker, Vice-President, in the chair.

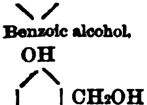
The Secretary, in the first place, explained and discussed at length the theories of Kekulé, Ladenburg and Körner to account for isomerism in the compounds containing the benzene nucleus. The formation of isomeric oxybenzoic compounds from phenol was then treated of in the following report upon Organic Chemistry:—

On the Formation of Salicin Derivatives from Phenol.

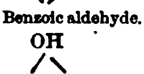
BY WYNDHAM R. DUNSTAN, F.C.S.,

Assistant Demonstrator of Chemistry in the School of Pharmacy of the Pharmaceutical Society.

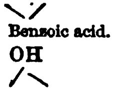
After the lengthy, and, I fear, tedious explanation which I have given of the theories to account for isomerism in the compounds containing the benzene nucleus, we will consider the constitutional position which the derivatives of salicin hold in this series of compounds. The derivatives of which I am about to treat—salicylic alcohol, salicylic aldehyde, and salicylic acid,—may all be theoretically considered as formed from benzoic alcohol, benzoic aldehyde, and benzoic acid, the relation of which to benzene I have already indicated, by the substitution of one atom of hydrogen of the benzene nucleus by one semi-molecule of hydroxyl.



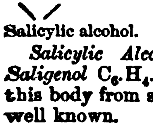
Benzoic alcohol.



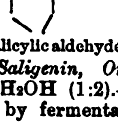
Benzoic aldehyde.



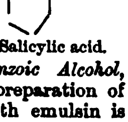
Benzoic acid.



Salicylic alcohol.



Salicylic aldehyde.



Salicylic acid.

Salicylic Alcohol, Saligenin, Orthoxybenzoic Alcohol, Saligenol $C_6.H_4.OH.CH_2OH$ (1:2).—The preparation of this body from salicin by fermentation with emulsin is well known.

A synthesis of saligenin has recently been effected by W. H. Greene* from phenol by the action of dichloromethane (methylene chloride) in presence of sodium hydrate. Thirty grams of phenol are mixed with a solution of 40 grams of sodium hydrate in 50 grams of water. When the mixture is cool, 30 grams of methylene chloride are added, and the whole is transferred to a tube, which is, after sealing, placed in a water-bath for about six hours. The liquid is then treated with a slight excess of hydrochloric acid and exhausted with ether. The ethereal solution containing the saligenin and any excess of phenol is evaporated, and the residue extracted with boiling water; this, after cooling, is filtered from any undissolved phenol, and concentrated on the water-bath. Any phenol which deposits from this solution is filtered off, and the filtrate allowed to crystallize over sulphuric acid, the saligenin thus obtained being purified by recrystallization. The yield is very small.

The reactions which take place are expressed by the following equations. Sodium phenol (sodium carbolate) is first produced by the action of sodium hydrate on phenol:—

$$C_6H_5OH + NaOH = C_6H_5ONa + H_2O.$$

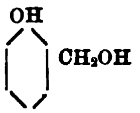
This in the presence of methylene chloride and sodium hydrate yields the sodium compound of saligenin.

$$C_6H_5ONa + 2NaOH + CH_2Cl_2 = C_6H_4.ONa.CH_2OH + 2NaCl + H_2O.$$

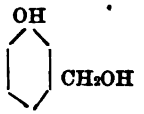
This on treatment with hydrochloric acid gives saligenin.

$$C_6H_4.ONa.CH_2OH + HCl = C_6H_4.OH.CH_2OH + NaCl$$

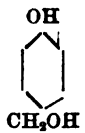
Theory indicates the existence of three isomeric oxybenzoic alcohols.



Orthoxybenzoic alcohol.
(1:2)



Metoxybenzoic alcohol.
(1:3)



Paroxybenzoic alcohol.
(1:4)

Only orthoxybenzoic alcohol (saligenin) is at present known, but by analogy, and from the general rule of substitution in phenol, it would be expected that the para compound would have been produced in the above reaction, the small quantity of the ortho compound which is produced also favours this supposition. No other compound, however, has as yet been isolated from this solution.

Salicylic Aldehyde, Orthoxybenzoic Aldehyde $C_6H_4.OH.COH$ (1 : 2).—This body is the volatile oil existing in the flowers of the meadow-sweet, *Spiræa ulmaria*; it can also be obtained by the oxidation of salicin with sulphuric acid and potassium dichromate, and by the oxidation of the corresponding alcohol, saligenin.

The synthesis of this body from phenol was made by Reimer and Tiemann,* by the action of trichloromethane (chloroform) in presence of sodium hydrate. Fifteen grams of chloroform are gradually introduced with constant agitation, into a flask, fitted with a reflux condenser, containing 10 grams of phenol previously dissolved in a solution of 20 grams of sodium hydrate in 30 grams of water, the temperature not being allowed to rise much above 60° C. An energetic reaction takes place, the mixture assuming a dark red colour, due to the formation of "rosolic acid"; after all the chloroform has been added, the flask is heated on the water-bath for about one hour, and the chloroform then distilled off.

To the solution, when cold, a slight excess of hydrochloric acid is added, any rise in temperature being carefully avoided; by this means a dark red oil, smelling strongly of nitrobenzol is precipitated; the mixture having been transferred to a retort, steam is passed through until oil ceases to distil over. After pouring off the supernatant liquid from the oil, the former is treated with ether and the oil obtained by the spontaneous evaporation of this solution mixed with the other portion, which is then extracted with a saturated solution of hydrogen sodium sulphite. On treating this with an acid, salicylic aldehyde is obtained in a state of purity. The yield is small. The reactions are represented by the following equations:—

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* *Compt. Rend.*, 90, p. 40.

* *Ber.*, ix., 824.

Sodium phenol is first obtained.

$$C_6H_5.OH + NaOH = C_6H_5.ONa + H_2O.$$

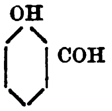
This is then acted upon with chloroform in presence of sodium hydrate, thus the sodium compound of salicylic aldehyde is produced.

$$C_6H_5.ONa + 3\,NaOH + CHCl_3 = C_6H_4.ONa.COH + 3\,NaCl + 2\,H_2O$$

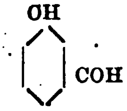
which on treatment with hydrochloric acid, yields salicylic aldehyde,

$$C_6H_4.ONa.COH + HCl = C_6H_4.OH.COH + NaCl.$$

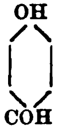
Theoretically, three isomeric oxybenzoic aldehydes are possible,



Orthoxybenzoic aldehyde. (1:2)



Metoxybenzoic aldehyde. (1:3)



Paroxybenzoic aldehyde. (1:4)

The ortho compound is salicylic aldehyde, the meta compound is not known.

If the solution which remains in the retort be filtered while hot and the filtrate treated with ether a body is obtained which crystallizes from water in white acicular crystals and is paroxybenzoic aldehyde.

Orthoxybenzoic aldehyde (1:2) or salicylic aldehyde is an oily liquid having a strong odour resembling nitrobenzol. Its solutions are coloured deep violet by ferric chloride.

Paroxybenzoic aldehyde (1:4) is a body crystallizing in white needles having no odour and giving a very faint violet colour with ferric chloride.

I have prepared both of these compounds from phenol. Specimens are on the table.

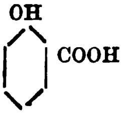
Salicylic Acid, *Orthoxybenzoic Acid*, $C_6H_4.OH.COH$. (1:2).—This well known compound, which exists naturally as methyl salicylate in oil of wintergreen, is obtained from phenol by the action of tetrachloromethane (tetrachloride of carbon) in presence of sodium hydrate, Sodium phenol is first obtained, and this, acted upon by carbon tetrachloride in presence of sodium hydrate, yields sodium salicylate.

$$C_6H_5ONa + CCl_4 + 4NaOH. = C_6H_4.OH.COONa + 4NaCl + 2H_2O.$$

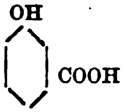
This on treatment with an acid yields salicylic acid.

When made on the large scale carbon dioxide is simply passed into heated sodium phenol instead of, as in the above reaction, using it in the nascent state, *i.e.*, by the action of sodium hydrate on carbon tetrachloride.

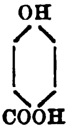
Three isomeric oxybenzoic acids are known.



Orthoxybenzoic acid. (1:2)



Metoxybenzoic acid. (1:3)



Paroxybenzoic acid. (1:4)

The ortho (salicylic acid) and paroxybenzoic acids are formed in the above reaction, the relative amount of the two depending upon the nature of the alkali used and the temperature, potassium hydrate and a high temperature yielding entirely paroxybenzoic acid. Metoxybenzoic acid is prepared in a different manner. The three isomers are easily distinguished, especially characteristic being their reactions with ferric chloride, salicylic acid giving a deep violet colour, metoxybenzoic acid giving no colour, and paroxybenzoic acid giving a yellow precipitate.

We thus see that in presence of sodium hydrate phenol yields:—

With dichloromethane CH_2Cl_2 – salicylic alcohol $C_6H_4.OH.CH_2OH$
With trichloromethane $CHCl_3$ – salicylic aldehyde $C_6H_4.OH.COH$
With tetrachloromethane CCl_4 – salicylic acid $C_6H_4.OH.COOH$.

A discussion followed the reading of the paper, in which the Chairman, Messrs. Bird, James and Thompson took part.

A vote of thanks was passed to the Secretary for his paper.

A discussion on the use of vaseline in pharmacy then took place, being introduced by Mr. Braithwaite. The subject was discussed by the Chairman, Messrs. James, Lewis and the Secretary.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[509]. In consequence of an error in this memorandum as printed on p. 729, it is reproduced:—

Sodæ Salicylas	℈j.
Ammon. Carb.	grs. xvj.
Sp. Chloroform.	♏ xx.
Aq.	ad ℥viij.

In dispensing the above a few days ago, I rubbed the two salts together in a mortar with a small quantity of water. I had occasion to leave it for a minute or two, and on returning found a kind of opaque, jelly-like mixture in the mortar. Will anyone kindly say what decomposition (if any) took place, and if the *modus operandi* was a correct one?

W. G. T.

[520]. Argenti nitras, when for internal medicine, is usually prescribed in the form of pill, the dose being ¼ to 2 grains. It is used in solution to form astringent lotions, and collyria in ophthalmia, of which latter the following is an example:—

℞ Argenti Nitratis	gr. x.
Aquæ Destill.	℥j.

Ft. collyrium.

One or two drops to be introduced into the eye every second day (for Egyptian ophthalmia).

I am inclined to think the drops were intended "Not to be taken," but from the abstruse manner in which directions are given, I do not wonder at "Islander" omitting the label.

Bedford. H. W. Nichol.

[521]. I have frequently made "quinine pills, B.P.," and have always obtained a good result.

Bedford. H. W. Nichol.

[522]. At first sight the prescription appears rather a formidable one to make up for so young a patient, but presuming the surgeon knew what he was about it would have been wise to have made it upon his authority (reserving a copy of the prescription), as doubtless he had reasons of his own for prescribing the remedy, and also for not making known his tenets for so doing.

Be that as it may, I consider that the surgeon (in consistence with the commonest rules of etiquette), might at least have sent a suitable reply to "Ferrum's" note.

Bedford. H. W. Nichol.

[523].
℞ Zinci Phosphidi . . . . gr. ½.
Ext. Nucis Vom. . . . . gr. ½.
Ext. Lupuli . . . . gr. ij.
Ft. pilul. Mitte xxiv. One twice daily after food.

Will any of your readers kindly inform me what change takes place in these pills? When first made up they form a good pill, but after a few days swell very much and then disagree with the patient. (They had been varnished.)

PHOSPHORUS.

[524]. How and with which ingredients ought the following to be dispensed to make a clear mixture?—
℞ Camphor . . . . 4 oz.
Spirits of Wine . . . . 4 oz.
Spirit of Ammonia . . . . 4 oz.

NEMO.

[525]. What is the best method of dispensing the following prescription?—
℞ Pulv. Ferri Sulph. . . . . gr. 18.
Pulv. Aloës Socot. . . . . gr. 24.
Ol. Sabinæ . . . . ♏ 18.
Ext. Hyoscyam. . . . . q.s.
Ut ft. pil. xij. Sign. S. ij secund. nocte.

SUB UMBRA FLORESCO.

[526].
℞ Quinæ Sulph. . . . . ʒiij.
Acid. Sulph. Dil. . . . . ʒij.
Aquæ . . . . ad ℥vj.
M. Sign. ʒj ter die ex aquâ sumend.

Should a sufficient quantity of acid. sulph. dil. be added to dissolve the quinine, or should the mixture be sent out with it but partly dissolved?

SUB UMBRA FLORESCO.

Obituary.

Notice has been received of the death of the following:

On the 28th of January, 1881, Mr. William Nathaniel Goggs, Chemist and Druggist, Acre Lane, Brixton. Aged 42 years. Mr. Goggs had been a Member of the Pharmaceutical Society since 1872.

On the 9th of February, 1881, Mr. George Sowter, Chemist and Druggist, Mildmay Grove, London. Aged 48 years.

On the 14th of February, 1881, Mr. Charles James Bloomfield Vlieland Coxeter Snell, Commercial Road, Peckham. Aged 20 years.

On the 26th February, 1881, Mr. Frederick Davey Cooper, Chemist and Druggist, Norwich. Aged 70 years.

On the 27th of February, 1881, Mr. William Edward Willis, Chemist and Druggist, Northgate Street, Gloucester. Aged 49 years.

On the 27th of February, 1881, Mr. Fretwell Hudson, Chemist and Druggist, West Bar, Sheffield. Aged 61 years. Mr. Hudson had been a Member of the Pharmaceutical Society since 1872.

On the 28th of February, 1881, Mr. Frederick William Manthorp, Chemist and Druggist, Colchester. Aged 38 years. Mr. Manthorp had been an Associate in Business of the Pharmaceutical Society since 1875.

On the 6th of March, 1881, Mr. George Frederick Grinden, Chemist and Druggist, Olney, Bucks. Aged 34 years.

On the 11th of March, 1881, Mr. Joseph Carter Colston, Chemist and Druggist, Finsbury Park, London. Aged 40 years. Mr. Colston had been a Member of the Pharmaceutical Society since 1876.

On the 13th of March, 1881, Mr. John William Sindall, Chemist and Druggist, Northampton Aged 38 years. Mr. Sindall had been a Member of the Pharmaceutical Society since 1870.

On the 16th of March, 1881, Mr. George Savage, Chemist and Druggist, High Street, Lincoln. Mr. Savage was a Member of the Pharmaceutical Society from 1873 until 1880.

Correspondence.

LAW VERSUS REVOLUTION.

Sir,—Mr. Hampson regrets that "a misdirected national sentiment should blind the understanding and occasion discord and unnecessary difference of views."

Allow me to inquire, who, after some thirty years of peace and pleasant practical working, has now brought in the apple of discord to our Society? Certainly not any member on this side of the Tweed.

Edinburgh, March 22, 1881. JOHN MACKAY.

THE RELATIONS OF MEDICINE AND PHARMACY.

Sir,—I am glad to see various letters on this subject, and trust they will lead to some practical result; if such, however, is to be the case we must remember that it is not only for doctors and chemists to arrange the affair nicely between themselves, but to take into consideration the interests of the public, who are patrons alike of both physician and pharmacist.

It was looking at the matter from this point of view that induced me to suggest a month ago the plan of the chemist dispensing for and charging the doctor instead of the patient for medicines; because there is a large class of people of limited means who have hitherto been in the habit of obtaining medicine from their medical men free of charge, who, in the event of medical men discontinuing to dispense, would naturally object to have to pay an additional fee to the chemist and would probably patronize those practitioners who still continued to supply medicine gratis.

Now as it is the requirements of this, the most numerous class of patients of that most numerous class of medical men, the general practitioner, that we have in the matter of medical dispensing to deal with—the mode of dispensing as at present carried on in the West-end of London working well enough among the more wealthy classes—and as those medical men who dispense their own medicines do so for gain, not exactly perhaps as profits on the sale of drugs but for the sake of advantages obtained thereby, and would not be likely gratuitously to forego such advantages simply for the benefit of chemists, by carrying out the plan I advocate of transferring their dispensing to an adjacent pharmacy they can with little, if any, additional cost to themselves, without affecting their patients or losing any of the advantages of sending out their own medicines, be relieved of the trouble, and gain considerably as to efficiency, style and dispatch; to say nothing of the mutual advantage to both doctor and chemist in the shape of increased good feeling and confidence which is brought about by the more personal, often daily, intercourse, which generally takes place in arrangements of this sort.

It seems to me that at present this is the first and only practical step in the right direction, though I look upon it as only one step, the object being to get dispensing out of the hands of medical men, without putting them to loss or inconvenience or annoying their patients in any way; afterwards will come the next step of the doctor giving prescriptions to be dispensed at the patient's own expense.

The objection to naming a special chemist is more sentimental than real, for the result of the scheme being the saving of expense to the patient and not a connivance between prescriber and dispenser for their own profit, the advantages are equally shared all round. And as the charges for dispensing are arranged between doctor and chemist, according to circumstances, the difficult point as to the desirability of alteration in chemists' charges to the public is avoided; a point which would cause some trouble in the case of medical men suddenly giving prescriptions for all those medicines hitherto dispensed by themselves, for they are generally of a less expensive and troublesome character than those now sent to chemists.

In passing, I would remark that in the event of any revision of chemists' charges to the public becoming necessary upon the relinquishing of dispensing by medical men, that certainly think they should be considered as a scale of fees adjusted according to number of doses or quantity of medicine supplied, rather than a charge in proportion to the intrinsic value of the component drugs, the charge as a rule being not so much for material as for the knowledge and experience necessary for carrying on a responsible business with safety to the public.

In conclusion, as to prescribing, when a chemist is personally and individually associated with one or more medical men in the way I have mentioned, it is to his interest to keep as far as he can from encroaching upon the preserves of his medical patrons in the matter of prescribing; thus his opportunity and inclination for counter practice are reduced to a minimum.

20, Boundary Road, N.W. J. J. Chapman.

Sir,—As we are invited to express our opinions on this subject, I beg to make a few remarks, and in doing so will be as brief as possible. Indeed I do not consider it worth many words, because whatever may be said, either by chemists or medical men, will not alter in the slightest degree the present course pursued by chemists in the conduct of their business, so far as prescribing is concerned.

I cannot do better than submit a case. A chemist, fresh from the examiners of the Pharmaceutical Society, commences business. He has been educated for, and he knows but one profession—his own legitimate one—and that he has made up his mind to practise conscientiously and exclusively. But suppose, after waiting a reasonable time for prescriptions, this important branch proves an utter failure? He rarely ever sees one—the medical men around him do their own dispensing—and he finds, as it were, the very ground dissolving under his feet. What is he to do? How is he to occupy his time? Is that well-stored brain to become bankrupt? Is he to starve? No; he will be pretty certain to do two things. He will lay himself out for simple prescribing, and he will also do what some of our great houses have of late been driven to do, namely, turn patent medicine proprietor.

As one of your correspondents in last week's Journal remarked, it is impossible for chemists to promise never to prescribe; but to reduce prescribing to its very minimum, is not in our hands, but rests entirely with medical men themselves.

But whilst it is useless medical men and chemists worrying about that over which we have no control, there is a system on which I have often written, which demands the most serious and urgent attention—it is underselling. By this our business is gradually being wrecked. A few of us are maintaining proper prices and the dignity of our profession; we are holding on to the old barque, hoping soon to see the day when our brothers-in-arms will show a far higher aim than the ruinous practice of "cutting." Other reforms may be necessary, but there is not one which requires such immediate attention as this.

86, Curtain Road, Finsbury. J. R. Summers.

Sir,—"A Minor Man" asks a practical and rational question when he says, "Is it not possible to confine the sale of drugs to chemists alone?" With the grocers and stores "cutting" the "patents" and selling drugs, we have left to us a Poison Act, which, as Mr. Hampson truly says, gives "more trouble than it was worth," reaping certainly a rich harvest (?) from the sale of poisons under it. It is all very well for "Beta" and others to recommend the developing of dispensing to make up for our deficiencies under other heads. But how is it to be done? Who has power or authority to bring it about? And further, considering that dispensing is "cut" alike with "patents" shall we be any better off than at present?

I have no wish to "croak," but to me there appears but a sorry look-out for many struggling chemists and druggists who have spent their time and money in qualifying for a position which they find usurped by grocers and stores, who are monopolizing their legitimate trade.

Such persons will soon have to turn their attention to some other more profitable and less harassing business or become pensioners on the Benevolent Fund, to which now they cannot subscribe, because of the curtailing of their incomes from the causes mentioned above.

My opinion is that legally qualified chemists and druggists and pharmaceutical chemists, and they exclusively, should have the privilege of selling drugs and medicines, "patent" or otherwise, in addition to the sale of poisons and the dispensing of prescriptions.

Again, I think it would be far more manly and to our credit if, instead of going to the Legislature with the plea of the "benefit and safety of the public" alone, we were to ask for legislative protection of our just rights and privileges as an educated, respectable and responsible body of men. We naturally look to the Editor of the Journal, the Council of the Pharmaceutical Society and the Chemists and Druggists' Trade Association to fight vigorously on behalf of their constituents and supporters.

16 and 17 High Street, Cliffe, Lewes. W. T. Martin.

Stamped Medicines and the Inland Revenue.

Sir,—We have noticed in your valuable Journal the queries and replies of several of your correspondents respecting what does and what does not require Government stamps. We have the proper schedule, but fail to understand it in some respects; this being so we have written to Somerset House enclosing certain labels and inquiring whether they are liable to stamp duty, but our replies have been unsatisfactory, merely acknowledging the receipt of the letters. Some six weeks ago an inspector kindly purchased from one of our shops a preparation which was liable, then unknowing to us, entirely through the unsatisfactory reply we had received upon the same preparation. This preparation was a 6*d*. bottle of cough mixture, and the fine was £10 and costs, which was eventually reduced to £2 10*s*. through our writing to the Chairman of the Board of Trade. Whether our writing to the Board of Trade authorities has displeased the Inland Revenue authorities we cannot say, but we have been annoyed by them ever since, having one or two of their inspectors visiting us every week. There would be no objection to their appearance if they purchased the article they ask for; but they come in a sly, dishonourable way and ask for a preparation (especially the cough mixture) for 6*d*. We tell them the price has altered to 7½*d*., but they argue and nearly compel you to supply them at the 6*d*.; their treaties of course being unsuccessful, they go out and refuse to purchase the preparation. The last one that came asked for threepennyworth of Austin's cough mixture in a bottle, and although the label has been altered to "Cough Mixture, Austin," we dare not supply it, as the law says that any medicine advertized by handbills, or in any other way, requires a stamp. We are fixed by them and can get no satisfactory reply as to what course to pursue, and they have evidently made up their mind that, if possible, they will again catch us. We think that the Pharmaceutical Society ought to take up the subject of stamps and make some inquires from the Revenue Office, so that chemists may not be constantly in doubt as to whether in selling their goods they are liable to heavy fines. It would certainly be a great boon to every chemist, as they now stand in a doubtful position and to get a reasonable or satisfactory reply from Somerset House seems a matter of impossibility.

Nechells. W. Austin and Sons.

G. W. Stephens.—We cannot find any clue as to what the name sent by you may mean. Have you made a mistake?

"*Bos.*"—See the remarks on the condition of opium used in the preparation of tinct. opii in vol. ix. of the present series, pp. 706 and 797.

J. G.—See remarks on the dispensing of salicylate of quinine in excess of solubility, before, p. 183.

J. H. Dingle.—(1) *Hypnum cupressiforme*, var. *filiforme*; (2) *Scapania resupinata*; (3) *Lophocolea bidentata*; (4) *Hypnum striatum*; (5) *Racomitrium lanuginosum*; (6) *Cladonia squamosa*, var.

H. Y. Pratt.—There is already a Botanical Exchange Club in existence, extracts from the Report of which are annually published in the *Journal of Botany*. See, for instance, vol. xvii., p. 369.

Nemo.—The Regulations as to the Dispensers in Naval Hospitals will be found in the Calendar of the Pharmaceutical Society, which may be had from the Secretary.

Vin Santé.—A mixture of borax and starch, both in fine powder.

W. G. T.—See the remarks on liq. chinchonæ on p. 798 of the present number.

Communications, Letters, etc. have been received from Messrs. H. Greenish, Renner, Nicholson, Pratt, Vin Santé, Bruised Worm, Student, Ferrum, G. W. F., J. K. C.

CONTRIBUTIONS TO A CLOSER KNOWLEDGE OF SOME LITTLE KNOWN LEAVES.*

BY DR. HEINRICH PASCHKIS.

I. FOLIA PATCHOULI OF COMMERCE.

The drug occurring in commerce under this name consists generally of leaves rolled together into larger or smaller balls, mostly of a dark red-brown colour, and having an intensely disagreeable smell, remotely reminding of that of musk. Even in a superficial examination of the dried leaves considerable differences are observed in the leaf-balls taken from the same sample. Some are of a light wood-brown colour, others dark red-brown, others again greenish coloured; some have a sparse, others an abundant and even velvety pubescence. These differences become still more clearly apparent when the balls are soaked for a time in water, and the leaves then carefully spread out and smoothed. The different leaf-forms which I have been able to obtain in this way are represented and described in the following paragraphs:—

First Form.—Broad, ovate, coarsely crenate, dentate leaves, 10 centimetres long, diminishing at the base into a long petiole, light brown, moderately thin, not very abundantly hairy on both sides, with one principal nerve, and the secondary nerves forming curves running towards the margin. The microscopic examination reveals in the epidermis of the upper and under side deeply indented, mostly elongated flat cells (0·063 mm. long, and 0·030 mm. broad); among them, in greater number below and fewer above, are stomata, with a single contiguous cell. The epidermal cells of the upper side are *coarsely papillose*, here and there brownish coloured. The cuticle is thick. The mesophyll consists of a row of palisade cells, below which is a layer of longitudinally elongated cells. Here and there are rosettes of oxalate of lime. The hairs are *simple throughout*, several-celled (up to 6); the cuticle of the hairs is warty, which is especially very clearly perceptible in the younger hairs. On the upper and under sides are numerous glands (*drusen*), one kind bearing a small head upon a short stalk, the other (large glands 0·048 mm. thick) imbedded deeply in the epidermis and stalkless. In the former are drops of a greenish-yellow volatile oil, which occurs also in the hairs, as well as in the cells of the epidermis and the mesophyll. In the mesophyll, in the wall of the epidermis cells, and in the hairs, is a tannin substance, giving a green colour with iron. Except as to size, I found leaves of *Pogostemon Patchouli* from the Vienna Botanical Gardens exactly similar to this leaf; but they were only 6 centimetres long. (Figs 1, 2, 3.)

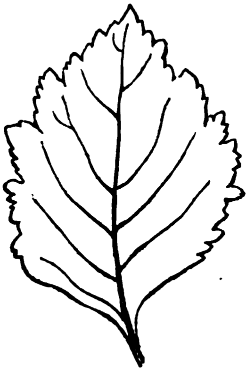


Fig. 1.—True Patchouli Leaf, from nature, fresh.

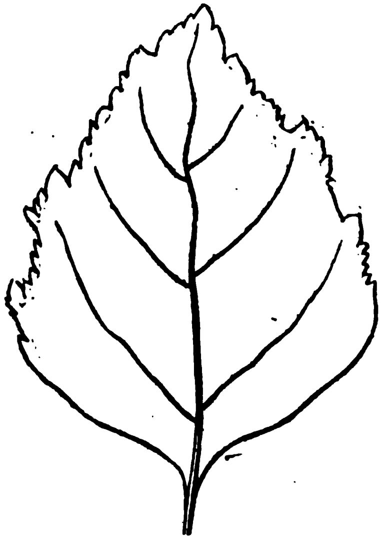


Fig. 2.—True Patchouli Leaf, from nature, dried.

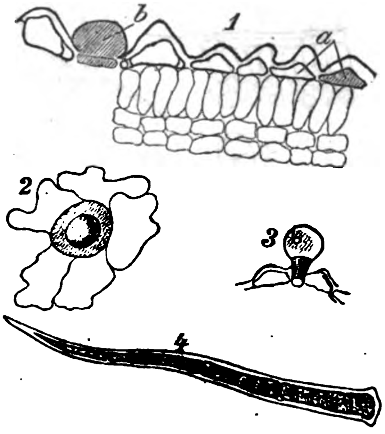


Fig. 3.—True Patchouli Leaf.—1. Portion of a section: (*a*), papillose epidermis cells; (*b*), large gland. 2. Large gland from the surface. 3. Small gland. 4. Hair.

FALSE PATCHOULI LEAVES.

*Second Form.**—Roundish, nearly transversely oval, 5-fid, dentate, 10 centimetres broad and 8 centimetres long, with radiate venation and cordate base. This leaf is dark brown above and grey-green underneath; moderately hairy on both sides, somewhat more abundantly on the under side, rather thin, but thicker than the first form. The epidermis of the upper side consists of moderately regular polygonal cells, 0·045 mm. in diameter, with very few stomata; those of the under side of indented elongated flat cells (0·075 mm. long and 0·030 broad), which enclose very numerous stomata without contiguous cells. In the mesophyll, consisting of a series of pallisade and small transversely-placed cells, occur round, bean-shaped or reniform mucilage cells of considerable size (0·051 mm. long and 0·030 mm. broad); besides these, very large crystal glands (0·030 to 0·040 mm. in diameter) are scattered there, especially in the neighbourhood of the vessels, and smaller rosettes (ordinary size) of oxalate of lime. On the upper and under sides, more abundantly on the under, are implanted small club-shaped glands, which are coloured dark brown by solution of potash. On both sides, also, are found *one-celled hairs, clustered in little bundles* of six to eight. These have a thick striated cuticle and contents that are coloured nearly red-yellow with solution of potash. (Figs. 4 and 5.)

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* Reprinted from the "Zeitschrift" of the Austrian Pharmaceutical Association, and communicated by the author, to whose courtesy we are indebted for the use of the wood engravings illustrating the paper. Figs. 2, 4, 6, 7 and 8 are from the restored drug; figs. 1, 9, 10 and 11 are drawn from fresh leaves. All are two-thirds the natural size.

* Compare Wiesner, 'Rohstoffe,' p. 685.

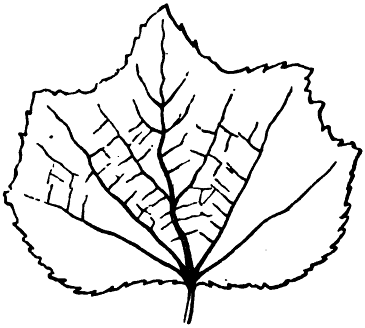

Fig. 4.—Second Form: False Patchouli.

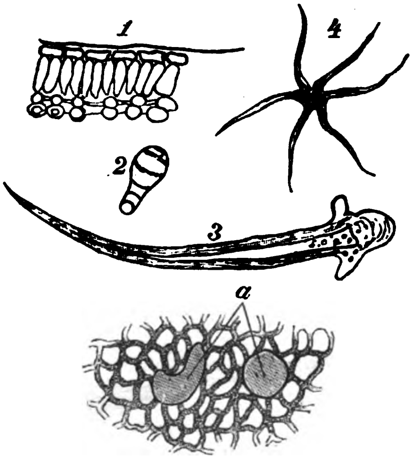

Fig. 5.—1, Part of a transverse section; 2, gland; 3 and 4, hair and stellate hair; 5, from the chlorophyll-bearing tissue of the "second form" of leaf; *a*, mucilage cells.

Third Form.—Rhomboid obtuse leaves, with coarsely dentate margin and three radiating nerves, abundantly hairy on both sides, thick, of a brownish-grey colour, attaining a length of 5 centimetres and a breadth of 2½ centimetres. (Fig. 6.)

Fourth Form.—Five-lobed sinuate leaves. The two lower lobes are small and round; the next pair are larger, also round, showing at the margin a second shallow sinus; the remaining and largest lobe is slightly crenate on both sides and acute. The margin of these leaves is also coarsely dentate, and drawn in acutely cordate at the base. The leaves are abundantly hairy on both sides, thick, brown above, green underneath, and attain a length of 7 centimetres and a breadth of 5½. (Fig. 7.)

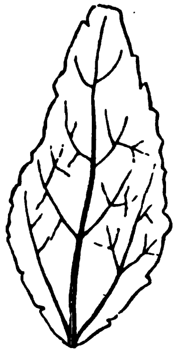

Fig. 6.—Third Form: False Patchouli.

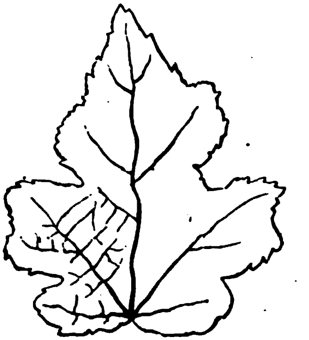

Fig. 7.—Fourth Form: False Patchouli.

Fifth Form.—Palmate leaves, with five lobes separated by deep sinuses. Each of these is separated by a second somewhat shallower sinus into two smaller lobes; all run to a point. The margin is coarsely dentate, obcordate at the base. The colour of this thinner leaf is brown above and

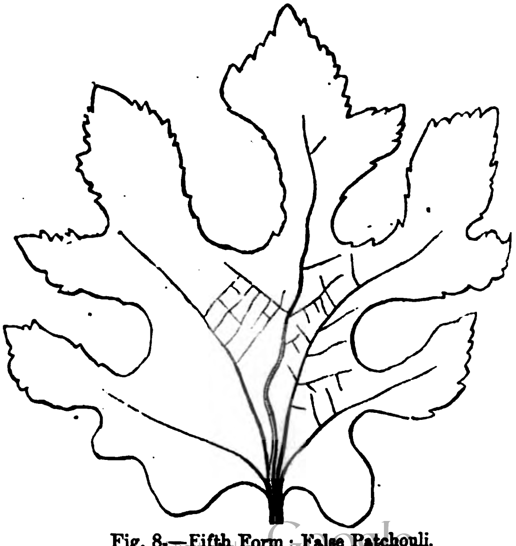

Fig. 8.—Fifth Form: False Patchouli.

grey-green underneath. Its length and breadth reach 10 centimetres. (Fig. 8.)

The two species last described have five radiating nerves. In their microscopic structure they correspond perfectly with each other, and are also only slightly different from the leaves of the second form. As compared with the second form the epidermis both on the upper and under side of the fifth form is composed of more indented smaller flat cells (0·030 mm. long), which on the upper side enclose among them fewer and on the under side more stomata without contiguous cells. In the mesophyll, consisting of a simple inferior palisade series and small roundish cells, are imbedded small rosettes of oxalate of lime. Above and underneath occur numerous club-shaped glandules, which turn brown with solution of potash, corresponding to those of the second form. The hairs occur either separately, in which case they are very large, thick-walled, and have contents coloured red-yellow by solution of potash, or in *clusters* of five to seven together, and are then smaller and have thinner walls. *All the hairs are single-celled.* In these leaves I could not find any mucilage cells or tubes.

Only the leaves first described as "folia patchouli" can be spoken of as true patchouli leaves; all the others must probably be considered sophistications. The absence of glands containing essential oil and of the characteristic many-celled hairs distinguishes the latter clearly from the true patchouli leaves, whilst all the false leaves present an almost similar macroscopic and microscopic structure. They have all radiate venation, and have similar glandules and hairs. Probably they may all be considered as derived from the same family. The mucilage cells found in the second form allow of the diagnosis as Malvaceæ. The mixing of these false patchouli leaves in many cases goes so far that they form 80 per cent. of the drug. The leaves of the third and fourth forms were most frequently found; the second and fifth more seldom. Only on one occasion have I obtained a pure sample consisting altogether of true patchouli leaves.

In the market gardens is sold, under the name of "patchouli herb," a Labiate, *Plectranthus Patchouli*, which on account of its odour resembling that of patchouli oil is used frequently by housewives in the same way as the *Pogostemon* leaves, in the protection of clothes and furs from moth. These appear very similar to the true leaves in respect to both their macroscopic and finer structure. They are 6 centimetres long and 5 centimetres broad, ovate, acute, with a doubly dentate margin, diminishing to the petiole. (Fig. 9.)

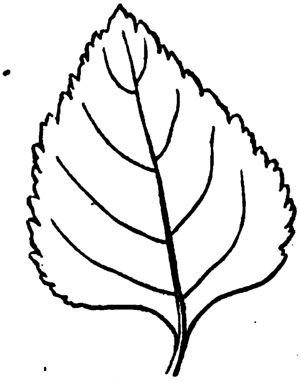

Fig. 9.—*Plectranthus fruticosus.*

The epidermis of the upper and under side is composed of a few indented flat cells, which on both sides enclose among them a few stomata. The mesophyll consists of a *double* row of pallisade and transversely placed cells. In the upper and under epidermis are numerous large and small glands, both of which correspond with those of patchouli, and the large ones also lie in the level surface of the epidermis. The hairs are throughout simple, several-celled (up to 14), are covered with a warty cuticle, and have rose-red contents.

In conclusion, there should still be mentioned comparatively the leaves of two Malvaceæ, *Lavatera obia* (Fig. 10), which resembles the fourth form, and *Pavonia Weldenii* (Fig. 11), which resembles the third form. Besides the before-mentioned elements there occur in the leaves of *Lavatera obia* oval mucilage cells, 0·045 mm. long and 0·024 mm. in diameter, and in the leaves of *Pavonia Weldenii*, besides the ordinary rosettes of oxalate of lime, some cells, 0·045 mm. in diameter, which contain large calcareous crystals imbedded in mucilage.

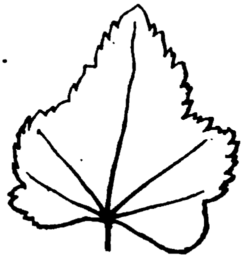

Fig. 10.—*Lavatera obia.*

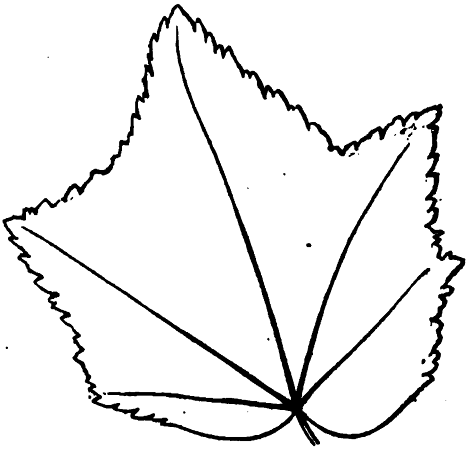

Fig. 11.—*Pavonia Weldenii.*

THE ALKALOID FROM PITURIE.*

BY PROFESSOR LIVERSIDGE, ASSOC. R. S. MINES, F.I.C.

The supply of piturie, upon which this investigation was conducted, was obtained with considerable difficulty. The blacks prize it very highly, so that it can only be obtained from them in very small quantities at a time;

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* Abstract of a paper read before the Royal Society of N.S.W., November 3, 1880.

hence it involves the expenditure of much time and trouble to collect together a few pounds weight of the substance. It was obtained from the Diamantina blacks who trade yearly with the Mulligan or Kykockodilla tribe, in whose country the piturie grows.

The first parcel of piturie was in the form of broken twigs, and fragments of leaves of a pale brown colour, emitting a smell somewhat similar to tobacco; the fine dust causes sneezing. This is its usual state, but a second parcel was much less broken up and was of a darker colour, the difference being probably due to the less careful drying which it had undergone.

The author was informed that the blacks mix the piturie with the ashes of the leaves of a particular plant and usually roll the mixture up with a green leaf into the form of a quid before chewing; the addition of the wood ashes is doubtless made for the same reason that lime is mixed with betel by the Malays and others, namely, for the purpose of slowly liberating the alkaloid during the process of mastication. The quid or bolus is, on ceremonial occasions, said to be passed from native to native, each one masticating it for a time, and then passing it on, it finding a resting place behind the original proprietor's ear until again required.

The effects of the piturie seem from all accounts to be very much the same as those set up by tobacco-smoking; it does not appear to have the exciting effect upon the blacks with which it was at one time credited. As is the case with other luxuries, it is reserved by the older men for their own use exclusively, neither women nor young men being allowed to use it. The reasons for using it appear to be much the same as those which induce white people to smoke and in certain cases chew tobacco.

In a letter addressed to the author, Baron von Mueller, gives the following account of the alkaloid obtained by him from piturie:—

"For the preparation of piturine and pituric acid the branchlets and leaves of *Duboisia Hopwoodii*, F. v. M., were subjected to exhaustion by boiling water, the infusion evaporated to honey thickness, then mixed with three volumes of alcohol, the resulting solution evaporated to the consistence of an extract, the latter dissolved in water and precipitated by basic acetate of lead. The precipitate, separated by filtration, contained a peculiar acid substance, while the filtrate, after sufficient concentration and after mixing with an excess of caustic soda solution and ether, yielded to the latter the alkaloid which was purified by agitating its etherous solution with diluted sulphuric acid, thereby forming the sulphate of piturine. The aqueous solution of the latter was then again decomposed by caustic soda, the pure alkaloid removed by ether, and the solution evaporated at a gentle heat. It formed a brownish liquid of oil-like thickness, heavier than water, of acrid and burning taste and tobacco odour, much affecting the organs of sight and respiration. It is volatile and forms fogs with diluted hydrochloric acid, is of strong alkaline reaction, and combines thoroughly with acids.

"Its hydrochloride forms precipitates with the chlorides of platinum and gold, with picric and tannic acids, phosphomolybdate of soda, bi-iodide of potassium, the iodide of potassio-mercury and potassio-bismuth, also with phospho-wolframate of soda, but this precipitate is easily dissolved in an excess of this reagent. Piturine mixes with every proportion of water, alcohol, and ether. Concentrated hydrochloric and nitric acids do not effect a coloration with it; concentrated sulphuric acid forms reddish brown clouds and dissolves to a brownish green liquid. The yield was about 1 per cent. of alkaloid from the dried plant.

"Piturine is in some respects allied to nicotine, but more closely akin to the duboisine of *Duboisia myoporoides* (R. Br.), the latter being of lighter colour, of bitter not acrid taste, of fainter odour, less irritating to the eyes and respiratory passages; its hydrochloride in solution is not precipitated by chloride of platinum, but is so by phospho-wolframate of soda, and the precipitate is not redissolved by a superabundance of that reagent."

A. Ladenburg (*Comptes Rendus*, 1880, vol. xc., p. 874–876), however, states that the alkaloid of *Duboisia myoporoides* is identical with hyoscyamine and that it crystallizes in small needles, fusing at 108°5 C., and is isomeric with atropine, from which it is distinguished by forming a brilliantly lustrous compound with gold chloride, fusing at 152° C. Also when treated with baryta it is converted into *tropine* and *tropic* acid, both of which are also obtained from atropine.

The great discrepancy between A. Ladenburg's account and the Baron von Mueller's, the author thinks can only be accounted for by the supposition that Ladenburg must have been supplied with a different material. Baron von Mueller and Rummel (*Journ. Chem. Soc.*, January, 1879) state very plainly that the *Duboisia myoporoides* yields a volatile oily alkaloid. In the same paper Baron von Mueller also describes pituric or duboisic acid obtained from the precipitate given by the piturie on the addition of basic acetate of lead.

In the Pharmaceutical Society's Journal for April 5, 1879, there is an account of an examination of some piturie made by Mons. Petit, of Paris, in which he comes to the conclusion that the alkaloid is identical with nicotine; but M. Petit does not seem to have had sufficient material to permit a combustion to be made of the alkaloid; he had to rely mainly upon its reactions with certain chemicals, and apparently was only able to make one determination each of the platinum and chlorine in the platinum salt; the amounts of which apparently roughly corresponded with those required for the chloroplatinate of nicotine, viz., 34·4 per cent. platinum and 37 per cent. chlorine, the percentages obtained being platinum 34 per cent. and chlorine 36 per cent. These results, however, cannot be regarded as final, since, as will be shown later on, the platinum salt cannot be depended upon, as it is not of uniform composition.

In the preparation of the alkaloid by the author the piturie was extracted with boiling water slightly acidified with sulphuric acid, the liquid concentrated by evaporation and distilled with an excess of caustic soda, the alkaline distillate neutralized by hydrochloric acid, and evaporated over a water-bath until reduced to a small bulk; the yellowish residue was once more distilled with caustic soda, the distillate neutralized with hydrochloric acid and again concentrated. It was now nearly colourless, caustic soda was again added, and the liquid shaken up with ether. The ether was next removed by distillation at as low a temperature as possible in a current of hydrogen, the heat meanwhile being raised gradually until it reached 140° C., a bath of sulphuric acid being used for this purpose. It was allowed to remain at this temperature for about six hours; the bath was then removed, and the distillation continued at a still higher temperature over a naked flame, the current of hydrogen being still maintained, until all the alkaloid, with the exception of a very small quantity, which had become charred, had passed over in a clear and colourless condition. During the distillation the thermometer indicated a temperature between 243° and 244° C.

Sixty grams of the substance gave ·622 gram of the alkaloid, or 1·037 per cent. In this case the alkaloid was not allowed to boil, but was maintained at a temperature of 140° C. in a current of hydrogen for several hours, to remove water and traces of ammonia. In a second experiment 500 grams of the piturie gave 12·34 grams of alkaloid, or 2·47 per cent., when distilled in a current of hydrogen. The piturie did not contain any non-volatile alkaloid.

The alkaloid when freshly prepared is clear and colourless, but with access of air rapidly becomes yellow, and finally brown, especially when exposed to the sunlight. In a sealed tube one specimen remained unchanged during eight months. It is soluble in all proportions in water, alcohol, and ether, yielding colourless solutions. On paper it produces a greasy stain, which disappears after a time. It is just a little heavier than water, a drop of it sinking slowly to the bottom of a vessel of distilled water.

When freshly prepared its smell is very like that of nicotine; afterwards, when darkened in colour and thickened in consistency, the odour is more like that of pyridine. It is volatile at ordinary temperatures, its vapour forming a dense fog with hydrochloric acid. Its vapour irritates the mucous membranes very much, and when working with it induced violent headaches. The taste is acrid and pungent, and very persistent.

The alkaloid neutralizes acids completely; but the neutral solutions of acetate, sulphate, and hydrochloride all become acid on evaporation from the loss of alkaloid. Oxalic acid is the only acid which yields a crystalline salt; but this is more or less mixed with free acid, from the loss of alkaloid by volatilization, an acid salt mixed with free oxalic acid being left. The acetate, sulphate, and hydrochloride, when kept over strong sulphuric acid, dry up into hard, brittle, transparent, varnish-like substances, without the slightest trace of crystallization, even after standing for months. All these compounds are very hygroscopic, especially the sulphate, and are very readily soluble in alcohol.

Neither concentrated hydrochloric acid nor nitric acid changes the colour of the alkaloid in the cold, but when warmed, hydrochloric acid imparts a slightly reddish colour, and nitric acid turns it yellow. Concentrated sulphuric acid turns it brown after some time, immediately when warmed.

Platinic chloride does not precipitate an aqueous solution of the alkaloid (1:100 aq:) so long as the alkaloid is in excess, but when the solution has become neutralized, the addition of another drop of platinic chloride throws down a slight yellowish flocculent precipitate, which dissolves on heating, but does not reappear on cooling; if a larger quantity of the platinic chloride be added, the precipitate still dissolves on the application of heat, but on cooling reappears in a crystalline condition.

In a solution of 1 part of the hydrochloride of the alkaloid to 50 of water, a precipitate similar to the above is thrown down, and if heated, a part redissolves, the undissolved portion turns to an orange-yellow colour and becomes crystalline—the dissolved salt also crystallizes only on cooling. Under the microscope the crystals appear to have the form of the octahedron, or combinations of that with other forms belonging to the cubical system. More dilute solutions of the hydrochloride are not precipitated by platinic chloride.

In an aqueous solution of 1 part of the alkaloid to 100 water,

Mercuric chloride throws down a white cheesy precipitate insoluble in excess of the precipitant.

Copper sulphate a light green precipitate insoluble in an excess of the alkaloid.

A few drops of gold chloride give a reddish white precipitate, which disappears on shaking; a larger quantity gives a persistent flocculent reddish white precipitate.

Tannic acid gives a greyish white precipitate, easily soluble in hydrochloric acid.

The double iodide of mercury and potassium gives a heavy white crystalline precipitate.

The alkaloid behaves very like nicotine with picric, phosphomolybdic and metatungstic acids; the addition of picric acid throws down a yellow precipitate soluble in hydrochloric acid.

Phosphomolybdic acid forms a yellowish white amorphous precipitate, insoluble in cold dilute hydrochloric acid, easily and completely dissolved on warming.

The precipitate with nicotine is a dirty yellowish white, amorphous, insoluble in cold dilute hydrochloric acid, soluble when warmed, but apparently not so readily as is the precipitate from the piturie alkaloid, some white flakes being left undissolved.

Metatungstate of sodium forms with both piturine and nicotine a white amorphous precipitate, soluble only in much dilute hydrochloric acid when warmed.

When iodine dissolved in ether is added to an ethereal solution of the alkaloid the fluid becomes brownish red and turbid; after a short time yellowish red needles are deposited, the mother liquor being yellow; these crystals are easily soluble in alcohol, yielding a brownish red solution; when the alcoholic solution is evaporated at the ordinary temperature, indistinct needles and oily drops are left behind.

When this alcoholic solution is treated with caustic soda in the cold, a smell similar to that of iodoform is emitted, not that of the alkaloid; from the nicotine compound nicotine is liberated, according to Wertheim (Watt's 'Dictionary of Chemistry,' vol. iv., p. 47).

The iodine compound of piturie melts at about 110° C., that of nicotine at 100° C. (Watt's 'Dictionary of Chemistry,' vol. iv., p. 47).

From coneine piturine is distinguished by its aqueous solution not becoming turbid on heating nor by the addition of chlorine water. It differs from aniline by not being coloured by chloride of lime; it differs from picoline in specific gravity (picoline being only ·9613 at 0° C.); from pyridine by its reaction with copper sulphate, the precipitate $Cu(OH)_2$ produced by pyridine with copper sulphate redissolves in an excess of the precipitant; and it appears to be distinguished from nicotine by its reactions with platinic chloride, gold chloride, iodine and mercuric chloride, also by Palm's test. According to Palm (*Russische Zeitschrift für Pharmacie*, i., 4, and Husemann's 'Pflanzenstoffe'), nicotine when gently warmed with a little hydrochloric acid of 1·12 sp. gr. turns violet and on the addition of a little strong nitric acid the colour changes to a deep orange. The only sample of nicotine to be obtained in Sydney yielded the latter part of the above test very well; the orange being very stable, the violet colour was not so well marked. The piturine does not change colour at all, but when more heat is applied it becomes yellow.

The Composition of the Alkaloid.

To determine the composition of the alkaloid, the carbon and hydrogen were estimated in the usual way by combustion with lead chromate; the nitrogen by the soda-lime process; the ammonium chloride left after the evaporation of the excess of hydrochloric acid was titrated with decinormal solution of silver nitrate.

The alkaloid for the determination of the carbon, hydrogen, and nitrogen was taken from two different specimens prepared from two different supplies of the piturie, but in both cases the boiling points were the same, viz., 243° to 244° C.

To prevent oxidation, the alkaloid was enclosed in the combustion bulbs immediately after its preparation.

The results obtained were as follows:—

	I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Carbon . .	76·63	76·64	....	....	lost.	76·53	....	76·46
Hydrogen .	8·49	8·46	....	....	8·52	8·51	....	8·41
Nitrogen. .	....	....	14·80	15·00	....	....	15·01	....

The average of these eight analyses is—

Carbon	76·56
Hydrogen	8·48
Nitrogen	14·94

And the relative proportions when calculated in the usual way are—

Carbon	5·98
Hydrogen	7·96
Nitrogen	1·00

or very nearly 6 : 8 : 1.

The formula would therefore be C_6H_8N, which requires—

		Theory.	Found.
C_6	= 72 =	76·59 per cent.	76·56 per cent.
H_8	= 8 =	8·51 „	8·48 „
N	= 14 =	14·90 „	14·94 „
	94	100·00	99·93

To confirm this formula a platinum double salt was prepared in the usual manner. The crystals so obtained were orange red octahedra, fairly soluble in warm water, but very easily soluble when even a trace of the free alkaloid is present; partly soluble in alcohol, but insoluble in ether.

To ensure as far as possible uniformity of composition, the platinum salts were always prepared from the same portion of alkaloid with the same solution of platinic chloride, and as much as possible under the same circumstances; notwithstanding this, the percentages of platinum and of chlorine obtained were never the same for the salts prepared at different times, neither did they fit in or correspond with the above-mentioned formula. The amount of chlorine was too small for the usual proportion of 1 Pt to 6 Cl met with in the normal double salts of platinum; in some cases it was even less than 1 : 5.

The amount of platinum was determined in twenty-three cases upon salts prepared at ten different times, but from the same substance and with the same platinic chloride; the amount of Pt varied from 34·15 per cent. to 38·40 per cent.; seven analyses yielded between 35·35 and 35·55 per cent. Pt. Nine determinations of chlorine were made, and they varied from 31·32 to 36·86 per cent. Cl.

The platinum salt is therefore clearly not of uniform composition, or else very unstable; it undergoes decomposition with loss of chlorine during evaporation, even when conducted under the desiccator without the aid of heat.

The mercuric chloride double salt, prepared by adding an excess of saturated solution of mercuric chloride to a solution of the hydrochloride of the alkaloid, crystallized well in rhombic plates and prisms; the double salt was crystallized from boiling water, dried at 100° C., and the amount of mercury and chlorine determined in it.

Two analyses gave—

	I.	II.	Mean.
Mercury .	63·26 per cent.	63·09 =	63·175
Chlorine .	24·60 „	24·64 =	24·620

The mean results calculated in the usual manner come to 1·00 Hg : 2·1955 Cl, or 5 Hg : 10·9775 Cl, or very nearly 5 Hg : 11 Cl., which would fit to the formula

$$(C_6H_8N)_2HCl + 5HgCl_2$$

which requires 63·31 per cent. Hg and 24·72 per cent. Cl, while the corresponding compound of nicotine

$$C_{10}H_{14}N_2,HCl + 5\,HgCl_2$$

would require 64·37 per cent. Hg and 25·15 per cent. Cl.

Besides nicotine is said to form under the same circumstances a double salt containing 4 $HgCl_2$ instead of five molecules of $HgCl_2$. (*Vide* Watt's 'Dictionary of Chemistry,' vol. iv., p. 47.)

The above two analyses appear to make it probable that the true formula of the alkaloid is $(C_6H_8N)_2$ or $C_{12}H_{16}N_2$, *i.e.* double that yielded by its ultimate analysis, but much importance cannot of course be attached to such a compound as $(C_6H_8N)_2HCl + 5HgCl_2$, in which the amount of alkaloid present is so very small.

0·2986 gram of the alkaloid required 18·5 c.c. $\frac{1}{10}$ normal sulphuric acid, a corresponding amount to that required by nicotine, to form $(C_{10}H_{14}N_2)_2\ H_2SO_4$; the molecular weight of nicotine being 162, 0·0162 × 18·5 = 0·2997 instead of 0·2986.

MYROXYLON PERUIFERUM, LINN. F.[*]

BY THEODOR PECKOLT.

It was at the suggestion of the late Daniel Hanbury that this tree might afford balsam of Peru, that the investigation, the results of which are herein described, was undertaken.

Myroxylon peruiferum is closely allied to *M. Toluiferum*, differing chiefly in its smaller leaflets containing elongated pellucid vesicles, and in the smaller flowers. It is found in Tropical America from the south of Mexico to Peru, and even as far south as the Province of Rio Janeiro where, according to Martius, it is known as the "Oleo vermelho," *i.e.*, red oil; in the Provinces of Minas and Espirito Santo it is called "Balsamo."

It is a large tree, and indeed one of the most important representatives of the primeval forests, often reaching a height of 25 metres and a diameter of 6 to 6½ metres. It is easily recognized at a long distance by its crown of shining green leaves, decked in August with small white jasmine-scented flowers, and in December by the singular one-seeded winged pods. It prefers moist mountain valleys, giving place at an altitude above 200 metres to the allied *Myrocarpus fastigiatus*, Fr. Allem, the "Oleo pardo" or "Cabureiba" of the Brazilians.

As it grows only in rich soil its presence in the forest is considered as an indication of the fertility of the soil, and consequently of its fitness for cultivation. Every part of the tree is used by the natives. The leaves yield a much esteemed, pleasantly flavoured tea. The pods contain, in a cavity surrounding the seed, a small quantity of a pale, yellowish, aromatic oleoresin, which is carefully collected and preserved in the nuts of *Cocos flexuosa*, and highly prized under the name of "Anguay do Guaiani," or by the Portuguese as "Balsamo do Espirito Santo." This product rarely enters commerce. The bark is often used as a vulnerary and as a tea for pulmonary affections. The bark of the root is considered stronger and is used in syphilis. The wood has a reddish-brown colour and an odour resembling a mixture of turpentine and balsam of Peru, the duramen being of a darker red and a more powerful odour. It is easily polished and is used for furniture or by the foresters for water wheels, waggon axles, and especially for situations where it is exposed to the air; in moist soil, however, it soon rots. It yields also a hard charcoal much prized by smiths.

The leaves have a weak balsamic odour; ten kilograms afforded on distillation 5·603 grams of an ethereal oil of weak but agreeable, yet peculiar odour; its specific gravity was 0·874 at 14° C.

In order to ascertain if the trunk would yield balsam of Peru, a large tree about a metre in diameter and 20 metres in height was selected, and the bark on two sides was beaten with the back of an axe to loosen it from the wood. After four days the loosened bark was charred by the application of lighted torches and the bared spots under the bark were covered with linen rags, and when these had become of a brown colour they were removed and replaced by fresh ones. The rags coloured with a brownish oil gave, when pressed, scarcely a drop of balsam, and were extracted with water at a gentle heat.

Martius states in his works that it is scarcely probable that the balsam floats at the top of the water; but it is so, so long as the liquid is heated, and some must be driven off during the process. When the liquid is cooling the greater proportion of the balsam sinks to the bottom; but still about one-third remains suspended in the water, which, when the vessel is quite cold, collects at the bottom. This balsam has a weaker odour than the heated and cooled balsam.

As the tree was half a mile from the author's dwelling the rags were changed only every morning and evening, being brought home in a vessel filled with water. After twelve days there was obtained in this way 230 grams of a dark brown balsam of specific gravity 10·31 at 17° C., having a pleasant odour between that of benzoin and vanilla, whilst the balsam of Peru of commerce has a less pleasant odour and has a specific gravity of 1·150 to 1·160 at 17° C.

Pods.—Of the pods it was not possible to obtain a quantity sufficient for the distillation of an ethereal oil. One hundred grams of the pods treated by various solvents yielded to ether 16·8 grams of a colourless balsam of an agreeable odour, soluble in alcohol, and in liquor potassæ giving immediately a magnificent red coloration. The pods exhausted by ether gave up to absolute alcohol 6·1 gr. of a pleasantly smelling soft resin, insoluble in alkalies, and 1·05 of an odourless resinous acid, soluble in alkalies, 19 grams of starch and small quantities of albumin, glucose, pectin, etc.

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[*] Abstract of papers in the *Zeitschrift Œsterr. Ap. Ver.*, 1879, pp. 49, 145, 426, 441, 457; 1880, p. 130.

Bark.—The bark in the fresh state is smooth, of a grey-green colour externally, and clear brown within; it is 8 to 10 millimetres thick in old trunks, and has a very pleasant balsamic odour, most of which disappears on drying. The bark distilled with water yielded a milky distillate of an agreeable cinnamon-like odour. From this liquid a heavy oil, sp. gr. 1·017, separated after some time, falling to the bottom of the vessel in pearly drops. The oil when freed from water was yellow and transparent, and had much the appearance of essential oil of almonds freed from prussic acid, and was also similar in odour, but weaker. It had a sharp burning balsamic taste; 36 kilos of the bark yielded only 30 grams of sp. gr. 1·17 at 13° C. of the oil after three distillations, for the oil is only separated with difficulty from the bark. In another experiment, made by the employment of a steam heat on a partially dried bark, the oil was more easily and quickly obtained, but the yield of oil was less, and the sp. gr. at 15° 1·139. The oil is easily soluble in ether, chloroform and absolute alcohol, 1 part requiring 30 parts of spirit of wine at 28° Cartier, 10 parts of alcohol at 36° Cartier and 980 parts of water for solution.

When the bark was dried in the air and in a shady place and afterwards powdered and submitted to distillation, instead of yielding an oil heavier than water it afforded from the same quantity only 1·688 gr. of a clear yellow light oil of sp. gr. 0·924 at 17° C. This oil in a short time assumed a brownish tint. In the fresh bark 1000 grams were found to yield 0·9 gram of an ethereal oil, 4·6 of crystallized myroxylin, 9·7 gr. of cinnamic acid, 5·9 per cent. of tannic acid, 151·9 of resin, 5·5 per cent. of a waxy substance, besides balsamic, bitter, and a tasteless and an odourless extractive, albumen, glucose, pectin, etc.

Wood.—The sawdust obtained from cutting up the timber of this useful tree is thrown away to the extent of millions of kilograms, and could better be turned to account for technical purposes than the wood itself. It has a brownish colour and when fresh a strong odour like that of a mixture of balsam of Peru and turpentine. It burns easily when brought into contact with a clear but sooty flame, giving off a pleasant odour and leaving a white ash. As the results of several analyses it was found to yield as the principal constituents in 1000 grams 4·4 ethereal oil, 4·4 crystallized myroxylin, 5·1 balsam, 9·5 of an odourless soft resin, 31·4 of an acid resin, 0·09 gr. of benzoic acid; besides traces of gallic and tannic acids, a red colouring extractive and inorganic matter, fibrous tissues, etc.

The ethereal oil is of a pale yellow colour, or after repeated distillation entirely colourless. It has a pleasant aromatic sassafras-like odour; and a burning aromatic taste, and is neutral to test paper.

When treated with sulphuric acid and bichromate of potassium it yields on distillation, besides a few drops of oil, a distillate containing butyric and valerianic acids. When submitted to the action of a mixture of nitric and sulphuric acids it gives off a penetrating odour, and 1 gram of oil affords 0·600 gr. of a brittle resin, with a musky odour which it retains for a long while when exposed to the air; this resin might probably be used with advantage for sachet powder, pastilles, etc.

The acid resin obtained from the wood was found on further examination to be a complex body consisting of five acid resins, a neutral resin and a small quantity of myroxylin.

Myroxylin is obtained in the largest quantity from the bark, but the preparation and purification of the crystals is very troublesome. The best method of obtaining the crystals is as follows:—The bark, dried in the air, is exhausted with alcohol of sp. gr. 0·865, and the liquid filtered hot and the filtrate allowed to cool, when white flocks of a waxy matter are deposited. The alcoholic solution filtered from the wax, is then evaporated by distillation, until it no longer gives off the odour of alcohol; then treated with boiling distilled water to remove resin, the clear solution precipitated with neutral and afterwards with basic acetate of lead, the precipitates removed by filtration, the lead precipitated by dilute sulphuric acid, and then by sulphuretted hydrogen; lastly, the liquid filtered and evaporated to a syrupy consistence and allowed to crystallize in a cool place.

Another method is by exhausting the sawdust of the wood with bisulphide of carbon, evaporating by distillation and separating the resinous oil which adheres to the conglomerated mass of crystals left in the retort, and purifying them by solution in boiling alcohol and recrystallization.

The acicular crystals are odourless and colourless, readily soluble in chloroform and bisulphide of carbon, less in ether and boiling alcohol of 80 per cent., and with difficulty in cold alcohol, and insoluble in cold or boiling water. It is a neutral substance, uniting neither with acid nor bases, and does not appear to be a glucoside. It would seem to be a chemically indifferent crystalline resin, and resembles in many points the myroxocarpin of Stenhouse.

When compared with true balsam of Peru, the balsam obtained from *M. Peruiferum* exhibits the following differences:—

Sp. gr. 0·160. *M. Pereira.*	Sp. gr. 0·955. *M. Peruiferum.*
Taste warming to the tongue; then burning the throat; bitter and aromatic; odour agreeable, like vanilla.	Taste slightly pungent, but not warming: aromatic and astringent; odour aromatic.
Yields a volatile oil when distilled with water.	Gives only traces of a volatile oil.
Mixes with chloroform in all proportions.	Acts in the same manner, but deposits a powdery precipitate on standing.
Dissolves in six parts of alcohol of 90 per cent., and gives, after a time, a fawn-coloured deposit.	Soluble in alcohol of 90 per cent. in all proportions, and forms no deposit.
Ether, benzin and petroleum spirit dissolve only the yellow oil (cinnamein).	Insoluble in these three liquids.
Bisulphide of carbon only partially dissolves it, giving a yellow solution.	Bisulphide of carbon partially dissolves it, forming a clear light brown solution.
Castor oil takes up 15 per cent.	Mixes with castor oil in all proportions.
Equal volumes of balsam and concentrated sulphuric acid mixed give a stiff mixture which, kneaded with water, yields a brittle resin, which is not sticky when pressed between the fingers.	The same treatment causes the formation in twelve hours of a gelatinous mass of a reddish-black colour, which kneaded with water colours it dirty green; the mass, after washing, is sticky, and of greasy consistence.

In many points the balsam from the wood of *M. Peruiferum* agrees with balsam of Peru, and the author thinks it could for many medicinal purposes replace that more expensive drug, and might be distinguished in commerce as Brazilian balsam. He states that he has used it with remarkable success as a balsam for wounds and in the treatment of scabies.*

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* The fact of its mixing readily with castor oil in all proportions would give it an advantage over the balsam of Peru for use in stimulating pomades.

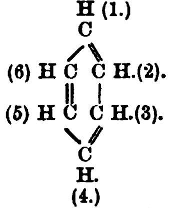
AZO DYES.*

BY GEORGE TATE, PH.D.

The aniline dye industry, which sprang into existence on the discovery of mauveïne by Perkin in 1856, must be regarded as entirely the creation of the scientific chemist. The chemical investigator in his endeavours to solve interesting and important chemical problems has discovered new colouring bodies, or, in attempts to determine the constitution of natural dyes has been enabled to introduce new and more economical methods for their production. I may instance to you, 1st, the discovery of dioxyanthraquinone, by Graebe and Liebermann in 1868, as being identical with alizarine, the dye of the *Rubia tinctoria*, the artificial dye having now almost entirely taken the place of the natural product, and further, the discovery by Professor Baeyer, in seeking to prove the constitution of indigo, of a new, technically practicable, synthetic method for the preparation of this valuable dye.

The various beautiful and gorgeous colours which have within the last twenty years come so extensively into use are, from the chemical point of view, derivatives of benzol, C_6H_6.

The author next explained the constitutional formulæ, or graphic representations of the arrangement of the atoms building up the molecules, of a few of the simple organic compounds; serving as an introduction to a description of the ring-formula proposed by Kekulé to explain the various transformations which benzol (benzene) and its derivatives are capable of undergoing.



It was then shown how by substituting one hydrogen atom in benzol by an other univalent element or univalent compound radicle or group, such as NO_2, NH_2, etc., the monosubstituted benzol (benzene) compounds were obtained.

Nitrobenzol, $C_6H_5NO_2$, amidobenzol or aniline, $C_6H_5NH_2$, methylbenzol or toluol, $C_6H_5CH_3$, phenol, C_6HOH, were given as the chief of these substituted benzols.

Kekulé's formula was then made use of to explain the fact of there being three classes of disubstituted benzols, known as the ortho, meta and para compounds, the ortho being obtained when the H atoms marked 1 and 2, meta when 1 and 3, para when 1 and 4 were replaced.

In the ortho series were classed:—Ortho-dinitrobenzol, $C_6H_4(NO_2)_2$, orthodiamidobenzol, $C_6H_4(NH_2)_2$, phthalic acid, $C_6H_4(COOH)_2$, orthonitrotoluol, $C_6H_4\left\{\begin{matrix}CH_3\\NO_2\end{matrix}\right.$, etc.

In the meta series:—(Meta-) dinitrobenzol, $C_6H_4(NO_2)_2$ (meta-) diamidobenzol or m-phenylenediamine—

$$C_6H_4(NH_2)_2;$$

m-nitrotoluol, $C_6H_4\left\{\begin{matrix}CH_3\\NO_2\end{matrix}\right.$, isophthalic acid, $C_6H_4(COOH)_2$, resorcine, $C_6H_4(OH)_2$, etc.

In the para series:—Para-dinitrobenzol, $C_6H_4(NO_2)_2$, terephthalic acid, $C_6H_4(COOH)_2$, etc.

The preparation of several of these derivatives was briefly sketched:—

Nitrobenzol, obtained by treating benzol with nitric acid; aniline from nitrobenzol by reduction in acid solution, *e.g.*, by acetic acid and iron.

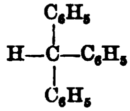
M-dinitrobenzol by the action of nitric and sulphuric acids on benzol, the meta compound being the chief constituent of the product.

Diamidobenzol, obtained by reduction of the corresponding dinitrobenzol, the meta from the meta, the para from the para.

The author then continued—

The so-called tar colours, derivatives of benzol, may be divided into four classes.

In the first class we have the derivatives of triphenylmethane—



$$\begin{matrix} & C_6H_5 & \\ & | & \\ H- & C & -C_6H_5 \\ & | & \\ & C_6H_5 & \end{matrix}$$

These are rosaniline (the base of magenta), aurine, rosolic acid, malachite green, the phthaleines (eosine, fluoresceine), etc.

In the second class, the azo dyes, saffranine, aniline yellow, chrysoidine, etc., derivatives of azobenzol, $C_6H_5-N=N-C_6H_5$.

In the third class, nitro-derivatives of phenol (C_6H_5OH), or naphthol ($C_{10}H_7OH$), *e.g.*, picric acid and naphthaline yellow.

In the fourth class, derivatives of anthraquinone, $C_{14}H_8O_2$, *e.g.*, alizarine.

The azo dyes have, on account of the interesting reactions by which they are formed, as well as of their practical utility, especially attracted the attention of scientific chemists. They are so called from being substituted derivatives of azobenzol (the product of the reduction of nitrobenzol in an alkaline solution), though not usually prepared from this body.

The formation of aniline I have already described. Benzol is nitrated and the nitro-benzol reduced in acid solution; for the production of azo dyes this or an amido compound is transformed into a so-called diazo salt. The diazo compounds, as a type of which diazo-benzol, $C_6H_5-N=N$, may be cited, form an important class; they are capable of undergoing many and interesting changes, and the study of these reactions has greatly advanced theoretical chemistry, and in leading to the discovery of the azo-derivatives has caused a new chemical industry to spring up. They were discovered by P. Griess, in 1860, and are obtained by the action of nitrous acid, HNO_2, on an aniline salt.

$$\underset{\text{Aniline nitrate.}}{C_6H_5NH_2.NO_3H} + HNO_2 = \underset{\text{Diazobenzol nitrate.}}{C_6H_5-N=N-NO_3} + 2H_2O.$$

Diazobenzol, $C_6H_5N_2$, does not exist in the free state, it is a univalent compound basic radicle and can, like ammonium, NH_4, replace hydrogen in acids to form salts, *e.g.*, the nitrate, the sulphate, $C_6H_5N_2.SO_4H$, the chloride $C_6H_5N_2.Cl$. The salts are obtained by passing nitrous acid into cold aqueous solutions of the corresponding aniline salts or by adding nitrite of potassium to solutions of aniline in excess of the acid whose diazo salt the operator wishes to obtain. The salts are obtained as precipitates on the addition of alcohol and ether.

Change of Diazo Salts with Aniline into Diazoamido Compounds.

When a diazo-salt, such as the nitrate, is brought in contact with aniline a change takes place represented by the equation:—

$$\underset{\text{Diazo nitrate.}}{C_6H_5N_2.NO_3} + \underset{\text{Aniline.}}{H_2N.C_6H_5} =$$

$$\underset{\text{Diazoamido-compound.}}{C_6H_5N_2-HN-C_6H_5} + HNO_3.$$

The new body is void of basic properties and can manifestly be produced by allowing nitrous acid gas to act on an excess of free aniline dissolved in alcohol. In contact with aniline the above body forms one, isomeric, but with entirely different properties, both physical and chemical.

$$\underset{\text{Diazo-amido-benzol.}}{C_6H_5N=N \vdots NH-C_6H_5} + \underset{\text{Aniline.}}{C_6H_5NH_2} =$$

$$\underset{\text{Amido-azo-benzol.}}{C_6H_5N=N-C_6H_4NH_2} + C_6H_5NH_2.$$

In the neutral body diazoamidobenzol, two benzol rings are connected by three nitrogen atoms; in the basic amidoazobenzol by two, only. We may regard the molecule as separating at the dotted line; the diazo group then becomes substituted for H in the ring of the aniline molecule, aniline being again formed. A minute quantity of aniline is thus capable of effecting the change.

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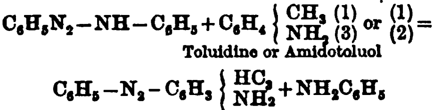
* Abstract of a paper read before the Liverpool Chemists' Association, March 3, 1881.

Amidoazobenzol, $C_6H_5-N=N-C_6H_4NH_2$, forms the chief ingredient of aniline yellow; it is azobenzol where one H is substituted by the amido group, NH_2. It is manifest, however, that, according to our theory, at least three isomeric amidoazobenzols could exist; three, according to the position of the H atom in aniline, replaced by the diazo group, with respect to the amido group NH_2, ortho, meta and para. We find, however, that only the para compound is formed, *i.e.*, the diazo group endeavours to place itself in the para position (1·4) to NH_2; in the same way that the substituent nitro group placed itself in the meta position to the nitro group already present, forming metadinitrobenzol, or in the ortho and para positions to the methyl group when forming nitrotoluol. Therefore if, in the above action, we substitute para-amidotoluol $C_6H^4\left\{\begin{matrix}CH_3\\NH_2\end{matrix}\right.$ for aniline we shall get no action, whereas with the corresponding meta or ortho compound (where the place opposite (1·4) the NH_2 is free to be substituted) a dye is formed thus:—



$$C_6H_5N_2-NH-C_6H_5+C_6H_4\left\{\begin{matrix}CH_3 & (1)\\ NH_2 & (3)\end{matrix}\right. \text{ or } \begin{matrix}(1)\\(2)\end{matrix}=$$

Toluidine or Amidotoluol

$$C_6H_5-N_2-C_6H_3\left\{\begin{matrix}HC_3\\NH_2\end{matrix}\right.+NH_2C_6H_5$$

aniline being set free.

One of the most important dyes of the class which we are considering is *Chrysoidine*, the base of which is diamidoazobenzol.

It was first obtained by Caro in December, 1875, by allowing metadiamidobenzol (metaphenylenediamine) to act on diazoamidobenzol. The formation of this base is exactly analogous to that of aniline yellow or that of a dye from orthotoluidine; only the meta compound will react, the same law of substitution holding good in this case also.

$$C_6H_5-N=N-NH\,C_6H_5+C_6H_4(NH_2)_2=$$
$$C_6H_5-N=N-C_6H_3(NH_2)_2+NH_2C_6H_5$$

O. Witt discovered this new body in the following January, independently of Caro. He found that a diazo salt reacted directly with phenylenediamine with production of diamidoazobenzol.

$$C_6H_5-N=N.NO_3+C_6H_4(NH_2)_2=$$

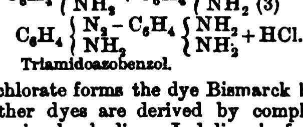
Diazobenzol nitrate

$$C_6H_5-N=N-C_6H_3(NH_2)_2+HNO_3$$

as a blood red precipitate on mixing aqueous solutions of the above reagents.

Chrysoïdine of commerce is the hydrochlorate of the base; it is soluble in water and dyes silk and cotton wool orange yellow, and like all azo dyes without the aid of a mordant.

Manchester or Bismarck Brown is formed by a reaction exactly similar to that expressing the formation of chrysoïdine, metaphenylene being used in place of aniline. Nitrous acid is allowed to act on an excess of a salt of this base; a diazo salt is thus formed, which with the excess of the diamidobenzol (meta) gives a triamidoazobenzol:—



$$C_6H_4\left\{\begin{matrix}N_2Cl\\NH_2\end{matrix}\right.+C_6H_4\left\{\begin{matrix}NH_2 & (1)\\NH_2 & (3)\end{matrix}\right.=$$
$$C_6H_4\left\{\begin{matrix}N_2-C_6H_4\left\{\begin{matrix}NH_2\\NH_2\end{matrix}\right.\\NH_2\end{matrix}\right.+HCl.$$

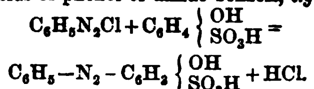
Triamidoazobenzol.

The hydrochlorate forms the dye Bismarck brown.

Many other dyes are derived by complex reactions from these simpler bodies. Induline is formed by the action of the hydrochlorate of aniline on amido-azobenzol.

Saffranine, $C_{21}H_{20}N_4.HCl$, is a valuable dye, and replaces saffron.

The tropæolines are obtained like chrysoïdine, by using sulphonic acids of phenol or amido benzols, *e.g.*:—



$$C_6H_5N_2Cl+C_6H_4\left\{\begin{matrix}OH\\SO_3H\end{matrix}\right.=$$
$$C_6H_5-N_2-C_6H_3\left\{\begin{matrix}OH\\SO_3H\end{matrix}\right.+HCl.$$

In the same way resorcine gives rise to the production of a dye.

Biebrich Scarlet is derived from a double azo compound, $C_6H_5.N_2.C_6H_4N_2.C_{10}H_7O$, obtained by diazodizing amidoazobenzol and treating the salt with naphthol. The sodium salts of the mono and disulphonic acids form the commercial dye.

Recognition of Azo Dyes.—The action of mild reducing agents gives us a ready means of distinguishing a dye of the class under consideration from the triphenylmethene derivatives.

Bodies of both classes, when subjected to the action of zinc and a weak acid (acetic acid), lose their colour; azo bodies give under such treatment hydrazo bodies, triphenylmethan dyes, *e.g.*, magenta or rosolic acid give so-called leuko compounds.

Hydrazo bodies are readily reoxidized, atmospheric air being sufficient to restore the azo group, with production of colour. Leuko compounds, on the contrary, require moderately strong oxidizing agents to reform the dye With chrysoïdine base the change may be expressed thus:—

$$C_6H_5-N=N-C_6H_3(NH_2)_2+H_2=$$
$$C_6H_5-NH-NH-C_6H_3(NH_2)_2.$$

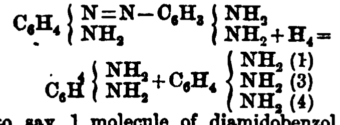
Diamidohydrazobenzol.

One atom of oxygen abstracts two H atoms the double bond between the two N atoms being restored.

If the reduction of a hydrazo compound is continued further, with strong reducing agents, *e.g.*, tin and hydrochloric acid, the molecule is split up into two, the connection between the two nitrogen atoms connecting the benzol rings entirely dissolves, and in the case of chrysoïdine, aniline and triamidobenzol are formed, thus:—

$$C_6H_5-N=N-C_6H_3(NH_2)_2+H_4=$$
$$C_6H_5NH_2+C_6H_3(NH_2)_3$$

In the case of Bismarck brown:—



$$C_6H_4\left\{\begin{matrix}N=N-C_6H_3\left\{\begin{matrix}NH_2\\NH_2\end{matrix}\right.\\NH_2\end{matrix}\right.+H_4=$$
$$C_6H^4\left\{\begin{matrix}NH_2\\NH_2\end{matrix}\right.+C_6H_4\left\{\begin{matrix}NH_2 & (1)\\NH_2 & (3)\\NH_2 & (4)\end{matrix}\right.$$

that is to say, 1 molecule of diamidobenzol and 1 of triamidobenzol, where the three amido groups occupy the positions 1, 3, 4.

In this way the probable mode of formation of a dye may be determined.

Certain of the dyes may be distinguished from each other by the characteristic changes in colour they undergo on the addition of a strong acid. Saffranine, for example, gives a blue coloration.*

The dyes I have described are derived from azobenzol by substitution in the benzol-ring. They give rise to dyes where radicles are substituted for hydrogen of the amido group, NH_2. Chrysoïdine gives on heating to 100° with benzylchloride, C_7H_7Cl, a dibenzyl chrysoïdine $C_{12}H_{10}N_4(C_7H_7)_2$

An increase in the molecular weight causes a change in the tone of a dye; but with increase of basicity or salt-forming capacity we obtain an increase in tinctorial power. Thus in Bismarck brown, where the three amido groups give the molecule a very weakly tribasic character, the tinctorial power is greater than that of chrysoïdine, where only two such groups are present; this again is a stronger dye than aniline yellow, *i.e.*, H in ammonia substituted by an azobenzol group (which like phenyl, C_6H_5, weakens the alkaline nature of ammonium, a marked distinction, by the way, from the effect produced by the substitution of ethyl or methyl in ammonia, $NH_2C_2H_5$ being capable of expelling ammonia from ammonium salts, whereas aniline is weaker in this respect than ammonia).

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* On this point see J. Spiller "On the Identification of Coal-tar Colours," *Report Brit. Assoc.*, 1880, p. 542, and *Chemical News*, vol. xlii., p. 191.—Ed. Pharm. Journ.

In England, where comparatively few chemists work in the domain of organic chemistry, the aniline dye industry has attained but little importance; on the Continent, fostered by the researches of an army of workers, it bids fair to become one of the first chemical industries.

THE COMMERCE OF GUM ARABIC AT TRIESTE.*

The commerce of gum arabic at Trieste has for a number of years past assumed very large proportions. Mr. L. Ordega, Consul-General of France at Trieste, has furnished, under date of August 10, 1880, an interesting account of the total movement, as well as a list of the thirty-two grades into which all the gum arabic arriving from Africa is divided.

The total importation and exportation during the years 1877, 1878 and 1879 was as follows:—

	Importation.	Exportation.
1877 . .	2,695,100 kilos.	2,707,600 kilos.
1878 . .	2,726,300 „	2,796,400 „
1879 . .	4,638,400 „	3,080,900 „

The gums are divided into the following thirty-two grades,† of which the mean prices per 100 kilos have the following ranges [in American money, calculated by Ed. N. R.]:—

		Dollars.		Dollars.
1.	(Gum) Arabic, white, No. 1, a	74·76	to	75·60
2.	Ghizira, white, No. 1, b	51·66	„	52·08
3.	Arabic, pale-yellow, No. 2, a	52·08	„	52·50
4.	Ghizira, pale-yellow, No. 2, b . . .	43·26	„	43·68
5.	Arabic, yellow, No. 3, a	42·00	„	43·26
6.	Ghizira, yellow, No. 3, b	35·70	„	36·12
7.	Arabic, superfine, choice, No. 4, a . .	32·34	„	37·76
8.	Arabic, fine, No. 4, b	29·82	„	30·24
9.	Ghizira, fine, No. 4, c	26·88	„	27·72
10.	Arabic, medium, choice, No. 4, d . .	28·56	„	28·98
11.	Ghizira, medium, choice, No. 4, e . .	20·16	„	21·00
12.	Arabic, granular, No. 5, a	24·36	„	24·78
13.	Arabic, granular, No. 5, b	21·84	„	22·26
14.	Ghizira, granular, No. 5, c	19·32	„	20·16
15.	Suakin sennāry, granular, No. 5, d .	18·28	„	19·32
16.	Suakin ordinary, granular, No. 5, e .	12·60	„	13·44
17.	Arabic, crude, granular, No. 5, f . .	29·82	„	30·24
18.	Arabic, crude, select, No. 5, g . . .	39·90	„	40·32
19.	Sennāry and Ghizira, crude, granular, No 5, h	19·78	„	20·58
20.	Gedda, No. 6, a	31·50	„	31·92
21.	Senegal, choice, No. 6, b	29·40	„	30·24
22.	Senegal, crude, No. 6, c	20·58	“	21·00
23.	Arabic, crude, No. 7, a	28·56	„	29·40
24.	Arabic, crude, without dust, No. 7, b .	32·76	„	33·60
25.	Arabic, crude, granular, No. 7, c . .	33·60	„	34·44
26.	Sennāry, crude and Ghizira, No. 8, a .	19·74	„	20·16
27.	Sennāry, crude and Ghizira, without dust, No. 8, b.	19·74	„	20·16
28.	Sennāry, crude and Ghizira, granular, and without dust, No. 8, c	19·74	„	20·16
29.	Suakin, crude, No. 9	16·80	„	18·06
30.	Senegal, genuine crude, No. 10 . . .	29·40	„	29·83
31.	Damaged gums, No. 11, according to quality.			
32.	Powdered gums, No. 12, according to quality.			

The available stocks during 1877 amounted to 1,700,000 kilos; but in 1879 they exceeded 3,600,000 kilos; and even this enormous reserve was hardly sufficient to satisfy the demands from the various markets of Europe. On August 1, 1880, the stock on hand at Trieste was as follows:—

	Kilos.
Arabic	387,000
Ghizira	57,000
Sennāry	1,400
Suakin	313,000
Gedda	79,000
Total . . .	838,000

The construction of new routes has rendered the transport of the Suakin gum more easy from its place of origin to the port of debarkation. Unfortunately, certain rains, called karif in Egypt, frequently interrupt communication with Khartum; owing to this circumstance no arrivals whatever from Suakin reached Trieste during the whole of last October. The movement in gums is most active during the months of September, October and March.

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* From *Journal des Consulats*, January 1, 1881. Reprinted from *New Remedies*, March, 1881.

† Compare particularly 'Pharmacographia' [2], 235 *seq.*, where the quality and sources of the standard grades are given. There is some discrepancy between the kinds mentioned by 'Pharmacographia' and the usage among the merchants at Trieste; but this is not to be wondered at.

SYNTHESIS OF ATROPIC ACID.*

BY A. LADENBURG AND L. RÜGHEIMER.

The masterly researches of Professor Ladenburg, on the constitution of atropine and other solanaceous alkaloids, have repeatedly been mentioned in this journal. The successful synthesis of atropine from its products of decomposition, namely tropic acid and tropine has been recorded. It was only required now to find a method of producing both of these latter bodies artificially, and at that time already, Professor Ladenburg announced that he expected to solve the question. On page 2041 of the *Berichte der Deutsch. Chem. Ges.* (issued Nov. 22, 1880) the successful synthesis of tropic acid is announced.

Atropine has the composition $C_{17}H_{23}NO_3$. When this is heated with hydrochloric acid, or with baryta, it takes up one mol. of water, and is converted into a new alkaloid tropine, $C_8H_{15}NO$, and tropic acid, $C_9H_{10}O_3$ (both of which were successfully recombined, by Ladenburg, to atropine). It had previously been ascertained, however, that, if the decomposition of atropine with baryta is conducted at a temperature of 130° C., or if hydrochloric acid is allowed to act upon it, for several hours, at the same temperature, the tropic acid is itself deprived of 1 mol. of water, and is converted into $C_9H_8O_2$, which received the name of atropic acid, and into an isomer of the latter, of the same composition and termed isatropic acid. In a previous communication, Professor Ladenburg has shown that hydratropic, atrolactic, atropic, and tropic acids may be successively converted one into the other, and, to accomplish the synthesis of tropic acid, it only remained now to produce one of the three first-mentioned acids artificially.

The particular acid which Ladenburg succeeded in producing, is atrolactic acid. He started from dichlorethylbenzol, $C_6H_5.CCl_2.CH_3$, which can, itself, be formed artificially. By treating with cyanide of potassium and alcohol, two carbon nuclei were introduced, producing $C_6H_5.C.CN.C_2H_5O.CH_3$, while chloride of potassium and hydrochloric acid were eliminated. The cyanogen nucleus was decomposed by treatment with barium hydrate, whereby ammonia was eliminated, and by treatment with hydrochloric acid, separating with ether and final warming with carbonate of sodium, an ethylated atrolactic acid was obtained. This was easily converted into atropic acid by boiling with 50 parts of concentrated hydrochloric acid.

It now only remains for Professor Ladenburg to succeed in accomplishing the synthesis of tropine, and, so far as we know, there is a good prospect of his success.

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* From *New Remedies*, March, 1881.

The Pharmaceutical Journal.

SATURDAY, APRIL 2, 1881.

DRUGGISTS' CHARGES FOR DISPENSING.

Among the subjects upon which medical men are occasionally wont to inveigh against dispensing druggists, that of the charge made by them for medicine has been repeatedly dealt with in a manner that is not only unfair but calculated to mislead the public and excite an unreasonable prejudice against the druggist. Some effusive possessor of the legal qualification to practise medicine for gain, having, perchance, more leisure than practice, is periodically finding himself constrained to write to a newspaper and descant upon the enormity of druggists charging more for medicine dispensed according to a physician's prescription than the bare commercial value of the ingredients contained in the medicine.

One of the latest instances of this mistaken activity on the part of medical men is furnished by an anonymous correspondent of the *Standard*, signing himself M.D., and heading his letter with the startling title "A Thousand per Cent." The case he describes is that of a patient who had been recommended to him as deserving gratis medical advice, and for whom he had charitably prescribed an ointment consisting of twenty grains of ammoniated mercury and two and a half ounces of lard. For that ointment he states that his patient was charged eighteenpence by the chemist who made it up, and apparently with the object of making that charge appear in conformity with the sensational heading of his letter, he proceeds to state that since ammoniated mercury is quoted in the wholesale chemists' price lists at three shillings and eightpence per pound, the actual value of twenty grains of it would be less than one farthing.

With this suggestive representation of the druggist's behaviour the matter is left by the M.D., whose letter appears in the *Standard*, for the readers of that paper to draw their own conclusions, and the writer goes on to contend that the labouring classes are not entirely responsible for the great out-patient abuse associated with the metropolitan hospitals, because of the scale of charges indicated by the case he mentions as being made by dispensing druggists. He thinks that the existence of what he terms the gigantic demoralizing machine kept up by the charitable London public, which encourages the working population to take, as paupers, ointments and mixtures in their own pots and bottles, and invites them and their wives and daughters to spend half days in out-patients' rooms, is to be attributed to the exaggerated charges made by druggists for dispensing medicine ordered by medical men. If it were not for the assumed unreasonable nature of these charges, he believes that the evil custom he speaks of would grow rusty and less injurious.

As matters now stand in regard to the business of dispensing medicine we deny altogether that there is, as a general rule, any ground for the complaint that druggists' charges are unreasonably high. In judging of this matter, however, it is altogether inadmissible to take the wholesale cost of drugs, or even their retail price, as the basis upon which to determine what is a fair charge for medicine dispensed by a druggist. The intrinsic value of the ingredients in medicine often constitutes but a comparatively insignificant part of the sum that is to be regarded as fair remuneration for the work of dispensing. For the efficient performance of that work, and for the safety of the medical practitioner's patient, it is essential that the dispenser should possess a competent knowledge of his business, that in fact he should be in the same manner as the medical man a legally qualified person. To attain that position he must have been suitably educated, and for those reasons he, like the medical man, is entitled to remuneration for his skilled services upon a professional scale, altogether apart from considerations as to the intrinsic money value of the drugs which he componnds.

Medical men who, like the correspondent of the *Standard*, think that medicine should be valued according to the mere cost of its ingredients, and by allowing a rate of profit such as would suffice for groceries and haberdashery, fail to recognize, in their own interest and in that of their patients, the importance of the work to be done by the dispenser. They overlook the value of the skill that he must possess in order to judge of the quality of his drugs and to compound them in a proper and accurate manner according to directions of the prescriber.

But beyond these circumstances it must be remembered that the dispensing of medicine, though properly the function of the druggist, is so generally carried out by medical practitioners for their patients that in many instances druggists rarely or ever have a prescription brought to them, and having so little of this kind of business to do their charges must necessarily be higher than if the whole or greater part of the dispensing was carried out by them. Dr. Potter, in a letter to the *Lancet* last week, expressed the opinion that if doctors wish to see their profession advanced in true dignity and efficiency, they must cast away the miserable relic of earlier and more ignorant times, and stand forth in their true characters as physicians instead of apothecaries. He fully admitted, as very many of his colleagues do, the inexpediency of medical dispensing, and that from the druggist's point of view it is indefensible; but while regarding the practice as being some excuse for counter prescribing he did not seem to recognize the possibility of removing both causes of complaint by mutual concession and arrangement. It is not a case requiring one side or other to make the first move, or, as Dr. Potter puts it, to give way; but it is a case in which a simultaneous move on both sides must be made for their common benefit.

No doubt it is very true that if a man could buy his physic for sixpence he would not find it an economy to lose half-a-day's work in getting it for nothing; but we take it that it is rather the fear of a "doctor's bill" that induces many to have recourse to the aid offered by hospitals than the belief that druggists' charges are exorbitant. To the very same feeling also may be ascribed very much of the "counter prescribing," of which some medical men complain so loudly. The poor know well enough that often for a few pence they can obtain from the druggist a remedy for simple ailments and that it would cost them far more if they went to a doctor. If gratuitous medical treatment is to be discouraged for all that are not actual paupers, and the working classes are in this particular to be taught self-respect, the doctor's charges must be adapted to their means no less than the druggist's charges for dispensing the medicines he orders.

Whether the reform in this respect, which the writer in the *Standard* thinks so desirable, is to be best achieved by adopting a system of medical insurance such as that referred to by Mr. RADLEY in the *Standard* of last Thursday, or by other means, we will not pretend to say; but it is, we think, at least certain that one most essential condition for the realization of such a reform, and for the removal of grievances complained of by both medical practitioners and druggists, is a better mutual understanding and co-operation between these classes. Let there be an end to unprofitable talk of carrying on counter prescribing as a measure of justifiable retaliation, and to equally unprofitable criticisms upon the mode in which medical dispensing is often carried out in surgeries. The practice of counter prescribing as well as the resort to hospitals for out-patient relief, and, we may add, the growing use of patent medicines, are each and all indications that there is something out of joint in the domain of medicine. People of scanty means find themselves unable to seek the advice of a medical man because of the expense it involves, and consequently they fall back upon whichever of the three alternatives they find most convenient. Though fortunately there are not, as Dr. POTTER states, more than thirty thousand chemists and druggists in this country engaged in carrying on counter prescribing, we do not hesitate to say that the majority of those who do so would willingly unite with medical practitioners in the endeavour to exchange that part of their business for the more appropriate one of dispensing the medicines ordered by the latter.

The interests of both classes are so closely connected that there should be harmonious concert rather than the mutual recriminations that are so often heard, and if it could be arranged that the dispensing medical practitioner shook off from him what remains of the old apothecary by giving up the mortar and pill machine in favour of the druggist, there is every reason to believe that the public would be benefited by the change no less than those more immediately concerned in the arrangement.

In any case we must again enter our protest against the attempt to make druggists appear extortionate or unjust in their charges for the services rendered by them, as dispensers, to medical men and to their patients. It is probable that if the work of dispensing were more generally placed in the hands of druggists there might be a reduction in the scale of charges in certain cases or under special conditions; but whatever may be done in this direction it is essential that the dispenser should be as much considered from a professional point of view as the medical practitioner with whom he is to co-operate for the benefit of the public.

EVENING MEETING.

THE last Evening Meeting of the Pharmaceutical Society for the present Session will be held on Wednesday next, April 6, when a paper will be read on "Wanika, a New African Arrow Poison: its Composition and Properties," by Mr. A. W GERRARD. The chair will be taken at half-past eight o'clock.

PHARMACY IN NEW SOUTH WALES.

IN this colony the Pharmacy Board for carrying out the examinations has been up to the present time under the control of the Government. Now, however, that a Pharmaceutical Society has become well established, the present president of which is Mr. F. SENIOR, of Sydney, a Bill is being prepared with a view of identifying the examining body with the Society. The examinations are said to be thoroughly practical, and the diplomas of the Pharmaceutical Society of Great Britain and of the neighbouring colony of Victoria are accepted in lieu of them.

By the courtesy of a correspondent we are able to give some interesting information with respect to the conditions under which pharmacy is carried on in New South Wales. In a large representative establishment in Sydney, where four assistants are kept, from eight to ten thousand original prescriptions are copied annually. The establishment opens at 7 o'clock a.m., and the shutters are put up again at 6 p.m., which is the tea-time. After this two out of the four assistants remain on duty until 10 p.m., or 11 p.m. on Saturdays, when the establishment finally closes. On Sundays the doors only are open from 8 a.m. until 10 p.m., two assistants being on duty. The salaries commence at £2 per week, besides board and lodging (estimated at 25s.) for the first year, and advance 5s. per week each year until a maximum is reached of £3 (equal to £4 5s.) in the fifth year.

Our correspondent adds that a qualified man, provided he is of good character and has a pleasant manner, may generally secure an engagement. Besides this, opportunities for commencing business in the country districts frequently present themselves to respectable men having command of a small amount of capital.

Provincial Transactions.

LIVERPOOL CHEMISTS' ASSOCIATION.

The eleventh general meeting was held at the Royal Institution, on Thursday evening, March 17, the President, Dr. Symes, in the chair.

The minutes of the previous meeting were read and confirmed; and the following donations to the library were announced:—The current numbers of the *Pharmaceutical Journal*, from the Society; and the *Chemists' Journal*, from the President.

Mr. Arthur M. Hugill was elected a member.

Interesting communications were made on the following subjects—

On "Sweet Red Pepper," by the President; "Hydrogen Peroxide," by Alex. Watt, F.C.S., F.I.C.; "Artificially Coloured Rose Leaves," by Michael Conroy, F.C.S.

These were followed by a paper on "The History of Chemistry" (second part), by Mr. Thomas Farmer.

THE HISTORY OF CHEMISTRY FROM PARACELSUS TO JOHN DALTON.

BY THOMAS FARMER.

In my last paper you will remember I left alchemy at its zenith: all implicitly believed in it; all were sanguine of its early success. Indeed so sanguine were they in 1404, that Parliament considered it necessary to pass an Act abolishing the practice altogether, a few persons only by special licence being allowed to carry it on. It was feared that the secret of transmutation would be found out, and the happy alchemist, whoever he might be, would become too powerful for the State. Several patents were granted to persons who supposed they had discovered the art of making gold, during the reign of Henry VI. The firm belief in alchemy is well illustrated by the life of Böttgher. As a boy he was very much fascinated by the science, and after several years of hard study, probably getting tired of his failures, he one day pretended that he had discovered the philosopher's stone. He communicated with his master, Zörn, and succeeded by some means or other in making him and several others believe that he had really done so. The news spread far and wide; crowds gathered round the door to get a sight of the wonderful man, and among others came Frederick the First of Prussia, who, being in great straits for money at the time, determined to remove him to the strong fortress of Spandau, there to make an infinite quantity of gold. The young gold-cook suspected the king's intention, and did the wisest thing possible under the circumstances,—resolved on flight. He got into Wittenburg, and appealed for protection to Augustus the First, Elector of Saxony, who, being himself very short of money, conveyed Böttgher under a royal escort to Dresden, where he was very well looked after. Augustus had to leave him for a time, to visit Poland; but while there, running short of money, wrote to Böttgher asking him to send the formula, so that he might make gold to supply his wants. Böttgher, thus pressed, sent a bottle containing a reddish fluid, which he said possessed the magic properties. It is not necessary to say the experiment failed: the copper obstinately remained copper, and not a particle of gold made its appearance. On examining the instructions more closely Augustus noticed that "it should be used in great purity of heart," and remembering that he had spent the previous evening in very bad company, and was not as sober as he might have been, attributed his failure to this, went to confession, received absolution, and repeated the experiment with no better result. Augustus now became furious, and told Böttgher that if he did not make gold at once he should be hanged. Years passed away, he was not hanged, and ultimately discovered, not the conversion of copper into gold, but the conversion of clay into porcelain. His specimens pleased the elector, who erected him workshops, over the door of which these verses were inscribed:—

"Es möchte Gott der grosse Schöpfer
Aus einem Goldmacher einen Töpfer."

There is nothing more amusing than to read the alchemical literature published at this period. Everything is enshrouded with the greatest mystery. The wicked, avaricious man is ordered not to pollute the science, but to leave it for the wise and righteous. Compounds and elements are represented by plants and animals. As an example, Basil Valentine, who was remarkably fond of symbolical designs, represents the solution of a metal in an acid, by putting a lion for the acid and a serpent for the metal. The lion eats the serpent: certainly nothing could illustrate solution more simply. Metals were regarded by many as compounds of sulphur and mercury. Gold was condensed sunbeams. Metals were supposed to grow, and it was quite customary to close mines so that the contents might grow again. These instances might be multiplied without end, but they would be of no value to you, and would not serve to raise in your estimation the science which, as the most ardent alchemists said, could be distinctly traced back to Adam himself. The following remark of Whewell's may be readily applied to alchemy:—"Experience collected her stores in vain, or ceased to collect them altogether, when she had only to pour them into the flimsy folds of the lap of mysticism; who was in truth so much absorbed in looking for the treasures that were to fall from the skies, that she heeded little how scantily she obtained, or how loosely she held such treasures as might be found near her." We have now to consider a new phase of the science.

Paracelsus (1493–1541) pointed out the value of chemistry as a handmaid to medicine, and his views being very feasible caused men to turn their attention from the pursuit of alchemy to the new way pointed out—that a knowledge of the composition of bodies, necessarily furthered by alchemy, was important to the better prevention and cure of their ills. Paracelsus himself did but little, if anything, in the way of discovery and research. He mentions bismuth and zinc, and associates them with metallic bodies; makes use of sal. ammoniac and several compounds of mercury. He assumed the existence of three components of all inorganic substances, and was the first to include in the same classification animal and vegetable bodies. He held that the health of the organism depended upon the continuance of the true proportions of these constituents, while disease was caused by a disturbance of their relation. The writings of Paracelsus are as ridiculous and nonsensical as the general alchemical writing of the time. "The life of metals" is a "secret fatness;" "of pearls," "their splendour;" "of arsenic," "a mineral and coagulated poison." "The life of man is nothing else but an astral balsam, a balsamic impression, a celestial, invisible fire, an included air, and a tinging spirit of salts. I cannot name it more plainly, although it is set out by many names." Altogether he seems to have been a very peculiar man. As a boy he set out a penniless vagabond in pursuit of learning. He wandered about over Germany, France, Italy, Spain, Portugal and Poland picking up stray scraps of medical and other knowledge. In 1526 he performed several cures on certain notable personages, by which means he wheedled himself into the medical chair at Basil University. His first act was to burn all the works of Avicenna and Galen, assuring his astonished audience that "his shoe-strings knew more than these physicians." He became worse and worse and was very seldom sober when he appeared at the lecture table. The Basil people found him out, and at last he had to decamp through insulting a magistrate. The chief supporters of the Paracelsian doctrines were Thurneysser (1531–1596), Bodenstein, Lefebvre and Lémery in France, and Dr. Wills (1621–1675) in England. The era of Paracelsus continued to the end of the seventeenth century.

Contemporary with Paracelsus was Agricola (1490–1555), who did much to advance technical chemistry. Many of his methods are said to be in use at the present day. His work 'De Re Metallica' contains a complete treatise on metallurgy and mining. There is also Oswald Crollius, who mentions nitrate of silver by the long retained name of "luna cornea," or horn silver, and who was also acquainted with fulminating gold. Another person of note is Libavius, who died in 1616. He sought hard to free chemistry from the mazes of alchemy, and was to some extent successful. He was a very patient worker, and discovered the "fuming liquor of Libavius," now called perchloride of tin. He proved that the acid obtained by distilling alum with sulphate of iron was the same as that procured by burning sulphur with saltpetre; he was clever at making artificial gems, and was able to imitate almost any precious stone by colouring glass with various metallic oxides. He greatly assisted the general progress of science by collecting together all the main facts of chemistry into a work called 'Alchemia,' published in 1595, and which may be considered the first chemical handbook. His chief object was the preparation of medicines, but he still believed in the idea that the transmutation of metals was quite possible. His ideas of chemical combination do not appear to have been any clearer than the ideas of those who preceded him.

J. Van Helmont, who lived between 1577 and 1644, looked upon water as the principle of existing things.* To air he granted the rank of a true element. "The Archæus," something without form, he imagined to draw all bodies from water, to which its generating spirit was attracted by the odour of a ferment or ama-vitalis. The idea that water was the principle of things originated with Thales of Miletus, who lived in the sixth century B.C., perhaps because Homer made Okeanos the source of the gods.

Francis de la Boe Sylvius (1614–1672), who studied carefully the works of Descartes and Van Helmont, founded the Iatro-chemical sect among physicians; he believed that the health of the human body depended upon the relation of its acid and alkaline fluids, which acted upon each other and produced a neutral substance, and that there were two kinds of diseases, the one produced by acidity, the other by alkalinity. This theory led to the establishment by Lémery and Macquer of the distinction between acid and alkaline compounds, and paved the way for the conception of chemical affinity. Glauber (1604–1668), in his 'Miraculum Mundi,' treats of his wonderful salt, sulphate of sodium, which is known to this day as Glauber's salt. In other works he describes many chlorides of metals; the sulphates of copper and iron; nitric, sulphuric and hydrochloric acids, but does not theorize on their composition. He held the belief that the principles of all things were mercury and salt, and that salt was the origin of all things. Robert Boyle (1627–1691) was the first to overthrow the doctrines of the Iatro-chemists. In 1661 he published the first edition of his 'Sceptical Chemist, or Chemica-Physical Doubts and Paradoxes, touching the experiments whereby vulgar spagyrists are wont to endeavour to evince their salt, sulphur, mercury, to be the true principles of things,' in which both the Aristotelian and Paracelsian doctrines were completely overthrown. With him another new leaf is turned over in the history of the science. He held that it was not possible to tell the number of the elements, and that all bodies are to be considered as such when they are not capable of further decomposition. He was the first to completely grasp the difference between elements and compounds, and held that chemical combination consists of an approximation of the smallest particles of matter. To him belongs the honour of showing that chemistry is not a handmaid of any branch of art, but a part of the grand study of nature. His writings and experiments fill six large quarto volumes. In his investigations on the "Spring of the Air," he discovered the relation between volumes of gases and pressures to which they are subjected. The law may be enunciated thus:—The volume of a gas varies inversely as the pressure, and is known as Boyle's law. Boyle had views of the material nature of fire that biassed his ideas of the composition of the atmosphere, for although he noticed that metals formed calces weighing more than the metal itself, he held that this proved the material nature of fire and flame, and even gives experiments with the object of "arresting and weighing the igneous corpuscles." He rather inclined to a belief in "but one universal matter of things." In his 'Imperfections of the Chemical Doctrine of Quantities,' he points out the contradictory character of the classification of the acids and alkalies by Sylvius. Iatro-chemistry was opposed by Conring (1606–1681), Sydenham (1624–1689), Pitcairne (1652–1713), and Boerhaave (1668–1738). It gradually lost repute, and its fall was sealed by Hoffman (1660–1742). Kunckel (1630–1703) made a great number of researches, his chief being on phosphorus. He did not believe that the increase in the weight of metals was due to the absorption of fire; but his explanation was even more misty than the theory he did not believe.

Becher (1635–1682), who made the first attempt to bring physics and chemistry into closer relation, in his work 'Physica Subterranea,' held that the ingredients of matter were water and earth, and from these three earths were produced—fusible, fatty, and fluid. Stahl (1660–1734) enumerated four elements—water, acid, earth, and phlogiston. Becher explained the calcination of metals by saying that they were composed of an earth and something driven off. The burning of sulphur, for example, was thought to be the resolution into an acid and true sulphur, or that combustible part driven off; to this the term phlogiston was applied by Stahl. When a metallic calx was reduced by fusing with charcoal, it was thought that phlogiston was absorbed, and in course of time, charcoal, lampblack, and other reducing agents came to be considered as almost pure phlogiston. The phlogistic theory was objected to by Stabel and others on the ground that metals increased in weight during the act of calcination, which was contrary to the idea of anything being subtracted. This objection the Stahlians met with the argument that phlogiston had a negative weight. The phlogistic theory was supported by Neumann (1683–1737), Pott (1692–1777), Marggraf (1709–1782), and Macquer (1718–1784), who discovered arsenic acid. Although wrong, the phlogistic theory exercised a great influence on the true understanding of chemical phenomena; it took the place of the "souls and spirits" assigned by the alchemists to metals and salts, or what was termed by Geber, "the humidity of metals." It gave such a plain and excellent account of chemical action that the facts and observations of later periods, such as the existence and properties of oxygen, were almost unheeded. It was only in the latter part of the eighteenth century that the part played by oxygen in the formation of many chemical compounds was recognised. In Hooke's 'Micrographia' for 1665 it says that there exists in air a substance similar to that which exists in saltpetre. In the treatises of Mayhow, published 1668–1674, oxygen is described under the name of fire air aerial spirit, and nitre air. Dr. Hales published his experiments on gases, and Newton, early in the eighteenth century, in his 'Opticks,' indicated their nature and formation; but to Dr. Black, who experimented early in the eighteenth century, is due the honour of making the first steps toward getting a knowledge of the specific properties of the various gaseous bodies. Dr. Priestley (1733–1804) also distinguished himself in pneumat chemistry. In 1772 he discovered nitric oxide gas, and on the 1st of August, 1774, he discovered oxygen by heating the red oxide of mercury; he considered this gas as dephlogisticated air, for he thought that as it was a better supporter of combustion than "common air," it had parted with its phlogiston, and was therefore in a better condition to take up that body from other substances. When air drew phlogiston from burning substances, he believed that it became saturated and had no further affinity for it. Cavendish (1731-1810), like Priestley, was of the phlogistic school of thought. His chief discovery, and the one by which he is best known to us, was that when hydrogen and dephlogisticated air were mixed in proportions necessary to phlogisticate the air, and exploded, water was produced; he also found that the same product was produced when common air and hydrogen were exploded. He established the difference between nitrogen and hydrogen, pointed out the importance of knowing the specific gravity of gases, and discovered the pneumatic trough. Scheele (1742 to 1786) held to the phlogistic theory, and his conceptions bore very strong resemblance to those of the other contemporary chemists: in his dissertation on 'Air and Fire,' he says fire consists of air and phlogiston. His other works worth notice are 'A Dissertation on Flint, Clay, and Alum,' 'Analysis of the Human Calculus,' and the accounts of his discoveries in the 'Transactions of the Royal Society of Sweden.' To Scheele as a theorist we owe but little, the chief honour being due to him for his practical work. He isolated tartaric acid in 1769, discovered chlorine and baryta in 1774, glycerine in 1779, and first pointed out its properties in 1784; he first obtained hydrofluoric acid in 1771, pointed out its properties in 1781, and the same year prepared tungstanic acid. Between the years 1776 and 1786 he discovered benzoic, molybdic, lactic, mucic, oxalic, malic, and gallic acids, and made several important observations on arsenious acid. Towards the end of the eighteenth century Bergman, of Upsala (1735 to 1784), gave a great impetus to analytical chemistry. He devised methods of examining compounds in the wet way and by means of the blowpipe, and he also gave a dissertation on all the chemical substances known at the time. The nature of compounds, according to his idea, that were formed by the mixture of reagents, depended on the sum of their attractions. In 1777 Wenzel's observations were published; they followed up those of Bergman and Kirwan, and from them the idea of equivalency took its rise.

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* Van Helmont believed that metals and rocks could be resolved into water; that animal bodies were produced from it because fish live upon it. And he made what appeared to him a very conclusive experiment to show that it was capable of producing vegetable matter. A willow weighing 5 pounds was planted in 200 pounds of carefully dried earth, and frequently watered. At the end of five years it was taken up, and found to weigh 169 pounds and 3 ounces. The earth was found to have lost only 2 ounces. "Therefore, 164 pounds of wood, bark, roots, and leaves," said Van Helmont, "are produced from water alone."

Lavoisier (1743-1784) gave an entirely new aspect to the science of chemistry. Of him Liebig says: "He discovered no new body, no new property, no natural phenomena previously unknown, but all the facts established by him were the necessary consequences of the labours of those who preceded him. He infused into the science a new spirit." In the year 1765 Lavoisier firmly believed in the existence of phlogiston; but we find that eleven years later his faith is beginning to waver, for he states that to explain certain phenomena we must assign to it certain qualities other than those mentioned by Stahl. In a memoir 'On the Nature of the Principle which combines with Metals during their Calcination, and which augments their Weight,' he describes the production of "fixed air" from charcoal and in the reduction of calces; but he does not mention the fact that Priestley in the preceding November had acquainted him with his experiments, nor whether he had seen the observations made by Bayen in the *Journal de Physique* of February and April, 1774, that the change of a metallic element into a calx is due to the fixation of an "aerial fluid," and that the red oxide of mercury is reduced by heat alone, without the addition of anything, and that it loses weight. In 1777 Lavoisier combated Priestley's assertion that air is rendered irrespirable through becoming loaded with phlogiston. In 1778 he brought forward the theory that the "dephlogisticated air" of Priestley was the universal oxygenizing principle, which, combining with nitrogen, phosphorus, sulphur, and charcoal, forms nitric, phosphoric, vitriolic and carbonic acids; and with the metals, calces. He further held, that all the phenomena of combustion could be explained without the assistance of phlogiston, of the existence of which there was no evidence. In 1783, having heard of the labours of Cavendish, and their results, he made a number of experiments to determine what substance was produced when hydrogen burns, and to test the accuracy of the work of Cavendish. Assisted by Meusnier, he proved that water contained hydrogen by passing steam through a tube containing red-hot wire, and from the results of these experiments he explained that the evolution of hydrogen observed during the solution of metals was due to the decomposition of water, the metal becoming oxidized and the hydrogen escaping. The revolution that Lavoisier made in "chemical thought" completely sealed the fate of the "philosophy of Stahl," which, notwithstanding the noble efforts made on its behalf by Gren, Wiegleb, Delametherie, and Kirwan, declined, and the new doctrines of Lavoisier took its place. In 1779 Lavoisier published his 'Traité Elémentaire de Chimie' in which his doctrines are clearly set forth. He was helped in the establishment of his system by Fourcroy, Monge, Guyton de Morveau, and Berthollet (1775—1809), who in 1785 published a paper on dephlogisticated marine air, or chlorine, as it is now called, in which he pointed out its bleaching properties. Following up the experiments of Priestley, he showed that ammonia was composed of three volumes of hydrogen gas to one of azotic. In 1803 he published his work on 'Chemical Statics,' in which the conclusions arrived at by Bergman regarding the laws of the combination of acids and bases were disputed. The views of Berthollet were opposed by Proust (1775—1826), who had already shown that tin and antimony unite with oxygen, and iron with sulphur, in two definite proportions. He had a long correspondence with Berthollet, in which he conclusively proved to him that all compounds are definite, and contain only fixed proportions of their constituents. The next person of note to whom we come is John Dalton (1766—1844), who is well known to us all, from the fact of his having been the first man to apply the atomic theory to chemistry. The discovery of the theory is not itself due to Dalton, as many suppose, for it was known to Leukippos, and further extended by Demokritos (460 B.C.), who said of atoms that they were invisible by reason of their smallness, indivisible by reason of their solidity, impenetrable and unalterable; they have neither heat, cold, nor colour, and are infinite in number. An atomic theory had even been formed long before the time of Demokritos, by Kanáda in India, and is the chief feature of the Nyayan system of philosophy. The theory of Leukippos is ascribed by Possidonius to Moschus, a Phœnician. Indeed, we learn from the translation of a Hindu poem, 'Shi'ri'n and Ferhad,'[*] by Sir William Jones, that the Hindus not only possessed an atomic theory, but associated with those atoms the force of attraction. These few examples will be sufficient to show you that long before the time of Dalton atoms were known, had probably been discarded, although they were used by some writers on science during the Middle Ages, and were at last applied by his mathematical mind—for mathematics was his favourite study—to explain the phenomena of chemistry. All of you are probably aware of the circumstances that led him to frame the theory. While experimenting with marsh and olefiant gases, he observed that, calculating the carbon in each case to be the same, the amount of hydrogen in the one was double the amount of hydrogen in the other, also that the amount of oxygen in carbon dioxide was double that in carbon monoxide. From these and other observations he framed the atomic theory, which will ever be a memorial to his name. Dalton communicated his new theory to Dr. Thomson, who promulgated it in his 'System of Chemistry,' 3rd edition, 1807. It may be mentioned that his theory appears to have been foreshadowed in 1791 by W. Higgins, of Oxford, in his 'Comparative View of the Phlogistic and Anti-phlogistic Theories.' The first separate publication of Dalton was his 'Meteorological Observations and Essays.' On October 3, 1794, he read a communication on "Extraordinary Facts relating to the Vision of Colours," first drawing attention to that remarkable peculiarity "colour blindness," or "Daltonism," as it is sometimes called. In 1801 he read essays on the "Constitution of Mixed Gases," "On the Force of Steam or Vapour from Water and other Liquids at Different Temperatures, both in a Torricelian Vacuum, and in Air," "On Evaporation," and "On the Expansion of Gases by Heat." In 1803 he appears to have pictured the appearance of his atoms, for in his paper "On the Absorption of Gases" we read: "A particle of gas pressing on the surface of water is analogous to a single shot pressing on a pile of them." In 1808, in his 'New System of Chemical Philosophy,' he writes:—"Whatever, therefore, may be the shape or figure of the solid atom abstractedly, when surrounded by such an atmosphere (of heat) it must be globular; but as all the globules in any small given volume are subject to the same pressure, they must be equal in bulk, and will, therefore, be arranged in a horizontal strata like a pile of shot." His idea, therefore, differed from that of Demokritos in this—that while Dalton believed the atoms were equal in size and of the same shape, Demokritos believed them to be unequal in size and of different shape. In 1832 Dalton received the degree of D.C.L. of Oxford, in recognition of his scientific labours. When invested in his scarlet robe, it appeared to him, by reason of his "colour blindness," the "colour of nature," that of "green leaves." In 1833 Government granted him a pension of £150 per annum, which, in 1836, was increased to £300. In the autumn of 1834, he received the LL.D. of Edinburgh University. He had a very quiet, dry manner, and it is related that one day his physician finding him very much better after a severe attack of catarrh, ascribed his improvement to a dose of James's powder. "I do not see how that can be," said Dalton; "for I kept the powder until I could have an opportunity of analysing it." Of Dalton, Professor Sedgwick says: "He possessed a beautiful moral simplicity and singleness of heart, which made him go on steadily in the way he saw before him, without turning to the right hand or the left, and taught him to do homage to no authority before that of truth."

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[*] A divine spirit and the human soul disinterestedly pious.

A most interesting discussion followed, in which the President, Messrs. Chubb, Morton, Watt and Williams joined, and a cordial vote of thanks was passed to the author.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

A social meeting in connection with the above Association was held at the Flying Horse Hotel, on Tuesday evening, March 22. The chair was occupied by the President, Mr. R. Fitzhugh, F.C.S., and there was a moderate attendance of members.

The minutes of the last meeting having been read and confirmed, the President then called upon Mr. Jackson, who officiated as Secretary in the absence of Mr. Warriner, to read the clauses of the proposed New Pharmacy Act. Clauses 1, 2, 3 and 4 were agreed to *nem. con.* On clause 5, which limits the time an executor may keep on a business after the death of the proprietor, considerable discussion arose, in which most of the members took part, and very different opinions were expressed. Eventually, Mr. W. H. Parker proposed—"That this meeting objects to clause 5, thinking it harsh and unjust to widows." Mr. E. C. Patchitt seconded the motion.

Mr. Jackson then proposed as an amendment—"That this meeting approves of the clause," which was seconded by Mr. R. Widdowson. On a vote being taken the amendment was carried by ten votes to six, and it was afterwards put as a substantive motion and carried by same majority.

Clauses 6, 7, 8 and 9 were approved without any difference of opinion, but a long discussion arose on clause 10, which compels proprietors of patent medicines containing poisons to label them as such. This it was felt by some would interfere with the sale of cough mixtures, etc., over the counter, and would cause much unnecessary trouble; but as the clause expressly refers to articles bearing a patent medicine stamp, it was thought the sale of other preparations by chemists would not be affected, and Mr. Beilby proposed, and Mr. R. Widdowson seconded, that this clause be approved of, which was carried. The remaining clauses were agreed to without discussion.

Mr. Middleton then proposed, and Mr. Beilby seconded, "That the Secretary inform the Council of the Pharmaceutical Society that this meeting, having discussed the proposed Pharmacy Act, hereby approves of the same," which was carried.

A vote of thanks to the Chairman closed the proceedings.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The sixth meeting of the session was held on Wednesday, March 9, in the rooms of the North British Branch, Mr. J. D. Robertson, President, in the chair.

The minutes of last meeting having been read and confirmed, Mr. Maclaren, read a paper on "Our Association, its Aim and Object." Mr. Maclaren advocated a change in the Association in the direction of making it more of a debating society or ordinary mutual improvement association and not confining it so exclusively to the discussion of purely pharmaceutical matters.

Mr. Henry thought it would be going backward instead of forward to reduce the Association to the level of an ordinary debating society. He also thought as there were already so many mutual improvement associations in Edinburgh another one was quite unnecessary, and that the aim and object of the Association would be best carried out by the members confining their attention to the study and discussion of subjects strictly belonging to their profession.

Mr. Robertson agreed generally with the statements made by Mr. Henry, and pointed out that the Association was already a mutual improvement association confined to one department of knowledge, that department being the one most essential to them as chemists and druggists. He concluded by moving a vote of thanks to Mr. Maclaren, which was heartily accorded.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

The anniversary meeting of this Society was held on Thursday, March 30, Professor Roscoe, President, in the chair.

The President gave his annual address on the general condition of the Society. At no period in its history has the Society been in such a flourishing condition. The number of Fellows is the largest ever recorded—10 The papers read have increased both in number and importance, whilst the attendance and interest displayed at the meetings have at all events not diminished. The income has also increased, being £2916 as against £2719 the income of the preceding year. The number of papers read—113—has precluded the necessity of having lectures during the past session. The journal still upholds its character for accuracy and usefulness. Many additions have been made to the library; duplicate sets of some periodicals have been purchased; the books have been rearranged, and are now classified according to the subjects. Two card catalogues have been prepared, one arranged according to the authors' names, the other according to subjects.

The research fund, founded in 1876 by the donation of £1000 from Dr. Longstaff, now amounts to £4427. The City companies have materially aided the foundation of this fund. Up to the present time, thirty-seven grants have been made, in sums varying from £100 to £5, and amounting in all to £1021.

The President then briefly alluded to the more important discoveries in chemical science during the past year. The observed alteration in the density of chlorine has been admitted by Victor Meyer to be due to some unexplained error; whilst the well-established fact of the diminution in density of the vapour of iodine at a white heat can be explained by the dissociation of the molecules of that element. The solar and stellar evidence of the question of the decomposition of metals is being accumulated by Mr. Lockyer; but as yet has not assumed a sufficiently cogent form to enforce its general acceptance by chemists, perhaps because the nature of the proof is not one with which they are familiar. The researches of Captain Abney, in conjunction with Colonel Festing, have been continued with conspicuous success. By photographing the absorption spectra of organic compounds in the infra red part of the spectrum, they have accomplished for organic metals what ordinary high temperature spectrum analysis does for the inorganic metals. In these invisible portions of the spectrum are shown characteristic and distinct bands and lines for each organic radical, so that a glance at these photographs decides whether or no ethyl, methyl, etc., are present, just as a glance at the luminous portion of the spectrum satisfies us as to the presence of calcium, sodium, etc. An investigation of greater importance to chemistry has seldom, if ever, been communicated to the Society. An equally important confirmation of certain fundamental views of modern chemistry has been obtained by Helmholtz from a discussion of electro phenomena; an account of these will be given at the forthcoming Faraday Lecture. During the past twelve months not only has Baeyer succeeded in producing indigo artificially, but its manufacture on a commercial scale has been undertaken by competent hands. The first point of departure was cinnamic acid, the last link in the chain orthonitrophenylpropionic acid, from an alkaline solution of which pure indigo blue separates out on heating with grape sugar. The theoretical yield of indigo is 68 per cent.; 40 per cent. has been obtained. Kolbe's idea that the four combining units of each carbon atom are not of equal volume was apparently verified by Schreiner's researches on the methyl ethyl carbonic ethers. Gunther and Roese have, however, obtained results which flatly contradict those of Schreiner. Various new and rare metals have been prepared by Marignac, Nilson, Clève, etc.

The Society has lost by death two foreign members, Professor Heintz, of Halle, and Professor Mulder, of Amsterdam, and ten Fellows:—Sir B. C. Brodie, Dr. Stenhouse, Professor W. Hallows Miller; Messrs. J. Tennant, W. W. Stoddart, W. Arnot, A. C. Bruce, T. Eltoft, R. Johnson and the Rev. D. W. Ladley.

The President then presented the Longstaff Medal to Professor Thorpe, of the Yorkshire College, as the Fellow who in the opinion of the Council had done the most to promote chemical science by research during the past three years. The medal is of bronze, on one side is a very successful portrait of Dr. Longstaff. The medallion portrait is by Mr. A. Bruce Joy, the dies by Wyon, and the medal was struck at the Mint. It is accompanied by a purse of £20.

Dr. Longstaff rose to propose a vote of thanks to the President for his report and to move its adoption. He said that it was a source of great gratification to him to be present at the presentation of the first Longstaff medal. He traced back his love of science to his perusal of three books, when a schoolboy—Joyce's 'Scientific Dialogues,' Blair's 'Primer of Chemistry' and the 'Life of Dr. Franklin.' His researches had been principally confined to the application of chemistry to manufacturing purposes, but he hoped by his share in founding the Research Fund that he had contributed something towards the advancement of scientific research. He trusted that the research fund would be still more successful and that more persons who had benefited by the application of discoveries in chemistry to manufactures would come forward and contribute.

Mr. Carteighe, in seconding the motion, referred to the debt which the Society owed to the President for his very regular attendance.

The President, in returning thanks, said that no apology was needed from Dr. Longstaff; he had originated the research fund and thus done a very good work for the progress of science.

The Treasurer, Dr. Russell, then read his report. The principal items are as follows:—Receipts:—By subscriptions, etc., £2287; sale of Journal and Index, £323; dividends, £223. Expenses:—Journal, £1688; library, £441; house expenses, £176; collector's commission, £114. The total income is about £2900; the expenditure, £2600. The assets amount to £8193. The Treasurer congratulated the Society on its very flourishing financial condition, and pointed out specially the increase in the subscriptions and in the sale of the journal.

The Treasurer then gave an account of the research fund, the principal items of which are given in the President's address.

The Auditors then presented their report, and various votes of thanks were passed.

The Society then balloted for the Officers and Council for the ensuing year.

The Scrutators, Dr. Japp and Mr. J. Spiller, declared the following to have been duly elected:—President, H. E. Roscoe; Vice-Presidents, F. A. Abel, Warren De La Rue, E. Frankland, J. H. Gladstone, A. W. Hofmann, W. Odling, Lyon Playfair, A. W. Williamson, A. Crum-Brown, J. Dewar, J. H. Gilbert, A. V. Harcourt, J. E. Reynolds, J. Young; Secretaries W. H. Perkin, H. E. Armstrong; Foreign Secretary, Hugo Müller; Treasurer, W. J. Russell; Council, F. D. Brown, M. Carteighe, H. McLeod, G. H. Makins, E. J. Mills, W. C. Roberts, C. Schorlemmer, J. M. Thomson, C. M. Tidy, W. Thorp, T. E. Thorpe, R. Warington.

CHEMISTS' ASSISTANTS' ASSOCIATION.

A meeting of the above Association was held at the rooms, 32A, George Street, Hanover Square, on Wednesday, March 16, the President, Mr. F. W. Branson, in the chair.

Mr. W. A. Wrenn read a paper on the "Preparation and Strength of Commercial Pepsine," in which he pointed out how the activity of the product is influenced by the mode of preparation. The results of an examination of a series of numbered samples were tabulated, considerable variation of strength being shown. In the preparation of coagulated albumen, used for testing pepsine, uniformity of division is a matter of importance. This Mr. Wrenn said was best obtained by pressing the hard boiled albumen through a suitably sized sieve, a method he thought preferable to slicing. The strength of acid, and the exact temperature at which maceration must be performed, and the means of maintaining the same constant, were considered. Lastly, a number of samples of pepsine were exhibited in the various stages of manufacture by different processes.

Mr. W. R. Dodd read a paper on "Brewing," commencing with a short history of the subject, together with a general outline of the processes, materials used, and the chemistry of the various stages. The author stated that although one of the oldest arts, brewing had until quite recently been conducted in the most empirical manner, the production in earlier times differing in great measure from that of the present day. A fermented liquor obtained from barley as early as 1960 B.C. was known to the Egyptians and others under the name of zythum, and in Gaul as cerevisia. Mr. Dodd said that the first step of importance was that of malting, and alluded to the various stages of that operation, pointing out the necessity of the maltster being a practical man in order that he may judge from the character of the barley as to whether the treatment prescribed by the excise authorities would yield a satisfactory result. The author then detailed the manner in which the recent alterations affect the maltster. He showed that good water in a brewery is of the utmost importance, and though the action of mineral constituents upon the product is still a debated question, he laid great stress upon the desirability of comparative freedom from organic matter. The processes involved were divided into four stages, viz., washing, boiling, cooling and fermenting, but the author attached most importance to the first and last. He touched upon the methods adopted to insure the uniform diffusion of malt in the water, the temperature at which they should be mixed, and the time of maceration; showing the necessity of boiling and also of rapid cooling to the temperature most favourable to fermentation. The author showed the advisability of examining the yeast from time to time to ascertain its purity and freedom from bacteria. The methods of ascertaining the potential energy of a given sample of yeast, also for roughly judging the quality of malt were illustrated by experiments. Specimens of various kinds of malt and of wort in its progressive stages were also shown.

The meeting concluded with a vote of thanks to the authors.

Parliamentary and Law Proceedings.

Poisoning by Arsenic.

A case of wholesale poisoning has just occurred at Binbrook, a village on the Lincolnshire Wolds. Mrs. Gibson, the wife of a shepherd, made a number of cheesecakes. After eating one of them she suddenly became unwell, and the neighbours who visited her, and who had eaten some of the cakes, were also taken ill. Upon testing some of the cakes it was discovered that the woman had mistaken a tin of arsenic for ground rice, and had mixed the poison in her pastry. The arsenic, which was used by her husband in dressing the sheep, was kept in a cupboard in a tin precisely similar to that which contained the ground rice. The woman died a few hours after she had eaten the cake, before medical aid could be obtained, and eight or nine of the neighbours remain seriously ill from the effects of the poison.—*Medical Press and Circular.*

Obituary.

Notice has been received of the death of the following:—

On the 27th of January, 1881, Mr. William Townsend, Chemist and Druggist, Burton-on-Trent. Aged 67 years.

On the 26th of February, 1881, Mr. Matthew Urwin, Chemist and Druggist, Charlotte Terrace, North Shields. Aged 28 years.

On the 6th of March, 1881, Mr. Jonathan Sparke Walton, Pharmaceutical Chemist, Bouverie Street, Fleet Street. Aged 34 years. Mr. Walton had been a Member of the Pharmaceutical Society since 1870.

On the 21st of March, 1881, Mr. Richard Porter Bulmer, Chemist and Druggist, Market Place, Pocklington. Aged 46 years. Mr. Bulmer had been a Member of the Pharmaceutical Society since 1873.

On the 22nd of March, 1881, Mr. Thomas Binge, Pharmaceutical Chemist, Stockbridge Terrace, Pimlico. Aged 81 years. Mr. Binge had been a Member of the Pharmaceutical Society since 1842, and although he never took a prominent position in the deliberations of the Society, he always manifested a warm interest in its success as an educating body.

On the 25th of March, 1881, Mr. William Stephens, Chemist and Druggist, High Street, Merthyr Tydfil. Aged 57 years.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Saint Bartholomew's Hospital Reports. Edited by W. S. Church, M.D., and Alfred Willett, F.R.C.S. Vol. XVI. London: Smith, Elder and Co. 1881. From the Editors.

A Guide to Therapeutics. By Robert Farquharson, M.P., M.D., etc. Second Edition. London: Smith, Elder and Co. 1881. From the Publishers.

Rocky Mountain Health Resorts. By Charles Denison, A.M., M.D., etc. Boston: Houghton, Mifflin and Co. 1881. From the Author.

A Practical Guide to Health and Longevity. By G. W. Bacon, F.R.G.S. London: G. W. Bacon and Co. 1881. From the Publishers.

On the Action of Carbolic Acid upon Ciliated Cells and White Blood Cells. By T. Mitchell Prudden, M.D. From the Author.

Milk and its Analysis. By Walter Gibbons. Manchester. 1881. From the Author.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[524]. If "Nemo" dissolves the camphor in the spirit of wine, and afterwards adds the spirit of ammonia there can be no difficulty in dispensing a clear mixture.

Ipswich. J. C. Culph.

[527]. Would any reader of the Journal state how he would dispense the following prescription?—

℞ Kerm. Min. . . . . grs. v.
Tr. Veratriæ Virid. . . . . ♏ xv.
Loch. Pectorialis . . . . ad ℥iv.
M. Ft. mist.

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[528]. I received the following prescription to make up:—

℞ Tr. Ferri Perchlor. . . . . ʒss.
Liq. Strychniæ . . . . ʒss.
Syr. Limonis. . . . . ℥j.
M.

The above had been dispensed by a London chemist.

I made it up with the syr. limonis, B.P. The consequence was, a dark looking mixture; this was returned to me, with the complaint that it was much darker in colour than that prepared in London, which was of light colour.

The only way I can account for the difference in that my syrup was made according to the B.P., and the London syrup must have been made from a private receipt.

I conscientiously dispensed this prescription with B.P. preparations; still mine was pronounced wrong, and the London right.

What colour should it be, dark or light?

ANXIOUS INQUIRER.

[529].

℞ Tinct. Iod. c. Am. . . . . ℥ij.
Linim. nocte maneque utend.

W. J. S.

I dispensed the above yesterday. It had been previously dispensed in London and Hull, and I was told the liniment must be colourless. These non-official formulæ are puzzling to a sub-pharmaceutical Robinson Crusoe like myself. Can anyone give me the original formula? The prescription was written in the south district of London.

ISLANDER.

[530].

℞ Acid. Salicylat. . . . . ʒiij.
Aq. . . . . ad ℥vj.
Cap. coch. ampl. ter die.

Will any reader kindly inform me how the above should be dispensed? and oblige

BETA.

[531].

℞ Ammon. Sesquicarb. . . . . ℈ij.
Ammonii Bromid. . . . . ℈iv.
Salicine . . . . ℈ij.
Quiniæ Sulph. . . . . ℈j.
Spt. Chlorof. . . . . ʒij.
Aq. Flor. Aurant. . . . . ℥iv.
Glycerine . . . . ʒj.
Aquæ . . . . ad ℥viij.
M. An eighth part to be taken every four hours.

The above prescription is a copy of one left yesterday to be dispensed. My *modus operandi* was to rub down the quinine in a mortar, adding the salicine and glycerine, thinking the glycerine would suspend the quinine and salicine, having previously dissolved the ammon. bromid. in ℥vj. of water with the spt. chlor. and aqua flor. aurant. I then added the contents of my mortar. So well, so good. Lastly, the ammon. carb. in solution was added. After shaking the bottle, a gelatinous substance, as described by W. G. T., floated on the surface, leaving the mixture nearly clear. I should not have troubled you with the above had I not seen W. G. T.'s difficulty in Saturday's Journal.

J. H.

[532]. "Chemicus" would be glad to know what appearance the following mixture should have:—

℞ Ferri Am. Tart. . . . . gr. v.
Tr. Calumbæ . . . . ʒj.
Liq. Ammon. Cit. . . . . ʒss.
Aquæ Destillatæ . . . . ad ℥j.
M. Ft. haustus. To be taken every eight hours.

There being no quantity of doses ordered I sent a 12-oz. mixture, twelve doses. The patient brought it back, bringing with him a 12-oz. bottle of the same mixture, dispensed by one of the best London firms, for comparison with my own, that being quite a clear mixture, without any deposit, while the "London" mixture was very thick, with a deposit at the bottom of the bottle. Which of the two was right?

33, *High Street, Ilfracombe.*

Notes and Queries.

[699]. AQ. MELLIS is an ingredient in Mr. Erasmus Wilson's well-known hair lotion. What is the formula for the preparation intended?

NEMO.

[700]. SULLIVAN'S CEMENT.—Can any reader give me a recipe for making Sullivan's cement and thorough *modus operandi* of manufacture?

J. G. P. S.

[701]. RANGOON OIL.—Can any reader oblige by mentioning what oil is generally sold as Rangoon oil?

SUB UMBRA FLORESCO.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE SCOTCH BOARD OF EXAMINERS.

Sir,—Does Mr. Mackay or any other man know a good reason why I should not hold a seat on the Scotch Board of Examiners? I have held a seat on the London Board, and Edinburgh is only half the distance. Candidates for examination go from Newcastle to Edinburgh and are received. Why not Examiners?

Grey Street, Newcastle. BARNARD S. PROCTOR.

PROPOSED PHARMACEUTICAL LEGISLATION.

Sir,—If Mr. Gladstone in his forthcoming Budget struck out the patent medicine licence and stamp duty, and substituted a £2 2*s.* licence for every person (not a pupil) engaged in selling or dispensing drugs, including apothecaries, he would remove nearly all our difficulties, and render an Amended Pharmacy Act unnecessary. The licence would of course be granted, like the solicitors', to qualified masters only. Of course employers would pay for their assistants, thus:—"John Stokes, licensed for self and two assistants, £6 6*s.*"

79, *Grosvenor Road, Highbury.* GEORGE MEE.

Sir,—I heartily endorse the remarks of Mr. W. T. Martin in this week's Journal. It seems to me that chemists are afraid to go to Parliament to ask for what is their just right. I have no hesitation in stating that we have at least the sympathy of all shades of political opinion, and if our case is only laid before the House fairly we should succeed in passing a good protective Bill. All drugs and patent medicines ought to be retailed by chemists only. The fact that a patent medicine requires a stamp is sufficient to prove it is for medicinal use, and decidedly for many reasons its sale ought to be in the hands of the chemist. Most of us had to pay a good premium for our apprenticeship; by the Act of 1868, we are compelled to pass the several examinations of the Pharmaceutical Society at great expense and self denial, and the business is an exceedingly responsible one.

CEREDIG.

CHEMISTS' PRICES.

Sir,—On Thursday last there appeared in the *Standard* a letter signed M. D., which I consider will entirely mislead the public to the great detriment of the chemist. I therefore wrote a reply which the editor of the *Standard* has not thought fit to publish. Now, sir, the Pharmaceutical Society being an influential body any communication of theirs would, no doubt, be taken notice of, and I do think that such a letter as the one in question should not be allowed to pass unnoticed by them.

215, *Lewisham High Road.* FRANCIS DYMOTT.

Sir,—The enclosed letter, taken from the *Standard* newspaper of March 24, is likely to mislead the public in the matter of chemists' charges, and as such should not be allowed to pass unnoticed.

In attempting to prove the exorbitant profit charged on his prescription, M. D. refers only to the cost of the ingredients, and says nothing of the care, time and practice required in preparing it satisfactorily, but omits to state that our education, though not so costly as his own, is one nevertheless requiring much time and study, as well as expense. I have before me a prescription for a powder containing one-fourth of a grain of calomel, and calculating in the same manner how much of the medicine costing 3s. 6d. a pound would amount to—I will not stop to ascertain, but the exactness required in weighing, and time occupied in dispensing it leaves a profit which no reasonable person would dispute about, and I might, with equal justice, set the value of M.D.'s prescription at the cost of the ink and paper it was written on.

GEORGE NIND.

6, *Ringford Road, West Hill, Wandsworth.*

CAPE TEA.

Sir,—In the "Note on Cape Tea," by Professor Church, published in your issue of February 19th, are some points which call for remark from me.

I have not access in Dorpat to the *Chemical News*, and it was not until after the publication of my paper in the *Pharmaceutical Journal* that my attention was directed to an abstract of Professor Church's paper, in the *Journal of the Berlin Chemical Society*, under the head of "Correspondence from London."

Apart from the fluorescence (which is shown by my cyclopiofluorescin only in alkaline solution) Professor Church has neglected to give any qualitative reactions of his cyclopic acid. The only criterion, therefore, of identity or non-identity is the ultimate composition of the substance. In my paper on Cape Tea I have called special attention to the discrepancy in the two determinations of carbon.* Of the purity of the substance analysed I have no doubt; the microscope showed it to consist entirely of well defined pale sulphur-yellow acicular crystals. Till future analyses place me in a position to confirm or correct my results I cannot regard the identity of the two substances as placed beyond doubt. I was quite aware that the amount of carbon was unusually low for such a substance as cyclopiofluorescin, my attention having been specially drawn to that fact by Professor Dragendorff at the time the analyses were made. At the same time I cannot regard that fact as being the more singular because other substances examined contained as much as 51 to 55 per cent. of that element.

I do not doubt that Professor Church has made inquiries into the questions which induced me to undertake the examination of the *Cyclopia* (viz., the presence or absence of theine, or of any allied alkaloid, or of scoparin), but his paper, as published in the *Pharmaceutical Journal*, February 19, certainly contains no definite answer to any one of those questions. At the same time a systematic chemical examination of the drug could not have failed to reveal the presence of cyclopin, which is contained in considerable quantity.

Had I, therefore, been previously acquainted with Professor Church's paper I should still have published my own in the form in which it appeared in the *Pharmaceutical Journal.*

I trust on my return to London to be able to procure sufficient of the Cape tea to enable me to set at rest the question of identity or non-identity of the cyclopic acid isolated by Professor Church from *Cyclopia Vogelii* and the cyclopiofluorescin contained in the *Cyclopia longifolia.*

Dorpat, Russia. HENRY G. GREENISH.

THE BITTER SUBSTANCE IN GLUCOSE.

Sir,—Will you please permit me to correct a statement in the "Month" of last week's Journal, p. 795, in which Dr. Nessler is said to have made experiments in regard to glucose and to have considered the question whether the bitter substance be originally present in the glucose or formed during fermentation not yet determined?

It was I who first, as far back as March, 1879, gave an account of this bitter principle, described its origin, effect† and chemical reactions which I found to be similar to those of colchicine. This my account appeared in No. 7 (April 1, 1879) of the *Correspondenzblatt des Vereines analytischer Chemiker*, it was further published in the Bunzlau *Pharm. Zeitung*, No. 63, 1879, and No. 1020 (June 13, 1879) of the *Chemical News*, as follows:—

"*Foreign Bitter Principle in Beer.* (H. W. LANGBECK). —The author prepared two samples of a fermented liquor from solution of glucose with small quantities of tartar, tartaric acid, kino, and a few drops of a mixture of formic and œnanthic ether. Fermentation was set up by means of sound pressed yeast, and was maintained at a temperature of 18° to 20°. One sample, filtered through flannel after four days and allowed to stand for three weeks in a stoppered cask at 8°, yielded a pleasantly vinous liquid. The second sample, not filtered till after five days, tasted intensely bitter, and grew worse on standing. The newly formed yeast, at first of a whitish yellow, had taken a brownish colour, died off, was precipitated by the more alcoholic character of the fluid, and formed with the alcohol in nascent state that substance, which betrays itself by its bitterness in unhopped fermented liquors when the fermentation has been neglected. The compound in question is by no means innocuous. It was isolated by treating the liquor according to Dragendorff's methods I and II. The author succeeded in obtaining it in a crystalline form and describes its reactions.

"The solution of the bitter principle acidulated with sulphuric acid becomes turbid with potassium hydrargroiodide, and clear again by adding a mixture of alcohol and ether; heated a yellow-brown substance remains which is insoluble in water. The solution becomes turbid with chloride of gold; the latter is reduced if heated.

"Ammoniacal silver solution is reduced in the cold. Potassium biiodide effects a brown precipitate in the cold. Picric acid remains clear in the cold, turns brown if heated. With pyrogallic acid it becomes turbid in the cold. Tannic acid does not change it in the cold, but the solution becomes turbid if heated and assumes a deep yellowish-green colour if a drop of diluted ferric chloride is added; refrigerated and diluted with water, I obtained immediately the dark blue-green precipitate of tannate of iron. Phosphomolybdic acid forms in the cold a dirty yellow-brown precipitate; the supernatant liquid becomes dirty greenish; heated the precipitate becomes green, the liquid blue, then dirty grey-yellow; dried blue-green."

127, *Leman Street, E.* H. W. LANGBECK.

Southport.—A dispensing query has been received bearing the post mark of this town, but giving no other clue to the writer. Many similar questions are sent anonymously, but the impropriety of answering them indiscriminately must be obvious.

W. Vinson.—You do not seem to be aware that there are botanical exchange clubs already in existence. See the answer to Mr. Pratt in last week's Journal.

"*Nemo*" is recommended to extend his search as far as a Latin dictionary.

John.—No diploma is given.

"*Liturgia.*"—No, not always. Refer to a Latin dictionary.

Anxious Inquirer.—Your communication was only delayed.

Only a Junior.— The British Pharmacopœia is the only authority.

Bruised Worm.—An answer to your question would be affected to some extent by the ultimate destination of the wine, and that, at present, would appear to be a matter of conjecture.

Nabob.—See a paper on a "Recent Application of Phosphorescence," in the *Pharm. Journal* for May 1, 1880, p. 882.

Penelope.—We do not think there is such an office. Perhaps you refer to the dispensers in naval hospitals, the regulations concerning whom will be found in the Society's Calendar.

J. Garth.—*Tetraphis pellucida.*

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Brown, Oldfield, Martin, Jacque.

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* The analyses were as follows:—

	I.	II.
C=	43·36	44·86
H=	4·80	4·87

† Taking two glasses of fermented liquor containing this bitter substance, it caused irresistible sleepiness, stiffness of the neck and a severe headache, which lasted several days.

"WANIKA," A NEW AFRICAN ARROW POISON: ITS COMPOSITION AND PROPERTIES.*

BY A. W. GERRARD, F.C.S.,

Teacher of Pharmacy at University College Hospital.

The use of poisons to render more deadly the warlike weapons of man is a practice followed by uncivilized nations in various parts of the world. In most instances their source and method of preparation are jealously guarded by their possessors as knowledge to them of the highest moment, and, as a consequence, the endeavour to obtain authentic information and specimens is surrounded with the greatest difficulties and dangers; nevertheless, travel and research in the nineteenth century have brought to light much of the mystery surrounding these things.

Recently, Dr. Sydney Ringer received from Mr. Robert W. Felkin, a gentleman who has been travelling in Africa, through Livingstone's territory, specimens of an arrow poison, together with a poisoned arrow and some specimens described as the antidote to the poison. These were placed at my disposal, and, being altogether unique, I entered upon an investigation of their properties and composition.

The poison with which the barb of the arrow is smeared is enveloped in the leaf of a variety of grass or maize, the entire parcel in size and form being much like a sausage. Its length is 4½ inches, and circumference 3 inches. At each end it is tied with a strong ligature, one end of the ligature being carried about an inch down the parcel, turned at right angles, and passed round its circumference, then looped; this is repeated four or five times, until the other extremity is reached, and firmly tied. Its weight averages 1½ ounces. On breaking a parcel, a black extract, of firm consistence and almost odourless, was found in its interior.

The arrow is made in two pieces, fitting together by a socket situated about 4 inches from the barb. The barb is of iron of native manufacture. The object of the arrow being in two parts is that when a man is struck the barb may not easily be withdrawn.

The antidote is stated to be made from five roots. The proper proportion of each was given to Mr. Felkin, together with a porcupine quill. The roots have been submitted to Professor Oliver, who reports that he is unable to give any information as to their botanical source. The quantity of either root was much too small for a pharmaceutical investigation. To prepare the antidote, the roots are converted into charcoal, which is coarsely powdered, and preserved by being placed in a bottle-shaped gourd. When a warrior is wounded, he makes a special whistling noise, and the medicine man, who is usually hiding amongst the trees, approaches, and gives the antidote mixed with honey.

Judging from the taste of the roots forming the antidote, they do not appear to possess any active property. If they do, it is still difficult to believe how they can retain it after they have undergone carbonization. Charcoal is well known as an absorbent of poisons taken by the stomach; but it has not yet been proved that it antagonizes them when introduced primarily into the circulation. In two experiments with animals where the antidote was given it entirely failed.

At this time, writing to Mr. Felkin for information, I received the following reply:—"The use of arrow poison is very general in Africa; but that which you have is only used on the East Coast, between Zanzibar and the Sourali Land, and is a special poison made by the Wanika and Wakamba tribes, who live to the west of an island called Mombasa. Extracts are made from some eleven different roots, but I cannot tell you how or what plants are used. It was only with the greatest difficulty that I was able to get the poison at all. It is generally made fresh 'every time a cow calves,' or about twice a year. The antidote is generally made fresh each month. I have sent for more of that, as the sample given to Dr. Ringer is not good, I believe.

"Death follows a wound in some fifteen or twenty minutes, and unless the antidote is given within five minutes of the time when the wound was received it does no good. I have seen the antidote used with success, and have cut out the arrows from wounded men, and seen that nearly all the poison has been absorbed. . . . As you have doubtless found out honey is mixed with the poison to make it stick.

"The flesh of animals can be eaten when killed by these poisoned arrows. The poisons used in Central Africa are not so complicated, only four or five roots being used. I am inclined to think the poison is really one root. At the same time it must be remembered that this Wanika poison is terribly feared by all the neighbouring tribes, whereas this cannot be said of the poison used in the centre or by the tribes near the Nile, north of the Line. I may mention that none of the roots are used fresh. The roots, bark of trees, and twigs of shrubs are collected, dried, and then used as required. The natives are most jealous of the secret, and there are but few men in each tribe who know how to collect the plants; others know how to prepare the poison. The secret is handed down from father to son; but the elders of the tribe (not knowing the secret themselves) try the young man first, and he can only be entrusted with the knowledge after the consent of the elders has been given.

"Curious ceremonies are enacted at the times when the poison is prepared; but no strangers are allowed to be even near at the time. Dancing and singing are carried on round the huts where the pots are on the fire, and the moon must be in a certain position and of a certain age."

In reply to further inquiries, Mr. Felkin says:—

"The things used in the antidote were all given Dr. Ringer as given to me by the medicine man, and the porcupine quill forms a part of the antidote.

"I think that several of the ingredients are *not* absolutely needful, for the man told me that the small white root was the most powerful, and that without it the others were no good.

"The proportions of roots, etc., given Dr. Ringer are just enough for one batch of antidote.

"It was not possible to see the antidote made, but I was told to bake the whole ingredients given to me, grind them between two stones, mix well, and then add honey q.s., to make a sticky semi-fluid mass.

"The seeds* I think I have seen between Foweira and Fatiko in Central Africa; I have sent them to my companion, and he will reply fully, as he took up botany. I did not do much at it.

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* Read at an Evening Meeting of the Pharmaceutical Society, April 6, 1881.

* Strophanthus seeds sent to Mr. Felkin for recognition.

"Seeds look very much like what makes a very deadly poison on the East Coast. Either the hair of a cow, or seeds such as these sent me, are cut up very fine, and then mixed with milk or even water and given the thirsty traveller to drink.

"Fearful inflammation is set up and death is an almost certain consequence."

Botanical information being entirely wanting, no clue to the plants yielding the poison was obtainable; but as the result of physiological experiments, to be described further on, and comparing these with the physiological action of an African arrow poison investigated by Dr. T. R. Fraser, I have but little doubt that the chief ingredient of the new poison is a *Strophanthus*, either *S. hispidus* or *S. Kombé*, nat. ord. Apocynaceæ, thus closely allied to the genus *Strychnos*.

In 1872, *Journ. of Anatomy and Physiology*, vol. vii., Dr. T. R. Fraser made a communication on an African arrow poison, which I will summarize. The poison was collected in the expedition of Bishop Mackenzie and sent to Dr. Christison, from a plant described as a woody climber, growing in the forest, both of the valley and hills, at various places between the coast and the centre of the continent. The plants climb up the highest trees and hang from one to the other like a bush vine. The flowers are pale yellow. The poison was sent to Dr. Fraser in the form of follicles, 10 to 12 inches long and about an inch thick, containing one hundred to two hundred small seeds attached to a beautiful comose appendix. The plant yielding the follicles was pronounced by Professor Oliver to be a *Strophanthus*. Dr. Fraser obtained from the seeds an alcoholic extract containing crystals, also a powerful active principle; the method of preparation and physical properties of the latter are not described. Physiological experiments demonstrated the *Strophanthus* to be a powerful paralysing agent and cardiac poison.

Amongst the Hanbury collection of materia medica bequeathed to the Pharmaceutical Society, is a specimen of *Strophanthus* follicles, agreeing with those described by Dr. Fraser. Mr. E. M. Holmes kindly gave me about twenty of the seeds, an alcoholic extract of which produced the same physiological action as both Dr. Fraser's and the Wanika poison, thus strengthening the evidence that the plant yielding the Wanika poison is a *Strophanthus*.

Examination for Proximate Principles.—Five grams of the extract were dissolved in 15 c.c. of water and filtered from insoluble earthy matter, consisting mostly of particles of sand; the filtrate was evaporated to 5 c.c. and treated with 50 c.c. of alcohol, and separated from the albuminous precipitate; the filtrate, upon evaporation, gave a pale brown viscous residue. A small portion of the residue dissolved in water separated a brown flaky resin; its clear solution gave no precipitate worthy of note with alkaloidal reagents. With ferrous and ferric salts it gave a bluish-green precipitate, indicating the presence of a tannin. Another portion treated with ammonia and chloroform, and after the chloroform with ether, gave upon the evaporation of these solvents a minute residue of no apparent importance. A further portion was boiled successively with ether, chloroform, benzole and benzine; of these the ether only left upon evaporation a small residue of acid reaction and narcotic odour, insufficient for further examination.

A portion of solution gave abundant evidence of glucose when treated with Fehling's solution.

The preceding results affording no evidence of the presence of an alkaloid, search was made for a glucoside in the following manner:—Three grams of alcoholic extract of arrow poison was diluted with water and filtered from insoluble matter, then treated with basic lead acetate, filtered, and residue washed with alcohol; excess of lead was removed by sulphuric acid, and the solution left upon evaporation a pale straw-coloured mass weighing 1 gram. This was again examined for alkaloid with negative results. Fehling's solution demonstrated that glucose was still present, the removal of which appeared to present considerable difficulty; but after several experiments it was accomplished in the following manner, the process, I believe, being a new one:—The extractive last described was dissolved in 20 vols. of absolute alcohol, and 30 vols. of chloroform slowly poured into it, with frequent shaking; after standing at rest for ten minutes there separated to the surface a sweet fluid containing the glucose, the active principle being mainly retained in the mixed alcohol and chloroform solution. A second treatment in this way removed the last traces of glucose. The residue obtained upon evaporation weighed 33 grams, was of a neutral reaction and showed no trace of crystalline character; it dried up to a scale which was of pungent, bitter taste, leaving a sensation on the tongue of isolation of the spot on which it was placed. A portion now treated with Fehling's solution gave no reduction till boiled with a dilute acid, thus giving evidence of the presence of a glucoside. If nitric acid be used for the conversion into glucose a characteristic reaction is developed on heating, viz., a distinct but dull red colour, soon passing to a yellow, and an odour similar to that of nitrosalicylic acid. The glucoside is freely soluble in alcohol and water, quite insoluble in ether and chloroform; on combustion it yielded no ash; with strong sulphuric acid it gives but a slight brown colour; heated with soda lime it evolved ammonia. No other reactions were obtained worthy of record.

The separated resin was examined and found freely soluble in alkaline solutions, ether, and alcohol; the alcoholic solution formed a compound with basic lead acetate from which a purified resin was separated with weak nitric acid. Its properties were not further investigated.

Physiological Action of Extract and Glucoside.—The following are Dr. Ringer's conclusions from his experiments conducted in the Physiological Laboratory of University College:—

"I have no doubt that this arrow poison is the same as that investigated by Professor Fraser in 1870. The seeds Dr. Fraser investigated were derived from a *Strophanthus*.

"I find that this arrow poison is a powerful muscle poison. It is as active as veratria. Unlike veratria it does not prolong the relaxation of a muscle after its contraction.

"Injected under the skin of a frog it destroys all muscular irritability in about an hour and a half. Eight minims of a 5 per cent. solution will kill a cat in about eight minutes, and muscular irritability is destroyed in about three-quarters of an hour.

"It is a feeble poison to motor nerves.

"It has no effect on afferent nerves.

"It is a powerful cardiac poison, as powerful as digitalin, and more powerful than veratria. It arrests the ventricle in systole.

"It does not prolong the systole of the heart nearly so much as veratria.

"It has but little action when administered by the mouth. Five minims of a 5 per cent. solution hypodermically given will kill a cat in from fifteen to twenty minutes, whilst forty-five minims given by the stomach cause only nausea and vomiting, with a little weakness.

"The antidote is useless, for a cat to which the antidote was freely administered was killed in twenty minutes by an injection of 6 minims of a 5 per cent. solution of the poison.

"Neither topically applied does it antagonize the action of the poison on the frog's heart."

Although the glucoside I have obtained represents the action of the poison, I am not inclined to name it as a definite principle, for if, as Mr. Felkin has stated, eleven plants enter into its composition, such a mixture, and prepared by an African savage, is not likely to yield a pure product. More material is yet required, and that in the form of the plants used, before the exact properties of the active principle can be fully ascertained; but at present the physiological evidence identifies the active principle of Wanika arrow poison with strophanthin.

In the absence of a name I have called this poison after one of the tribes who employ it.

[*The discussion on this paper is printed at p.* 849.]

COMMERCIAL NOTES ON OPIUM.[*]

BY KARL VON SCHERZER,

Austrian Consul-General at Smyrna.

Among the many productions of Anatolia, nothing is so important, from a commercial point of view, as that most precious export, opium.

Asia Minor is the most northern part of the vast regions adapted to the cultivation of the poppy. From the East Indies this cultivation has gradually extended to Egypt, Algiers, Anatolia, and lastly to Persia, where, towards the close of the last century, the Dutch Colony, the members of which mostly had important establishments in Asia Minor, introduced the poppy. The Society of Commerce of the Netherlands, which had frequent dealings with the Dutch colonies in India and Java, gave the first impulse to this great trade. Even now this society buys about a quarter of the regular crop, to cover the requirements of its commerce in the Indian archipelago. Formerly opium was only used by smokers and exclusively by Asiatics.

Opium requires a sandy clay soil, which must not have lain fallow, but be prepared for this crop the year before. If the land has not been already manured, it should be well fertilized with stable manure, and ploughed twice, the second time at right angles to the first. The seed is put in the second furrow, which should not be too deep. In order to cover the seed lightly, a tree, with all its branches, is dragged across the field thus tilled, by oxen. But care must be taken that the soil does not become too wet in the interval between the cultivation and the sowing, and that the covering is but light. The light-coloured seeds are preferred, that is those which are yellow or white. They produce plants with white and yellow flowers, and vigorous poppies, which yield an abundant juice and a clear gum, while the grey or black seeds, which have blue and dark red flowers, have small heads, contain less juice, and give a dark coloured opium. Moreover, chemical analysis shows that light coloured opium contains more morphia than dark. They reckon about ¾ lb. (fiscal pound) of poppy seed for each dunum,[*] which before being sown must be mixed with four times the quantity of sand or fine earth, so that the ground may be evenly sown in equal proportions, which would be difficult with the seed alone. The end of October and the beginning of November are considered most favourable for sowing, especially when the fine weather following the first rain has prepared the ground for cultivation. The sowing is done exactly the same as for poppies in European gardens.[†] The germination takes about fifteen days. Should frost occur, and the seeds not open on account of the earth being covered with a hard crust, the land is cultivated and sown again at the end of November or the beginning of December. While winter lasts, the plant remains small, and grows only by the root, which, in a well pulverized soil, becomes strong and does not suffer from night frosts, even if the plant itself was injured. When spring comes, the development is rapid, according to the vigour of the root and the success of the seedlings. The plant is then trimmed and thinned; weeds are destroyed, and poppy stalks, when too crowded, also. Sometimes, when weeds grow afresh, a second weeding is necessary. The plant then increases rapidly, and puts forth from one to four stalks, 3 or 4 feet high, which flower at the end of April or the beginning of May. The poppy heads come to maturity about fifteen days after the flowers fall. Its ripeness is tested by gentle pressure with the finger. The ripe poppy-head is soft; when green it is hard. One must learn to perceive the ripeness at the proper time, for the incisions should then be made immediately. The harvest itself should be gathered in a few days; otherwise the over-ripe poppies, that is to say, ripe poppies left unpicked for six or eight days, give no juice.

The incisions are made in the afternoon, with a small curved knife. The incision is made half way up to the head and around it. To this end the poppy is grasped with the thumb and fore-finger of the left hand, and half the incision made with the right, after which, without otherwise shifting one's position, the poppy is slightly turned round, and the incision completed. As soon as the blade (which should never penetrate the capsule, for if this be cut through, the juice is lost) enters, the white juice of the poppy escapes and flows about the cut. It is then left to dry in the sun in its place for six or eight hours. By this time it will have thickened, and changed to a yellow resinous substance which later on becomes a reddish-brown. It is then taken off with a knife and kneaded into spherical cakes of various sizes, seldom weighing more than 2 lbs. (fiscal[‡]) each. These cakes, wrapped in poppy leaves, are dried in the sun for several days. The cakes, while yet soft, are packed in baskets, or in little osier packages lined with cloth. To prevent the cakes from becoming disfigured, or sticking to one another, they are always dusted over with the dry fruits of a species of *Rumex*. To get in the crop of 5 *dunums*, a harvest which we have before said must be quickly gathered, requires ten labourers. The average yield of a *dunum* is estimated at 4 lbs. (fiscal) or thereabouts.

In Asia Minor the cultivation of opium is only successful in the valleys of Kutaja, Ushak, Karahissar, Balikesri, Afium, Sparte, and Konijah, which are mostly protected from cold winds by high mountain ranges, and where the deep soil, adapted for wheat, is especially suitable for the poppy. The principal arrivals from the interior reach Smyrna at the end of July or the beginning of August. Fresh opium is too heavy for sale. The older opium, which is dry, and therefore costs more, is preferred.

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[*] Taken from his recent work: 'Smyrne, considerée au Point de Vue Géographique, Economique et Intellectuel.' 2de édit., 8vo. Leipzig, 1880. Reprinted from *New Remedies*, January, 1881.

[*] A *dunum* is a piece of ground 900 square metres.—*Ed. N. R.*

[†] The common poppy, cultivated in central Europe for its seed alone, gives excellent opium, it is true, but its extraction being only practicable on a large scale, this opium is too expensive.

[‡] The author means the Custom House Pound (Zollpfund) of the German Custom's Union (Zollverein) 1 kilo = 1·963 Zollpfund. 1 Zollpfund = 509·4 grams.—*Ed. N. R.*

The sale concluded, the opium is examined in the presence of both buyer and seller by an expert, recognized as such by all the merchants, and all pieces of a different quality, or mixed with foreign matters, so as to be worthless, are rejected. The condemned portion is returned to the seller, who disposes of it at 20 or 30 per cent. discount to French and German manufacturers of morphia. The opium inspected is hermetically sealed in tin boxes, and cased in wood, when it is ready for export. The best opium comes from the Kutaja or Kutachia district, that is, from the village of Bogaditsh and its neighbourhood. It is in rather small round cakes, of a light brown colour, with bluish gloss, and diffuses a pungent odour. It contains from 11 to 11½ per cent. of morphia.

The opium known to commerce by the name of *yerli*, and which comes from the western districts (Kintabir, Akhissar, Kirkagatah) only contains from 8 to 10 per cent. Another kind, called *Roba mercantile* or *Roba commune*, cultivated in Afium Karahissar, is very common in the market. This last production, which is in dark coloured cakes, almost black, contains but from 7½ to 9 per cent. of morphia. Finally, the poorest kind, furnished by the province of Konijah, the cakes of which are small, very hard, and dark coloured, contains only 7 to 8 per cent. of morphia, and is sold under the name of *adet* (ordinary).

The price of opium depends above all on the year's crop. This has varied of late years between 4000 and 7000 baskets of about 150 lbs. each. Usually, however, when 4000 baskets (*couffes*) are harvested, the average price per *tsheki*[*] is 200 piastres, which corresponds to 23*s.* 7*d.* per English pound; 34 francs the ½ kilogr.; 18 fl. 15 kr. the Vienna pound; while a harvest of 7000 baskets will reduce this price to 120 p. = 14*s.* 2*d.* the English pound, 20 francs 46 c. the ½ kilogr., 10 fl. 75 kr. the Vienna pound, free on board at Smyrna. The harvest is less when, for example, either want of rain has delayed the sowing fifteen days, or when hard frost has injured the plant, or when the months of March and April pass without rain, or if this should come at the time of ripening.

The price of opium is also governed:—

1. By the reserves from the last harvest in the warehouses of Smyrna and London, which are the chief markets for opium.

2. By the demands of America, which has for some years required a large quantity of opium for her Western States, where this article is not used so much by physicians as by the Chinese immigrants (since the construction of the Californian railways) who smoke it largely.[†]

3. By the Persian and Indian crops. Persia has for some years cultivated opium with some success, and the European markets were abundantly supplied with opium from this source, when the famine, which in 1871 desolated Persia, put a temporary end to its cultivation. India, really the chief opium producer, cannot satisfy the Chinese demand, even when the harvest is a maximum one, but supplies itself from London and Smyrna.

4. By supply and demand.

The prices, which often fluctuate 100 per cent. per tsheki in one season, that is to say, from August until May, offer ample scope for speculation. More than one-fourth thus changes hands annually; furthermore, the same state of affairs exists in the markets of London and New York. We may add that opium is an article of daily sale, and therefore the speculation is independent of the consumption. It frequently happens that prices are lower in foreign markets than where it is produced.

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[*] A *tsheki* is a weight, differing for different products. A *tsheki* of goat's hair is 2 heavy *okas* or 800 drams = 2561 grams; a *tsheki* of opium is $27\frac{1}{41}$ heavy *okas*, or 34 kilos 587 grams, or 76·22 lbs. avoird.—*Ed. N. R.*

[†] This is not exactly the case. Probably the larger portion of this opium finds its way into patent medicines and into the hands of persons addicted to opium eating. It is well known that many of the Chinese in the United States smoke opium. For this purpose an extract of opium must be prepared, and it is not unlikely that some Chinese in the U. S. are engaged in its manufacture. Certainly there is but little opium for smoking imported, as the custom house returns show.—*Ed. N. R.*

THE ANALYSIS OF SOAPS.[*]

BY JUL. LOEWE.

For the determination of moisture the author takes from 8 to 10 grams, shaved very finely, and dries them first, at 60° to 70°; afterwards at 100° to 105°. If it is supposed that the soap contains caustic alkali, the process must be conducted in an atmosphere free from carbonic acid. The free alkali may also be determined before the process of drying by exposing a portion of soap, shaved very fine, and weighed upon a watch-glass in a cylinder filled with dry carbonic acid, and closed, the proportion of caustic alkali being calculated from the increase of weight. The exposure must not last too long, in order to prevent the formation of bicarbonate.

To determine free unsaponified fat, the portion of dried soap is thrown into a rather high beaker capable of being well covered, and extracted with benzol or petroleum with the aid of heat, according to the method of Perutz, and decanting, when clear, into a small tared flask. If the decantation is difficult, it is passed through a weighed filter, which is afterwards used for the alcoholic solution of the soap. After two or three extractions the filtrates are collected and distilled, the residue dried at 108°, in a chloride of sodium bath, and the increase of weight of the flask is noted, which shows the proportion of the non-saponified fat.

The residue freed from such fat is covered with about 8 to 10 parts of alcohol at 90 per cent., and heated to 40° to 50° in the water-bath. Caustic alkali, and that in combination with fatty acids, along with glycerin, are readily dissolved, whilst soda (carbonate), farina and mineral impurities remain undissolved, and after washing with hot alcohol, and drying at 100°, may be weighed. In the better class of soaps, the residue does not exceed 1 to 1½ per cent.

A moderate stream of well-washed carbonic acid is then allowed to play upon the surface of the warm alcoholic filtrate. Caustic alkali, if present, is deposited as alkaline carbonate. The beaker is covered, allowed to stand till clear, heated in the water-bath, the contents filtered, and the filter is washed with warm alcohol. In the aqueous solution of the residue the carbonate of soda may be determined volumetrically.

The second alcoholic filtrate, thus freed from soda, is mixed with sulphuric acid diluted with alcohol as long as a turbidity is produced. When clear, the sulphate of soda deposited is filtered off, collected upon a weighed filter, washed with alcohol, dried at 110°, and weighed. The weight shows the alkali which was in combination with the fatty acids.

The filtrate is acidulated with sulphuric acid, mixed with water, and freed from alcohol by evaporation in a platinum capsule. When cold, the acid aqueous extract which may contain glycerin is separated from the congealed fatty acids by filtration. These acids, as well as the glycerin, may be determined by known processes, the latter after the accompanying sulphuric acid has been saturated with barium carbonate.

The residue, insoluble in alcohol, after being weighed, is washed with cold water till the filtrate makes up exactly 60 c.c. The water is then driven out of the filter by means of alcohol, and the residue is dried at 100°.

After being weighed the residue is submitted to microscopic examination in order to detect starch. Mineral impurities are sought for by ordinary analytical methods.

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[*] *Zeitschrift für Analytische Chemie.* Reprinted from *New Remedies*, January, 1881.

The Pharmaceutical Journal.

SATURDAY, APRIL 9, 1881.

INTERNATIONAL PHARMACEUTICAL CONGRESS.

It will be seen from the report of the proceedings of Council last Wednesday that the projected meeting of the International Pharmaceutical Congress this year in London may now be looked forward to as a certainty. Already a sufficient number of foreign pharmacists have announced their intention to be present on that occasion to make it likely that the meeting will be a successful one, and it is to be hoped that many of those who are yet uncertain whether they can attend will be able to do so.

The Committee appointed by the Council last Wednesday, to act as the executive body in making the necessary arrangements for the Congress has already held two meetings, at which additional members have been placed on the Committee, and various preliminary steps of organization have been taken. In the first place, we may state that the time for holding the three business meetings of the Congress has been fixed for the 1st, 2nd and 3rd of August, and that on the 30th of July there will be a conversazione at the house of the Pharmaceutical Society for the official reception of visitors and for the purpose of personal introductions. On the following Monday the first business meeting will commence at eleven o'clock, and after the delivery of an address by the President of the Pharmaceutical Society, welcoming the visitors, a President and Officers will be elected to carry out the special business of the Congress.

A programme of the proceedings has been drawn up provisionally, and in the course of a few days it will be distributed both abroad and at home among those who may be expected to take part in the Congress. It is proposed that the subjects to be discussed shall be arranged under three separate heads, one day being devoted to each. These subjects are pharmaceutical education, Pharmacopœia revision and the equalization of the strength of official preparations containing potent drugs. This last named subject, which may be regarded as the most feasible step towards the establishment of an International Pharmacopœia, is one that has on various occasions been referred to as of considerable practical importance, not only to pharmacists and medical men, but also to the general public, and it to be hoped that its discussion at the Congress may lead to some means being devised for bringing about international uniformity in certain preparations commonly employed in medicine.

Pharmaceutical education, and the means by which it may be made more conducive to placing pharmacists in a position commensurate with the advances that have been made in the educational training of medical men, now engage the consideration of the pharmacists of most countries, and the state of things prevailing in our own country ought to make the discussion of this subject especially interesting.

We have so recently referred to the subject of Pharmacopœia revision, and to the desirability of an official representation of pharmacists in the body entrusted with that important work, that it is unnecessary now to do more than point to the International Congress as a suitable opportunity for discussion in this respect, and for obtaining an expression of opinion that may be beneficial in rendering the case of British pharmacists less exceptional than it has been hitherto.

At present it would be premature to say anything as to the precise mode in which these subjects are to be placed before the Congress for discussion, but we believe it is the intention of the Executive Committee to ask for expressions of opinion on the various points of detail coming under one or other of the heads above mentioned, and if sufficient material for the purpose be furnished in that way to collate the views put forward and prepare reports to submit to the meeting.

It has also been decided that the Executive Committee should at once communicate with the Presidents of Pharmaceutical Associations in the provinces, requesting their co-operation in arranging for the forthcoming Congress, and in the meantime we take this opportunity of expressing our hope that such assistance will be liberally accorded.

THE BENEVOLENT FUND.

The Benevolent Fund, established by the Pharmaceutical Society for the relief of unfortunate pharmacists or their relatives, is, in some respects, certainly one of the most successful achievements of the Society, and it might have been expected that when, at the passing of the Pharmacy Act, its benefits were made available for all members of the trade there would have been a proportionate increase in the number of subscribers to the Fund. But since that time it has always been a source of regret that this has not been the case and that a very large majority of the chemists and druggists never subscribe to the Fund at all.

The total number of subscribers to the Fund does not amount to two thousand, although the number of those for whom the Fund is applicable is between thirteen and fourteen thousand. Consequently it is evident that, as a natural result of this disproportion between subscribers and non-subscribers, there is the probability that a majority of the applicants for relief at any time will not have any claim upon the Fund, in so far as having formerly been subscribers to it would constitute such a claim. Under present conditions, therefore, the applicants for relief who have been subscribers are placed at a disadvantage as compared with others who have never subscribed to the Fund.

Mr. **Robbins** long since pointed out this circumstance as being one that required consideration. Though it may be pleasant to look upon the Benevolent Fund as a pure charity, supported by the well-to-do for the benefit of the needy, it must not be forgotten that as between those unfortunate members of the trade who are compelled to seek relief from the Fund it is a positive injustice that those who have contributed to it all their life should only stand a chance of sharing equally with others who had never contributed to the Fund at all.

The most satisfactory mode of doing away with this unfairness would unquestionably be increasing the number of subscribers to the Fund so largely that it might be regarded not only as a charity, but to some extent also as a benefit club, from which any unfortunate but deserving member of the trade might look for relief, partly because he had been a contributor to it in his prosperous days. Such a development of the Benevolent Fund and of its beneficial influence is, however, to be looked for only as a result of more zealous action on the part of the Society's Local Secretaries. The prosperity of the Fund depends to a very great extent upon their efforts, and when it is possible to instance such facts as those mentioned by the Society's Secretary at the last Council Meeting, there can be no question that some of the Local Secretaries do not do all they might do towards obtaining subscribers.

It is in that direction that we think improvement is most desirable. No doubt it may be wished that the trade comprised more charitable people; but to be practically charitable it is necessary that one should be moderately wealthy, and by far the larger proportion of those connected with the drug trade will have less reason for contributing to the Benevolent Fund from that motive alone than from consideration of the possibility that by some unexpected reverse of fortune they may be compelled to have recourse to it for assistance. Out of regard for the kind of charity which begins at home, however, there ought to be a much more numerous list of subscribers to the Fund; and even if the amounts subscribed were small, the fact of its being generally supported by the trade would be in itself a very considerable gain.

THE ROYAL COMMISSION ON MEDICAL REFORM.

The *Lancet* states there is good reason to believe its arguments against the formation of a Commission on medical reform in which medical men should be conspicuous by their absence have prevailed with the Government so far as to lead to the abandonment of the idea, and that we may look confidently to the formation of a Commission so composed as to command the respect of the medical profession and of the public. We congratulate our contemporary on its success in this respect and hope that in similar cases this recognition of its views will serve as a precedent for the due representation of technical interests in other bodies that have to deal with matters affecting those interests.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, April 6, 1881.

MR. THOMAS GREENISH, PRESIDENT,

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present—Messrs. Andrews, Atkins, Butt, Churchill, Frazer, Gostling, Hampson, Hills, Mackay, Radley, Richardson, Robbins, Sandford, Savage, Squire, Symes, Williams and Woolley.

The minutes of the previous meeting were read and confirmed.

The Late Mr. Abraham.

The **President** read a letter which had been received by the Secretary from Mrs. Abraham, thanking the Council for the letter of sympathy sent last month.

Nominations for Council and Auditors.

Council.

The Secretary reported that he had received *twenty-four* nominations to fill the fourteen vacant seats on the Council, and that the following *sixteen* had declared their readiness to accept office if elected:—

Bottle, Alexander, 37, Townwall Street, Dover.
Butt, Edward Northway, 13, Curzon Street, W.
Carteighe, Michael, 180, New Bond Street, W.
Churchill, Walter John, 46, New Street, Birmingham.
Gostling, Thomas Preston, Market Hill, Diss.
Greenish, Thomas, 20, New Street, Dorset Square, N.W.
Hampson, Robert, 205, St. John Street Road, E.C.
Hills, Walter, 338, Oxford Street, W.
Radley, William Valentine, 42, Hampton Road, Southport.
Robbins, John, 372, Oxford Street, W.
Richardson, John George Frederick, Houghton House, Stoneygate, Leicester.
Spink, Harry Nelson Bowman, 3, Marsham Street, Westminster, W.
Symes, Charles, 14, Hardman Street, Liverpool.
Williams, John, 16, Cross Street, Hatton Garden, E.C.
Wills, George Sampson Valentine, 116, St. George's Road, Southwark, S.E.
Woolley, George Stephen, 69, Market Street, Manchester.

The following *eight* nominees had declined or had not expressed their willingness to accept office:—

Bell, William Henderson, 96, Albany Street, Regent's Park, N.W.
Gulliver. William, 6, Lower Belgrave Street, S.W.
Hills, Thomas Hyde, 338, Oxford Street, W.
Sandford, George Webb, 47, Piccadilly, W.
Savory, Arthur Ledsam, 143, New Bond Street, W.
Shepperley, George, Long Row, Nottingham.
Wade, John, 174, Warwick Street, Pimlico, S.W.
Young, John Rymer, 42, Sankey Street, Warrington.

Auditors.

The following had been nominated as Auditors for election in May next, and had declared their willingness to accept office:—

Hodgkinson, William, 74, Golden Lane, E.C.
Lescher, Frank Harwood, 60, Bartholomew Close, E.C.
Stacey, Samuel Lloyd, 300, High Holborn, W.C.
Thompson, Henry Ayscough, 22, Worship Street, E.C.
Watts, William Manning, 32, Lower Whitecross Street, E.C.

Mr. **Mackay** said he supposed it would be of no use to make any remark on the list which had just been read, but he could not allow it to pass without saying that he felt personally an amount of regret which he was unable to express that Mr Sandford and Mr. Hills declined to be put in nomination. There were so many associations connected with those gentlemen, both as regarded the Council and the Society, that he was sure the regret he felt must be shared by all who wished well to the Society.

Mr. **Savage** hoped those gentlemen would reconsider their decision.

The **President** feared it was now too late to do that. He was sure it would be with great regret the whole of the Council would find that Mr. Sandford's name was not amongst those who had accepted nomination, and the same with respect to Mr. Hills. Ever since he had been on the Council, which was now a long time, those gentlemen had given the utmost attention and a large amount of time to the business of the Society, and he was sure it would be a great loss to the Council to part with such able members.

Mr. **Gostling**, as a comparatively young member of the Council, wished to supplement what had been already said. He was sure that every member of the Society would feel great regret that those two gentlemen thought it desirable to withdraw. In fact their names had been so intimately mixed up with the Society that it would be a matter of great regret to find that they no longer appeared at the Council Board.

Mr. **Savage** was sure that the regret which had been expressed would not be confined to that Council, but would be shared throughout the country. It would not only be a matter of regret, but also of surprise, that two such able men should retire.

Mr. **Frazer** said he did not like to be silent on this occasion, though he felt too deeply to say much. When he was first elected on the Council, being perfectly ignorant, he was ashamed to say, of the politics of the body, he had waited on Mr. Sandford, who had received him with a kindness which could not be surpassed. He felt sure the Society at large would feel the loss very deeply.

Mr. **Atkins** said that to him it was not merely a matter of regret, but also of surprise, and he was perfectly unprepared for it. It was true he had heard some time ago that Mr. Sandford contemplated such a step, but he had hoped that second thoughts had prevailed over first. He could hardly realize the existence of the Society apart from Mr. Sandford, and he extended the same remark to Mr. Hills, whose generosity, kindliness and sound common sense had always been available, and he had no idea that he was contemplating such a step.

Mr. **Richardson** said he must add his humble tribute, as one of the youngest members of the Council, to the discussion. Coming from the midland counties, he could assure the Council that the names of Mr. Hills and Mr. Sandford were household words in pharmacy. He could only regret that this step should have been taken in a crisis of the history of the Society, when it was about to go to Parliament for further powers. Mr. Sandford had assisted in the foundation of the Society, and Mr. Hills was one of the connecting links with Jacob Bell, whose portrait adorned the Council room walls. To him it would be a sad thing to come into the room, month after month, and to miss their faces. The present resignation could not be helped, but he hoped that after a year's rest the Council might have them back again. At any rate, he hoped the Council would not lose the name of Hills, for he saw a gentleman of that name on the list of nominees, and he hoped he would be returned.

Mr. **Williams** said he had, perhaps, been thrown more into contact with those gentlemen than many other members of the Council, and when he found they intended to retire he could only say he looked upon it as nothing less than a calamity. He was quite sure that the Society and the trade at large would suffer severely from their absence. In times of difficulty, when the Society required good calm judgment and advice, it had found both gentlemen, especially Mr. Sandford, the very men it required—the men to guide when in difficulties. If he had known that they were going to retire he should not have allowed his own name to remain on the list. He had wished to retire, but had been persuaded to remain on a little longer; but he should certainly feel it a great loss to be without the assistance and advice of those gentlemen.

Mr. **Radley**, as one of the founders of the Society, could not help rising to say how much he regretted the removal of two gentlemen who had been so long connected with the Council. The founders were a small number, and were getting less year by year, and this was a serious loss to sustain at such a time.

Mr. **Sandford** said he must ask the indulgence of the Council for a few minutes, after the kind expressions which he had heard all round the table, regarding Mr. Hills and himself. It had been an effort to him to withdraw his name from the Council, having sat at the table for nearly thirty years. He had formed at that table some of his most intimate friendships, and although many had passed away on whose memory he looked with the greatest possible regret, yet he still saw about him many with whom he should have been glad to have associated with longer. But he felt that he was worn out; 17, Bloomsbury Square, had become a sort of second home to him; no doubt the Secretary would say that he had been there in season and out of season, but he felt that he could not longer continue. It had been a great pleasure to him to do what he could for the benefit of the Society, and at such a time as this he felt there might be a question about retiring, because he knew that when the Society was going to Parliament for an amendment of the Pharmacy Act, it was desirable to have on the Council men who lived on the spot, and who could get at members of Parliament to a certain extent. He was very glad, however, to see the name of Hills on the list of candidates, for he was afraid that his own retirement had, to some extent, set the example to Mr. Hills, but Mr. Hills happily had a relative of the same name, who he hoped would succeed him. He could assure his colleagues that he felt most deeply the kindness he had always experienced at their hands. Of course they differed occasionally, but he left that Council table without one single drop to embitter his cup in recollection of his attendance there. It had always been a source of pleasure to him to be associated with the Council, but he now felt that there ought to be on the Council more active men—not more active than he had been, he was happy to think—but more active than he could be now, and that the Society would benefit by the change. He could only thank the Council for the very kind expressions which had been made.

Mr. **Hills** also thanked the Council for what had been said. It was a great blow to him to leave the Council, but he felt that it was time to do so. He had been about twenty-one years upon it, and he thought it was better now to leave the work to younger men. He could thoroughly re-echo the sentiments of Mr. Sandford, and he believed that if his nephew were elected he would do his duty in a straightforward and honourable manner. He begged again to thank the members of the Council for their kind expressions.

Mr. **Symes** said he should not rise merely to repeat what had been already said by so many, but he hoped the Council would not altogether lose the benefit of these gentlemen's advice when required, or when the President might think it desirable to seek that advice. He was perfectly sure they would be ready to afford that help.

Mr. **Savage** suggested that the Council ought to pass a special resolution expressing its regret at losing the services of these two gentlemen, and hoping to have the assistance of their advice when occasion required. He would give notice of motion for such a resolution for next month.

Henry Bates, of Oldham, an Associate of the Society before 1842, was restored to his former position in the Society upon payment of the current year's subscription and a fine.

ELECTIONS.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Barnes, James William	London.
Bates, Henry	Oldham.
Burrell, Thomas	Montrose.
Ekins, Charles	London.
Fowler, William	Bath.
Gifford, Richard Lord	Blackburn.
Morgan, William	London.

Chemists and Druggists.

The following registered chemists and druggists, who were in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Bagshaw, Henry Braddock	Birmingham.
Davies, Charles	London.
Dixon, William	Ash, next Sandwich.
Garman, Cornelius Edwin	London.
Kirkby, William	Sheffield.
Parkins, Thomas	Salford.
Reckless, Arthur Henry	Ashbourne.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Callander, William Wright	Ilminster.
Cooke, Edmund Herbert	Totnes.
Farquhar, Robert Forbes	Insch.
Francis, Matthew Robert	London.
Golding, John Frederick	London.
Gooch, William Hobbs	Dedham.
Martlew, Thomas	Carlisle.
Maurice, James	Plymouth.
Tucker, William Tyley	London.
Warren, Francis William	London.

Modified.

Attenburrow, George John	Eastbourne.
Bridgman, William Louis	St. Mary Church.
Carter, James	Bamber Bridge.
Coates, Edwin	Edinburgh.
Millidge, Alfred	Newport, I. W.
Williams, James	London.

ASSOCIATES.

The following, having passed their respective examinations and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Austin, Charles Wilson	Surbiton.
Bond, Peter Gillard	Kingsbridge.
Chisholm, Alexander	Edinburgh.
Dobson, Fred Ainsworth	Great Driffield.
Fletcher, James Edward	Saltley.
Gould, Henry Thomas	Newport, I.W.
Johns, John	Llandilo.
Matthews, Herbert Rouse	London.
Nelson, Harry	York.
Peat, Joseph	Accrington.
Stephen, James, junr.	Gamrie.
Watts, Francis Wapshare	Banbury.

Modified.

Thomas, Joseph Josiah	Ryde.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Elston, William Alfred	London.
Evans, Evan	Carmarthen.
Foulds, Robert, junr.	Liverpool.
Fraser, John	Edinburgh.
Hamilton, Bruce	London.
Hamilton, Henry	Finchley.
Hemstead, Alfred Joseph	Rochester.
Latham, Walter Joseph	Spalding.
Lees, James Nall	Rochdale.
Roberts, Lewis	Aberystwith.
Taylor, Thomas Ernest	London.
Thomas, David	Pontypridd.
Whitford, William	London.
Wright, Charles Franklin	Great Yarmouth.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The name of the following person, who had made the required declaration and paid a fine of one guinea, was restored to the Register of Chemists and Druggists:—

Charles Mackaness, High Street, Chesham, Bucks.

ADDITION TO THE REGISTER.

The Registrar reported that—

David Edwards, 67, Hall Street, Stockport,

having made the statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been supported by a duly qualified medical practitioner, his name had been placed on the Register.

HONORARY MEMBERS.

The Council went into Committee to select names for election in May as honorary members, and four names were ordered to be suspended in the Library in the usual way, for one month preparatory to election.

AUDITORS' REPORT.

The Secretary laid on the table the Auditors' report for the financial year ending December 31, 1880.

REPORTS OF COMMITTEES.

FINANCE.

The report of the Finance Committee was received and adopted, and sundry accounts ordered to be paid.

HOUSE.

The report of this Committee was mainly confined to a statement that estimates would be obtained for the tablets to be erected recording the names of prizemen and donations to the Benevolent Fund.

Mr. RICHARDSON hoped these tablets would be erected before the Annual Meeting.

The PRESIDENT said it was just possible this could be done, but it was rather doubtful, as the boards would require time to thoroughly dry before being erected.

Mr. RICHARDSON said it was very desirable in the interest of the Benevolent Fund that they should be up by the Annual Meeting.

The report was received and adopted.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£10 to the widow of a late annuitant, aged 45.

£10 to the widow of a former member, aged 63.

£10 to the widow of a former member, aged 39.

£10 to the widow of a former member, aged 46.

£10 to the widow of a former member, aged 61. This applicant has had several former grants.

£5 to the widow of a late annuitant on the Fund, aged 67.

£10 to the widow of a registered chemist and druggist, formerly in business, but lately an assistant, aged 46.

£15 to the widow of a former member, aged 64.

£15 to a former member, aged 68.

£10 to the daughter of a former member, who has had several previous grants.

£10 to one of the unsuccessful candidates for an annuity at the late election, aged 74.

Several other cases had been before the Committee, and deferred for further information. Two applications the Committee declined to entertain.

The report and recommendations were received and adopted.

The President said he might be allowed to make an observation with regard to the condition of the Benevolent Fund. Last month the Committee had twenty-three applications for relief, and although he did not think a deserving case had ever been passed over, the Committee was now obliged to ask the question—Could the Fund afford it? The subscriptions were not coming in as readily as could be wished, and possibly these few remarks might induce chemists and druggists throughout the country to subscribe to the Fund. He might say, and he did so with great pleasure, that the Secretary would by-and-by announce the receipt of a cheque for fifty guineas from the Chemists' Ball, and though he was almost afraid to say anything in favour of dancing before his Scotch friends, he thought it was very gratifying to find that so much benefit to the Fund had arisen from what a Scotch preacher had described as "expressing the emotions of the mind by the rhythmic action of the lower limbs."

Mr. Hampson said the Committee was exceedingly anxious about the condition of the Fund, which was certainly not in a prosperous state. On the previous day several members had spoken on one subject, viz., that the time might arrive when the recipients of the Fund should be only those who had contributed to it at some time or other. The whole thing might have to be re-arranged. The large number of chemists who, as the law stood, were entitled to apply for relief, as compared with the small number who contributed to the Fund, made it very sad to contemplate the future. He hoped it would not be necessary to alter the conditions, and exclude those who did not contribute; but unless there was a better response in the future, he feared it would have to come to that.

The Secretary said the prosperity of the Fund depended in a great measure on the efforts of the Local Secretaries. He could mention one case in which the Local Secretary, in a place where there were only three members connected with the Society, had got ten subscribers to the Fund. In another place, where there were ten members, the Local Secretary said no one would subscribe to the Fund.

Mr. Symes said he happened to be Local Secretary for Liverpool, although he had only recently been appointed, and therefore his remarks might not have so much weight as if he had had longer experience. He suggested that it would be a great advantage if the Local Secretaries had the list of members whose subscriptions they were desired to collect placed in their hands earlier, and if the list were arranged alphabetically and the addresses added.

Mr. Savage noticed that in the Auditors' report it appeared there was one annuitant less than last year, but the absolute outlay was £60 14*s.* less.

Mr. Williams said he thought the annuitant only died late in the year.

Mr. Robbins said the Benevolent Fund was rather over-weighted. He had brought the subject forward some time since, when he did not meet with much support; but he found now that several gentlemen were beginning to see that it required consideration. There were less than 2000 subscribers, whilst the Society numbered about 4000; but the benefits of the Fund were applicable to something like 13,000 or 14,000. It was a question which must be taken seriously into consideration before long. It was hardly fair that those who had contributed all their lifetime should only come in for an equal share in the end with those who had never contributed at all.

Mr. Williams said the Benevolent Fund was not a benefit club; it was a charity, and those who subscribed to the Fund did so from charitable motives. He did not suppose that any of the subscribers did so with the idea of coming on the Fund themselves, but, unfortunately, it did happen sometimes that they were compelled to do so, and it was always very painful to the Committee when this was the case. He wished there were more charitable people in the trade who would take this view of the Fund, that it was a charity intended for all who were connected with the trade. If it were to partake of the character of a benefit club, into which persons might pay so much per month or per annum, with the expectation after so many years of being able to draw an annuity, the whole thing would have to be altered.

Mr. Robbins remarked that charity began at home.

Mr. Symes suggested that it would be well to issue a new form of circular, which might have more effect than the old stereotyped form which had been in use for some time.

Mr. Richardson was rather disappointed at some of the remarks which had been made, especially those of Mr. Hampson, because on a previous occasion that gentleman had stated that the Benevolent Fund was in a very flourishing condition, and had pooh-poohed a proposition he had made with a view of increasing its resources. He maintained that the rich ought to assist the needy, and he cordially agreed with Mr. Williams that the benefits should be extended to all persons engaged in the trade. But it must be remembered that pharmacy, especially in the country districts, had been much under a cloud during the last few years. Still he hoped the Fund would receive larger donations and subscriptions from those who could afford to help their poorer brethren.

Mr. Hampson asked what Mr. Richardson referred to, when he said that he had pooh-poohed a suggestion for the benefit of the Benevolent Fund.

Mr. Richardson said he referred to the suggestion that all persons or firms who contributed certain sums should have their names inscribed on a tablet; when Mr. Hampson remarked that donations might be given simply for advertising purposes. It appeared to him that that did not matter so that the Fund benefited; and there were some people undoubtedly whose pockets could only be got at by an appeal to their self-interest.

Mr. Radley was very pleased to report, in contrast to the supineness of many of the trade, that a surgeon of his acquaintance, who had formerly been a chemist, subscribed a guinea annually to the Benevolent Fund.

The President said he hoped the few remarks which had been made would produce a good effect. If the applications received by the Committee could be printed, he was sure the Fund would receive large additions; but he hoped that, even without that, the same result might be attained.

LIBRARY, MUSEUM AND LABORATORY.

Librarian's Report.

The Librarian's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
February	Day	347	22	8	·14
	Evening	140	11	1	7

Circulation of books.	Town.	Country.	Total.
February	183	131	314
Carriage paid	£2	7*s.*	6*d.*

The undermentioned donations to the Library had been received:—

Attfield (J.), Chemistry, 9th ed., 1881.
From the Author.
Baildon (H. B.), The Spirit of Nature, 1880.
From the Author.
Milton (J. L.), Hygiene of the Skin, 1879.
From Dr. Cattell.
New South Wales, Legislative Assembly, Report on Museums for Technology, Science and Art, etc., in Europe, by A. Liversidge.
From the Reporter.
New South Wales, Department of Mines, Annual Reports for 1878 and 1879, with maps.
Royal Society of New South Wales, Journal and Proceedings, 1879, vol. 13. From the Society.
Dragendorff (G.), Altersbestimmung der Hühnereier.
Schwartz (N.), Über das Verhalten einiger Antiseptica zu Tabacksinfusbacterien, 1881.
Zander (A.), Chemisches über die Samen von Xanthium Strumarium, 1881.
From Professor Dragendorff.
Schär (E.), Über Cortex Quebracho, 1881.
—Zur Übersicht und Kritik der Desinfektionsmittel, 1881. From the Author.

The Committee recommended that the usual letter of thanks be sent to the respective donors.

The Committee also recommended the purchase of the undermentioned works for the Library:—

British Homœopathic Pharmacopœia, 2nd ed., 1876. (A second copy.)
Church (A. H.), Laboratory Guide, 4th ed., 1877.
Helmholtz (H.), Popular Lectures on Scientific Subjects, 1881. 2 vols.
Helwig (A.), Das Mikroskop in der Toxikologie, 1865.
Jackson (R. E. Scoresby-), Note Book of Materia Medica, 4th ed., 1880.
Khory (R. N.), Digest of Medicine, with Tables of Indian Materia Medica, 1879.
Proctor (B. S.). Lectures on Practical Pharmacy, 1873. (A third copy.)
Wallace (A. R.), Island Life, 1880.

Curator's Report.

Attendance.		Total.	Highest.	Lowest.	Average.
	Morning .	350	30	6	15
	Evening .	74	13	0	8

The following donations were reported:—

Specimen of Pure Resorcin.
From Mr. W. Martindale.
Specimen of False Sassafras.
From Messrs. Hearon, Squire and Francis.
List of the Plants in the Koishikawa Botanical Gardens, Japan.
From Professor E. Kinch, Tokio.
Specimen of Trebizond Opium.
From Professor Attfield.
Specimen of Maltese Cummin.
From Messrs. Godfrey and Cooke.

Applications for materia medica specimens had been received from the Sunderland Chemists' Assistants and Apprentices' Association.

The Curator had been instructed to send such duplicate specimens as he was able to spare.

Letters of thanks for duplicate specimens had been received from the Kew Museum; the University of Ghent; the Bristol Pharmaceutical Association; and Professor Henslow.

The duplicate specimens of materia medica for the Bristol Museum had been despatched and a specimen of Trebizond Opium had since been handed to Mr. Schacht, for the same institution.

A few duplicate specimens for the Leicester Chemists' Assistants' Association were ready for despatch.

An application had been received from Mr. A. Dunstan, for the loan of specimens from the Museum, to illustrate the formation of salicin and its derivatives.

The Curator was authorized to lend such specimens as were required.

Exhibition of Pharmaceutical Apparatus.

A circular with regard to the Exhibition of Pharmaceutical Apparatus had been drawn up and it was recommended that a sub-committee, consisting of the President, Vice-President, Treasurer, Mr. Butt and the Curator, be appointed to make arrangements for the Exhibition.

International Pharmaceutical Congress.

The President had reported that he had issued about three hundred invitations for the International Pharmaceutical Congress, and the Committee recommended that a small committee be appointed to make arrangements for the entertainment of visitors, with power to add to its number gentlemen not members of the Council.

Annual Report.

The draft of the annual report had been considered and ordered to be printed and sent to each member of Council.

Mr. Mackay expressed his gratification at the Committee having placed two microscopes in the library for the use of students. When Dr. Maclagan suggested the same thing some years ago in Edinburgh, it was rather pooh-poohed; but he could only hope that the students who attended the library in London would find the microscopes as useful as they had been found in Edinburgh.

The President said he did not think the placing of a microscope in the museum in Edinburgh had ever been called in question; but the idea was, and to that exception was taken, that they were used in the examinations. Since he had been on this Committee, which was now some eight or nine years, the question of putting microscopes in the library or museum had never been raised. On one occasion he had asked the Council that a microscope should be provided for the use of the Curator, which should also be available for students when required.

Mr. Mackay said the fact was that in Edinburgh they had a microscope to which exception was taken, but Dr. Maclagan never suggested that it should be used in the examinations.

The report and recommendations of the Committee were then unanimously adopted.

The Boards of Examiners.

The President moved—

"That a deputation of the Board of Examiners for Scotland, with Mr. Mackay, be invited to attend the June meeting of the Board of Examiners for England and Wales."

It had been found by experience that such an interchange of visits had resulted in the examinations being as nearly as possible identical, and as a deputation from the English Board went to Scotland last year it was now the time to invite a deputation from the Scotch Board to England.

The Vice-President seconded the motion, which was carried unanimously.

The Annual Report.

The Council then went into committee to consider the draft annual report. Various verbal amendments were made, and the report was then approved, the Library, Museum and Laboratory Committee being authorized to add thereto any matter of sufficient importance which might arise before the next meeting of the Council.

Reports of Committees—*continued.*

PHARMACY ACT AMENDMENT.

This Committee had considered the Irish Pharmacy Act Amendment Bill and recommended that the Pharmaceutical Society of Ireland should be communicated with to the following effect:—That the Council desires to express its sympathy with the efforts of the Pharmaceutical Society of Ireland to obtain amended legislation, but in the absence of any special knowledge of the requirements of pharmacy in Ireland it is unable properly to discuss the particular amendments now suggested.

The Committee had also considered the memorial from the Lincolnshire Association for the Prevention of the Administration of Poisonous Drugs, etc., to Horses, and was of opinion that as most of the articles mentioned were largely used for technical purposes in various trades, to place them in the poison schedule would cause great inconvenience to the public, without remedying the evils complained of. The Committee was of opinion that if the "Drugging of Animals Act" were better known it would meet the difficulties of the case.

The Secretary had reported that no further progress had been made with the Medical Act (1858) Amendment Bill, which stands for second reading on June 29 next.

The report and recommendations of the Committee were received and adopted.

THE CONVERSAZIONE.

This Committee reported that a letter had been received from the authorities of the South Kensington Museum, granting the use of the building on the same terms as in previous years for the Conversazione of the Society in May. The Committee had instructed the Secretary to make arrangements for refreshments as before, to engage the band of the Grenadier Guards and a glee party, and to issue invitations as in previous years.

The report and recommendations of the Committee were adopted unanimously.

EXHIBITION OF APPARATUS.

This Committee had decided that a circular should be issued inviting exhibitors, and the Secretary had reported that several applications for space had been received. The Committee had decided that all applications for space must contain details of the proposed exhibits, and must reach the Secretary before April 30.

The **President** called attention to the fact that the Committee would meet every week for the purpose of making arrangements for this Exhibition, and it had also given notice that the Society could not be responsible for articles sent for exhibition. It had just had to pay for certain articles which were lost at the last Exhibition.

Mr. **Atkins** asked if any steps were taken to protect the property.

The **President** said there were assistants specially employed, under the superintendence of the Curator.

Mr. **Symes** asked if wholesale drug and chemical houses had been communicated with.

The **President** said he was not quite sure who had received invitations, but they had been sent to all who exhibited last year, and to many more than had been invited last year.

Mr. **Symes** said he had been asked within the last few days, whether wholesale houses having drugs of special character would be admitted. He was pleased to say that one firm in Liverpool was endeavouring to get some things of interest from Canada.

The **President** said it was necessary that the Committee should be careful to exclude nostrums, and to give the preference to novelties and improvements in appliances.

The report was then adopted.

GENERAL PURPOSES.

The report of this Committee included reports from Professors Redwood and Bentley as to the prize examinations at the end of the first course.

Professor Redwood had reported that ten students in his class had competed, of whom four obtained more than three-fourths of the total number of 100 marks.

Professor Bentley had reported that sixteen competitors in his class had sent in papers, of whom he recommended seven for recognition.

The Committee having opened the envelopes marked with the mottoes named by the Professors, in order to ascertain the names of the competitors, recommended that the following awards be made.

Chemistry and Pharmacy.

Bronze Medal	Frederick Charles John Bird.
Certificate of Merit ...	William Kirkby.
" "	Daniel Davies.
" "	Thomas Lewis.

Materia Medica and Botany.

Bronze Medal	John Oldham Braithwaite.
Certificate of Merit ...	Charles Walker.
" "	Frederick Charles John Bird.
" "	Andrew Hutcheson Cleland.
" "	John Henry Atherton.
" "	Thomas Lewis.
" "	Richard Henry Groves.

The report also included the usual letter from the Solicitor respecting cases which had been placed in his hands.

The Committee also had had before it certain cases of alleged infringement of the Pharmacy Act, and in two cases the Solicitor had been instructed to take proceedings.

The Council went into committee as usual to consider the report.

On resuming, the report and recommendations were adopted.

The following communication from the Privy Council was received and ordered to be entered on the minutes:—

"Privy Council Office,
"Whitehall,
"*March* 14, 1881.

"Sir,—I am directed by the Lord President of the Council to transmit to you, for the information of the Pharmaceutical Society, the enclosed copy of a report which has been received from Dr. Greenhow on the Pharmaceutical Examinations held in the year 1880.

"I am, Sir,
"Your obedient servant,
(Signed) "E. Harrison.

"The Secretary to the
"Pharmaceutical Society,
"17, Bloomsbury Square."

[*Copy.*]

"Report on the Examinations held by the London Board of Examiners of the Pharmaceutical Society during the year 1880.

"I have not for several years had occasion to report any change either in the regulations for candidates or in the mode of conducting the examinations of the Pharmaceutical Society; neither has any alteration been made in these respects during the last year; indeed, looking at the results of the examinations, I do not consider any material change at present desirable. The Minor examination, which confers all the privileges of the Pharmacy Act, as now conducted, affords a sufficient guarantee of competence to keep an open shop for retailing, dispensing, and compounding medicines. It is thoroughly practical and any increased stringency could only have the effect of adding to the already large number of candidates who are rejected.

"The first or Preliminary examination was conducted last year, as for several previous years, by the College of Preceptors, under the direction of the Board of Examiners of the Pharmaceutical Society.

"At the four meetings held for this examination, during the year, 1227 candidates were examined, 638 of whom passed and 589 failed. The rejections were therefore in the proportion of 48·0 per cent. Of the candidates who failed 26 were rejected, although they had gained the minimum number of marks in each of the separate subjects of examination, because they did not attain the aggregate number of marks required for passing the whole examination; 107 failed in all the subjects, namely, Latin, arithmetic, and English; 60 failed in English; 52 in Latin; 148 in arithmetic, and 196 in two of the three subjects.

"The large number of rejections at this examination is in accordance with former experience. It is quite evident that there is a lamentable defect in the early education of the candidates, for the examination is not a very severe one, and, with exception of Latin, might probably be passed with facility by most youths who have passed through the higher standards of education in good national schools. Indeed, even as regards Latin, many national school boys could without doubt pass this examination with ease and credit.

"According to the present regulations, it is only required that a candidate should have passed the Preliminary examination, without the intervention of any specified interval, before coming up for the Minor examination. This seems to be an objectional arrangement on two grounds; first, because it affords an opportunity for an imperfectly educated youth to obtain employment in a chemist's shop with the intention of being educated up to the standard of this examination during the three years he must be actually engaged in dispensing medicines previous to presenting himself for the Minor examination; and, secondly, because the preparation for this examination must, in the supposed case, occupy a large portion of that leisure which ought to be devoted to preparing himself in the technical and practical parts of his calling. It appears to me that these objections would be, at least in some measure, obviated if young men were required to pass the Preliminary examination previous to the commencement of their apprenticeship or studentship, and, further, if no evidence of time employed in dispensing medicines was received excepting that of having served as an articled apprentice or student with a legally qualified chemist and druggist.

"The London Board of Examiners held twenty-six meetings for conducting the technical examinations during last year. At these meetings, 116 candidates presented themselves for the Major examination, 63 of whom passed, and were registered as pharmaceutical chemists, and 53 were rejected, being at the rate of 54·31 per cent. Rather more than one-fourth of the candidates who failed were rejected because they did not gain the full passing number of marks upon the whole examination, although they had obtained the minimum passing number of marks in each of the separate subjects; 26 failed in chemistry and practical work, and 16 in botany.

"I regret to observe so small a proportion of the young men who have passed the Minor, or qualifying examination, come up for the Major examination. This arises, no doubt, partly because of the wider scope of the examination, partly also, perhaps, because being already registered as chemists and druggists, and qualified to keep open shop for the purpose of selling and dispensing medicines, the higher qualification confers no additional business privileges; and, lastly, probably because the title of pharmaceutical chemist is not sufficiently distinctive to induce candidates to undergo the expense and trouble of passing another examination in order to obtain it.

"It is, therefore, a question worthy of consideration whether some other and more distinctive title than that of "Pharmaceutical Chemist," such, for example, as "Fellow of the Pharmaceutical Society," might not be advantageously substituted for the present name, and have the effect of inducing a larger number of candidates to present themselves for this higher qualification. On public grounds, it is very desirable that a greater number of persons should hold it, inasmuch as the members of the Board of Examiners are selected from amongst persons of this class. During last year 551 candidates offered themselves for the Minor qualification. More than half of these failed, namely, 301, being at the rate of 54·62 per cent. Of these failures 48 occurred because the candidates had not obtained a sufficient proportion of marks to pass the whole examination, although they had gained enough to pass in each of the separate subjects; 71 failed in chemistry; 37 in reading Latin prescriptions; 29 in materia medica; 25 in practical dispensing; 20 in botany; 17 in pharmacy; and 54 in two subjects.

"It is impossible to say how many candidates would have failed in more than two subjects, because whenever a candidate is found to have failed in two subjects, his examination is discontinued; but I may mention that in addition to the 71 candidates who were rejected in chemistry, 30 others failed in that subject together with one other subject, and in addition to the 37 who could not read prescriptions written in the Latin language, 15 others failed in this, together with one of the other subjects comprised in the examination.

"It is painful to note that there does not yet appear to be any improvement in the results of this examination. This plainly shows that there is some serious defect in the mode in which the candidates are trained for their calling. To some extent the suggestion I have already made, that the candidates should be compelled to pass the first examination before being articled as apprentices, would probably tend to remedy this, particularly if taken in conjunction with my other recommendation, that the only evidence of practical training should be that of having served such an apprenticeship. This latter provision would involve a degree of responsibility on the part of the master for his apprentice's success in the examination, which does not always now exist. I am, further, of opinion that now candidates are not admissible to the examination until they have attained the age of twenty-one years, it would be no hardship if the period of practical training in a shop were extended to five years. It might, indeed, happen in the cases of young men who had served their apprenticeship in country places, that they might desire to spend a portion of their apprenticeship either in London or in some other large town. To provide for this, it might be permitted to a young man, in such circumstances, to spend the last two years of the five in a different pharmacy from that to which he was first sent as an apprentice.

"The propriety of compelling candidates for this examination to pass a certain time at a school of pharmacy has been a good deal discussed lately among persons who are interested in the subject of pharmaceutical education. I am, however, of opinion that a curriculum, or special course of study at a school of pharmacy, is not required for persons who are preparing for the Minor qualification. The examination, when properly conducted, affords a sufficient guarantee of a candidate's fitness for registration under the Pharmacy Act, and the examination is not at present so high that a fairly educated young man cannot very well prepare himself for it during the period of his apprenticeship, more especially if the length of the apprenticeship were extended to five years. Neither, on the other hand, do I think it desirable to raise the standard so high that special study at a school of pharmacy would be required. The Pharmacy Act was enacted in order to secure that chemists and druggists should possess a competent practical knowledge of their business, and to place some restriction upon the indiscriminate sale of poisons. These objects being already in a great measure accomplished under the system now in force, it does not appear to me necessary, in the interest of the public, to require any higher qualifications to entitle a person to be registered as a chemist and druggist than already exist. As a fact, however, I may state that the greater number of the candidates for the Minor qualification do actually study at a school of pharmacy, with the very frequent and obvious result of being crammed up for their examination, without having acquired practical skill and competence.

The question of studying or not, at such an institution, may, therefore, I think very well be left to the discretion of the candidates themselves.

"On the other hand, the Major being essentially an honours qualification, only to be obtained by persons who already hold a registered right to carry on business as chemists and druggists, the requirements for passing it might, in due time, be set at a higher standard and include attendance upon a fixed curriculum or special course of study at a school of pharmacy. The Pharmaceutical Society might, I believe, very properly be permitted to make any regulations in reference to it which the Council considered right, subject to the approval of any bye-laws to that effect by the Privy Council. Only ten persons presented themselves for the Modified examination during last year, four of whom passed and were registered as chemists and druggists, and six failed. There are still, I understand, a considerable number of candidates upon the list for this slighter examination; but inasmuch as they were obliged to send in their applications to be admitted to it before December 31, 1869, it does seem that there would be no hardship if, after the lapse of so many years, they were now compelled either to present themselves for examination within a certain fixed period of time, or to forfeit the privilege of admission to it.

"I have already incidentally expressed my opinion that the examination for the Minor qualification, which is that which is really of chief public importance, as at present conducted, is satisfactory and sufficiently stringent. I now desire to add that the examiners manifest much tact and great kindness and forbearance towards the candidate, affording nervous or weak men ample opportunity for passing. Although I look forward to the standard of the Major examination being raised at some future time, it is quite obvious, from the very numerous failures, that such a measure is not at present expedient. It could only have the effect of diminishing the already scanty number of candidates.

(Signed) "E. HEADLAM GREENHOW.

"14A, Manchester Square,
"*March* 8, 1881."

PROPRIETARY MEDICINES.

The following letter was read:—

"Association of the Owners of the Proprietary Medicines,
"95, Farringdon Street, London,
"18 *March*, 1881.

"To the President of the
"Pharmaceutical Council.

"Sir,—I am directed by the Managing Committee of the above Association to draw the attention of the Council to one or two points in the proposed Amendment to the Pharmacy Act, it being the opinion of the Committee that should the Amendment become law, it would interfere largely with the property of owners of proprietary medicines.

"The Committee is also of opinion that a few slight alterations in the wording of the Amendment could be made which would leave its spirit unchanged whilst depriving it of the power of damaging large vested interests.

"The alterations which the Committee respectfully suggest are as follows:—

"Clause 8. To leave out the words in brackets 'whether as patent medicines or otherwise.'

"Clause 10. To leave out the words 'or containing' and adding a few words with the view to providing that the Pharmaceutical Society *alone* shall have the power or right to institute proceedings against anyone for acting in contravention of this clause.

"Waiting the favour of a reply,
"I remain, Sir,
"Yours respectfully,
(Signed) "GEO. R. BARCLAY,
"*Secretary.*"

Mr. HAMPSON moved that the letter be referred to the Pharmacy Act Amendment Committee.

Mr. RICHARDSON seconded the motion, which was carried unanimously.

THE PHARMACOPŒIA.

Mr. HAMPSON moved the following resolution, of which he had given notice:—

> "That it is desirable that this Council should take steps to ensure that the Pharmaceutical Society be represented before the Royal Commission on medical reform, in order to obtain for pharmacists a legal position in the framing of the British Pharmacopœia."

It would be within the recollection of the Council, that in July, 1874, the Council agreed to the following resolution:—"That this Council respectfully urges upon the General Medical Council the desirability of associating more practical pharmacists with any Committee which may be appointed for the purpose of preparing any future edition of the British Pharmacopœia or any further addendum to the present issue. This Council would be prepared to nominate such pharmacists, in the event of the Medical Council agreeing to their proposal.' And then followed a resolution to the effect that a copy of that be sent to the Medical Council. To that communication no answer had been received; but since then six years had elapsed, and he thought now there was a favourable opportunity of bringing the question forward again. The Government was prepared, as far as could be learned, to appoint a Royal Commission upon the whole subject of medical reform, and as the position with respect to the Pharmacopœia was one of law, it was absolutely necessary that the Council should take some step. As the result of the Royal Commission, there would be a Government Bill, and there would be no other more suitable opportunity of obtaining what he considered to be a fair position. As matters now stood, the Medical Council had the sole right to prepare the Pharmacopœia without any consultation with any other body, and if it did call in pharmaceutical aid, it was only as a sort of voluntary concession to obtain the needful assistance. This had been done hitherto, and pharmacists could not complain very much of the result, because they had been singularly fortunate in Professor Redwood, who was so high an authority upon pharmaceutical matters, and Mr. Squire's assistance had also been obtained, and no doubt great improvements had been introduced into the last Pharmacopœia. Still the position was not a satisfactory one in comparison with that of their brethren in other countries. The Society for many years had been promoting education and furthering research, and had done everything possible for the purpose of establishing pharmacy on an intellectual and legitimate footing; it, therefore, naturally fell to its lot to share in the preparation of the national Pharmacopœia, since when that was issued it became, as it were, part of the Act of Parliament, and all pharmacists were bound to conform to its standard. They were doubly bound to do so—bound by the Pharmacopœia itself, issued by the Medical Council, and also by their own Act of Parliament, and yet they could do nothing but raise a protest after it was issued if there was anything in it unsatisfactory and impracticable. They had had by courtesy some information when a new Pharmacopœia might be in preparation, and copies of what was proposed had been sent to a few select persons for their consideration, and no doubt that had been to a certain extent beneficial, but the time had now arrived when they should ask for a more assured position, such as had been obtained in all civilized countries except their own, where pharmacists had a fair share in this work. In France, Germany, Austria, Belgium, Holland and the United States, the pharmacist was on equal terms, and in some countries had a larger share than the medical man, in the preparation of the Pharmacopœia. He had been trying lately to think what could be the objection raised by medical men to this necessary request, but could not conceive what it could be. He was anxious to approach them in the most friendly spirit and he admitted that pharmacy was a subsidiary branch of medicine, but still it was a branch, and it was to their interest that they should work harmoniously. In this spirit he made the proposal. He did not wish to trench on the rights of the medical profession; but pharmacists ought to take up their right position, and it was in the interests of medical men themselves that the Pharmacopœia should be a work of such a character as to be a credit to medical practice, and it could only be of that character if practical pharmacists were associated in its preparation. He did not wish the Committee to interfere with what should be introduced into the Pharmacopœia, the question of doses or therapeutics, but simply that practical pharmacists, nominated by the Society, should have the working of the methods and undertake experiments with a view to agree upon the best methods, so that they should be up to the present state of knowledge. If the Council did not take advantage of this opportunity it might be a great many years before such an occasion again presented itself.

The **Vice-President** said Mr. Hampson had asked him to second the motion, which he was quite ready to do, though he thought the subject specially referred to had been included in the resolution carried at the last meeting.

Mr. **Hampson** said the Council had never yet agreed that it was desirable that it should have a legal status with respect to the Pharmacopœia, so that it would be impossible in carrying out the former resolution to represent views before the Royal Commission, which did not receive the acceptance of the Council. He, therefore, did not think this resolution was covered by the general terms of the previous one.

The **Vice-President** said he was quite prepared to endorse these particular views, as he completely sympathized with them. His only doubt at present was whether it would be wise to pass special resolutions upon every particular topic which the Council might wish to argue before the Royal Commission. If it were the fact that the Council had never declared that pharmacists ought to have a hand in the preparation of the Pharmacopœia, it would be as well to record the fact, and, therefore, he was prepared to endorse the motion, but he would rather something should be added to the effect that to carry out this principle the subject be referred to a committee, in order that it might formulate such subjects as in its opinion the Council should advocate before the Royal Commission.

Mr. **Savage** endorsed very much that had fallen from the Vice-President, but he could not think it would militate against the proposition of Mr. Hampson if the committee, or deputation, representing the Society before the Royal Commission had much more general powers besides the specific point mentioned. There was a very important clause in the Medical Bill taking away from the Apothecaries Act that portion which was generally interpreted to give chemists and druggists certain privileges, and if that Bill were passed as proposed, it would be detrimental to the pharmaceutical body. Therefore, while heartily supporting this proposition, he did not think it would weaken it to attach to it that the deputation should have full power to represent the Society on other matters.

Mr. **Atkins** reminded Mr. Savage that the questions of the Royal Commission on medical reform would depend very much on the exigencies of the House of Commons; but the question of a new Pharmacopœia might come up independently of that, by the action of the Medical Council, and might come on at a much earlier date than the report of the Royal Commission. He therefore thought it would be wise to pass the present resolution.

Mr. **Williams** said when Mr. Hampson brought this question forward some time ago and moved a resolution which was negatived, he was one of those who had voted against it; but he was reminded that the reason of his so voting was not that he did not consider it most important that some representative of the Pharmaceutical Society should have a voice in the construction of the Pharmacopœia, but that motion proposed that the Council should go to the Medical Council and claim a legal right, and on that point he disagreed with Mr. Hampson. The position now was very different, and he could cordially support the motion. It had been urged many times that the pharmaceutical body ought to have a voice in the construction of the Pharmacopœia, but he would remark that that would be a great responsibility to take. It was much pleasanter to be a critic of such a work than to be the author; but pharmacists owed a duty to themselves and the public in respect to this question, and especially to themselves, because, as Mr. Hampson had pointed out, they were bound by the Pharmacopœia, and in the present state of the law it was important that they should have a voice in saying that the conditions imposed were consistent with the present state of knowledge. At the same time he agreed with the Vice-President that it would be advisable to make the resolution more general.

Mr. **Andrews** said every pharmacist would agree with this proposition. He could not agree with Mr. Williams that it would be better to mix up other things with it. The Council had before it a very definite proposal, which was clear and undeniable, and it had better keep that as it was and if it were thought necessary to introduce other matters to make a separate motion.

Mr. **Radley** said reference had been made by one or two speakers to the resolution which was carried following on his suggestion at the last meeting. It was a matter of great importance and was remitted to the Committee, upon whom the responsibility rested to take any steps required with reference to this Royal Commission, and he personally relied on this Committee to do its duty in the matter and bring forward whatever was necessary.

Mr. **Frazer**, though he was not prepared to move an amendment, was not sure that this was the wisest mode of attaining the purpose they all had at heart. He almost thought the Medical Council would act wisely by asking that Society to assist in preparing the future Pharmacopœia, but he did not think it was modest on the part of the Council or that it had any legal right to insist on taking part in the work. The Pharmacopœia was a huge prescription, and as medical men did not consult them in writing prescriptions, so neither could they insist on being consulted with reference to the preparation of the Pharmacopœia. He thought the Council would attain its object better by leaving it as it was and not insisting on a legal position which he did not think it could claim.

Mr. **Mackay** said there could be but one feeling in the minds of all pharmacists as to the common sense nature of the view propounded, that the Pharmaceutical Society should hold a certain position in assisting to compile the Pharmacopœia. But while that view commended itself to the Medical Council, as that body had shown by asking for pharmaceutical assistance, he was at a loss to see the ground on which the Council could proceed to establish any legal position. He thought it would be better to remit this matter to the Committee, which should bring up a report upon it.

Mr. **Symes** supported the motion. He held that the pharmacists should not merely have permissive power to assist in framing the Pharmacopœia, but that they should have a legal position and standing. He could scarcely share the fears of Mr. Atkins that the new Pharmacopœia might be framed before the Royal Commission sat, and pharmacists ought to have a voice not only in framing the Pharmacopœia but in saying when one should be issued. If they had a legal position in the matter it would be their duty at the present moment to take steps for introducing the new Pharmacopœia; but whereas they found themselves in the position that grave errors existed in the original work, they were utterly powerless to say that a new edition should be framed, and it was delayed on the paltry excuse that a number of copies of the present edition had been printed, and that there was no reason for issuing a new one. That showed the necessity that some persons who had more at heart the responsibility of trying to carry out the instructions of the Pharmacopœia should be associated in its preparation. They were required to abide by it, and yet there were certain directions which it was impossible strictly to follow. That showed there was a burden upon them, which they should attempt to remove. In all civilized countries that he was aware of, pharmacists had this position. He certainly must demur to Mr. Frazer's statement that the Pharmacopœia was simply a huge prescription. There was all the difference in the world between the two. One was private property, and the other was a public affair, and was subject to the provisions with regard to the Adulteration Act and to legal proceedings if the formulæ were not carried out, or if the results did not correspond with certain tests.

The **President** said he should be inclined to put the resolution more strongly than it was framed, and to say that it was not only desirable but necessary that the Society should be represented before the Royal Commission. He was glad that in the motion prominence had been given to the Pharmacopœia, and thought that if the Council did not seek to obtain a position to be heard on the Royal Commission it would be very much wanting in its duty to the body at large. It was, therefore, its bounden duty to take some steps, and he had very little doubt himself if it took those steps in a proper spirit it would be received courteously. He had not the slightest doubt but that the Council would have with it seventeenth-twentieths of the medical profession, for in his own conversation with medical men of some standing, he found they were, almost without exception, in favour of such an arrangement. He might be excused reading a few lines from a letter he had received from the United States, in reply to the invitation to attend the Pharmaceutical Congress:—"Pharmacopœial revision progresses here satisfactorily and, what is greatly to be rejoiced at, with a spirit of harmony between the medical and pharmaceutical members of the Committee. To the former is conceded, under all circumstances, any decision on therapeutical subjects, as well as the decision on the remedial merits or demerits of new and old drugs; while the pharmacists mainly confine themselves to working out the text in accordance with the rules agreed upon. Of course, on many points, both physicians and pharmacists have the right to render an equally valid opinion. It should be added, that this division of labour is not based upon any actual resolution adopted in committee, but upon a tacit mutual understanding, by which the proper dues are rendered to each profession. In my opinion, and in that of many others in this country, the pharmaceutical profession in Great Britain should have an officially recognized representation on the next committee of revision. No Pharmacopœia was ever satisfactorily constructed without the aid of specialists, and there is no reason why these specialists should not also be endowed with the privilege of sitting as members of the Committee. Co-ordination of the two professions in this matter will not only render the Pharmacopœia more perfect and uniform, but will also bring about a better understanding between the two professions." He did not think he could add anything to those remarks.

Mr. Hampson, in reply to Mr. Williams, wished to say that no doubt if pharmacists gained their right position they would have a considerable responsibility, but that responsibility would do them a great deal of good. It would bring out their best qualities, as responsibility always did. With reference to Mr. Mackay's remark, he did not think there was the least fear of giving offence. Pharmacists had been too retiring in connection with this question altogether and had kept themselves too much in the dark, as if they were simply hucksters and shopkeepers, although they had been doing what they could to advance pharmacy. He hoped now they were stretching out their hands, their medical friends would receive them with an equally warm grasp.

The motion was then put and carried *nem. con.*

The **Vice-President** then moved, as a rider to the above:—

> "That the Pharmacy Act Amendment Committee be requested to select and formulate all matters they may think it the duty of this Society to advocate before the Royal Commission about to be appointed upon medical legislation, and submit the same to this Council."

Mr. Williams seconded the motion, which was at once put and carried.

International Pharmaceutical Congress.

Mr. Butt then moved the following resolution, of which he had given notice:—

> "That a Committee be appointed, consisting of the President, Vice-President, Messrs. Bottle, Carteighe, Hampson, Hills, Sandford, Dr. Paul and Professor Redwood, with power to add to its number:
>
> "To fix the date on which the International Pharmaceutical Congress shall be held;
>
> "To organize generally the programme of business to be transacted at the meeting;
>
> "To decide on subjects to be dealt with, and the mode in which they shall be brought forward."

He said it would be as well to mention a few of the details with regard to the origin of this Congress. About eighteen or twenty years ago, a few prominent pharmacists on the Continent considered it advisable to meet at some central point to discuss matters of general interest to pharmacy. The first meeting was held at Brunswick, and a few years afterwards a second was held at Paris. At the conclusion of the business at Paris, it was resolved that the third meeting should be held at Vienna in 1867, and in due course the Committee appointed to carry out the proceedings at Vienna sent out its invitations, and an invitation was received by the Council of this Society, requesting it to send delegates to that Congress. Mr. Sugden Evans, the then President, and Professor Redwood were appointed, and a full report of the proceedings would be found in the second series of the Journal, vol. ii., p. 174. The subjects which appeared to be generally discussed were pharmaceutical education and the universal codex. After the business, a Committee was formed to decide where the next meeting should be held, and that Committee decided that it should be held at St. Petersburg in 1872. In consequence of the Franco-German war, however, and the unsettled state of the Continent, it was deferred until 1874, and early in that year the Society again received an invitation to send delegates to St. Petersburg. Mr. Greenish and Mr. Sutton were appointed delegates, and that Congress was held from the 8th to the 12th August, 1874. At the conclusion of the business, the members present felt a desire to hold the next meeting in London; but the English representatives stated that they had no authority to invite the Congress, and explained that they would bring the matter before the Society at an early date. A full report of the proceedings was submitted to the Council in October, 1874, signed by the two delegates, and subsequently Mr. Greenish brought forward a resolution that the International Pharmaceutical Congress be invited to hold its next meeting in London. That was seconded by Mr. Hampson and carried unanimously. It was then decided that it should be held in 1879, and again, in consequence of the disturbed state of the Continent arising from the Turkish war, it was postponed somewhat indefinitely. The next step was taken by Mr. Hampson at the Council meeting on August 4, 1880, when he drew attention to the fact that the International Medical Congress was about to be held in London, and suggested that it would be desirable to hold the International Pharmaceutical Congress about the same time. After some discussion the matter was referred to a Committee, and as a result, invitations had been sent out to the most eminent pharmacists on the Continent of Europe, Australia, Canada and the United States. In reply to those invitations several answers had been received, but as the time was somewhat distant he had no doubt a great many more would still be received, and everything led the Committee to suppose that there would be a considerable number of foreign pharmacists gathered together in London at the invitation of the Society at some date which remained to be fixed. The general object of this Congress appeared to be the discussion of subjects in relation to pharmaceutical education, the stimulation of pharmaceutical research, and the compiling of the International Pharmacopœia. The last, he feared, was somewhat of a utopian scheme, for with the divergency of the practice of medicine in different parts of the civilized globe he was afraid it would be almost an imponderable volume, but a step, and a great step in advance, might be gained if pharmacists only had a voice, which he hoped they would have soon, in the preparation of the Pharmacopœia, and if they could assimilate the strength of the preparations of the more powerful drugs in general use, and particularly of the powerful poisons and alkaloids. In the present day people travelled a great deal; they took prescriptions about from one country to another; and where medicines had the same name but differed in strength, mistakes were liable to occur. Of course, with the majority of things contained in the Pharmacopœia slight varieties of strength were not of much importance; but there were preparations, such as those of hydrocyanic acid, strychnia, morphia and opium, in which variations of strength might be very important. The Society having invited those gentlemen here, it would be its duty to entertain them. How that should be done he could hardly say, though it had been already discussed to a certain extent. At Vienna, after the conclusion of the business, the delegates were entertained hospitably at a banquet, and on the following day an excursion was organized to the top of the Semmering Pass, where they were received with bands of music, and a luncheon was provided. At St. Petersburg the case appeared to be somewhat similar. There was a dinner and a steamboat excursion, and he supposed that British pharmacists ought to do something of the same kind. It was quite certain they would have to entertain them intellectually. He presumed there would be a conversazione in that building, and that papers would be read and discussed, and that there would be an opportunity of showing them their unrivalled museum and library, which he believed were not to be equalled by any private collection or by that of any pharmaceutical society in the world. Another matter of interest would be the presentation of the Hanbury Medal to the distinguished gentlemen who should be selected by the Committee. As to other matters they must be left to the Committee, and he supposed that all would be called upon for a little donation to assist in defraying the expenses.

Mr. Hampson seconded the motion.

The President said he could not add anything to the very interesting account which Mr. Butt had given of the previous proceedings. He knew the president of the first Congress which was held in Brunswick, and at the second Congress in Paris the International Pharmacopœia was first spoken of. That question was again brought forward at Vienna, when the French pharmacists were asked to give their idea of an International Pharmacopœia. At the St. Petersburg Congress there was an immense mass of paper laid on the table representing the French pharmacists' idea of an International Pharmacopœia, but it was not adopted because it was found to contain a perfect Codex instead of suggestions for one International Pharmacopœia. The conclusion arrived at then was that the International Pharmacopœia should not supersede any national Pharmacopœia in existence, but should contain simply those medicines which were powerful, such as nux vomica, which was double the strength in France that it was here. Some people seemed to consider the International Pharmacopœia something which might be framed in the next half century; but he would remind the Council that in Switzerland a few years ago there were twenty-five or twenty-six Pharmacopœias which now were reduced to one, and the same thing had occurred in Germany. There was no reason why there should not be a small Pharmacopœia which should contain potent preparations used in this and other countries, and which should form an appendix to the ordinary Pharmacopœia, and that this would be the means of bringing the opinions of the pharmacists of different countries to a point with regard to the strength of these preparations. That was one of the subjects which would come before the Medical Congress; but there were other subjects which would have to come before the Pharmaceutical Congress, and it would be the duty of one of the Committees to formulate the business to be done. In the letter of invitation which had been issued suggestions had been asked for, and some had been already received and others had been promised. He believed a considerable number of foreign pharmacists would be here in August next, and he had every hope that they would be well received, and felt sure it would give a great impetus to British pharmacy.

It was suggested that this Committee should consist only of members of Council in the first instance, with power to add to its number others, either members of Council or not. It was also considered that this Committee might exercise the functions of the Committee recommended by the Library, Museum and Laboratory Committee to be appointed for the purpose of providing for and arranging the entertainment of visitors to the Congress.

The resolution was then put and passed unanimously in the following form:—

> "That a Committee be appointed, consisting of the President, Vice-President, Messrs. Bottle, Butt, Hampson, Hills and Sandford, with power to add to its number other gentlemen, including those who are not members of the Council;
>
> "To fix the date on which the International Pharmaceutical Congress should be held;
>
> "To organize generally the programme of business to be transacted at the meeting;
>
> "To decide on subjects to be dealt with, and the mode in which they shall be brought forward;
>
> "To provide and make arrangements for the entertainment of the visitors to the International Congress."

Mr. Hampson then moved:—

> "That the Pharmaceutical Society contribute £100 towards the fund for the entertainment of those who attend the International Pharmaceutical Congress in August next."

Mr. Richardson suggested that it would be well first to consider whether the Council had legal power to make such a grant.

The President said he had consulted the Solicitor upon the subject, and he would ask the Secretary to read his (the Solicitor's) opinion, which was accordingly done.

Mr. Hampson said this motion seemed to follow as a natural corollary to that which had just been passed, and he thought the Council could pass it with propriety.

Mr. Squire seconded the motion.

The President said it would be a good sum to head a list, and he had no doubt subscriptions would come in to the required amount.

The motion was then put and carried.

Certificates to be received in lieu of the Preliminary Examination.

The Vice-President then moved the following resolution:—

"This Council having, without notice, discontinued to receive the third class certificates of the College of Preceptors, and having thereby excluded certificates which are alleged to have been obtained for the express purpose of being submitted in lieu of the Society's Preliminary examination—

"It is resolved—

"That the Board of Examiners be authorized to accept, in lieu of the Preliminary examination of this Society, the third class certificate of the College of Preceptors, provided Latin was included in the subjects of the examination for which the certificate was awarded, and provided the certificate is dated prior to January 1, 1881.

"This authority is to extend to the meetings of the Boards in December next and no longer."

He briefly explained the necessity for the resolution, which arose from the resolution which had been passed on the previous month the effect of which was to exclude the third class examinations of the College of Preceptors.

Mr. Symes said when the resolution came before the Council last month he thought it was rather premature and that it would have been better to have remitted the subject to a Committee. It was certainly unfortunate the Council should have been led into this dilemma, and the question was, whether it was quite certain it was not doing an injustice as well to some other body in a similar manner. He was therefore rather inclined to think it would be wise not to carry this resolution, but refer it to a committee to see whether there were not any other bodies excluded unwittingly who might be entitled to make a similar protest.

Mr. Mackay asked what was the nature of this third class examination.

The Vice-President explained that the difficulty was that it only included a certain portion of the first book of Cæsar, whereas the Society's Preliminary examination included the whole of the first book, and he believed there was also a slight difference in the arithmetic. He agreed there might possibly have been improvement in the resolution of last month if the Council had postponed its operation for a certain time; but granting that, he did not think it was any argument against the present resolution. If another difficulty arose next month he should be prepared to move a similar resolution, but at the same time he quite believed himself that no such difficulty would arise.

The resolution was then carried.

A letter was read complaining of an infringement of the Pharmacy Act at Aberdare, which was referred to the General Purposes Committee.

A communication was read from the Honorary Secretary to the Brighton Association of Pharmacy, enclosing the following resolutions passed at a meeting of the Association, held in the Town Hall, March 11, 1881:—

"Resolved, that a communication be made to the Pharmaceutical Council, in confirmation of an opinion already expressed, that the 4th clause of the Pharmacy Amendment Bill, 1881 (referring to the compulsory sale of a business carried on by a widow, three years after the death of her husband), is an unjust and unnecessary infliction; and this meeting would urge the Council to withdraw the clause in favour of the present 16th clause of the Act of 1868, which has hitherto worked satisfactorily."

"Resolved, that this meeting is of opinion that clause 15, section 26, of the Medical Act (1858) Amendment Bill, 1881, introduced to supersede the 28th clause of the Apothecaries Act, 1815, would fetter the free action of the legitimate business of a chemist and druggist; that this meeting would urge upon the Pharmaceutical Council the necessity of watching the progress of the Bill, and if desirable to employ counsel to oppose the introduction of any clauses likely to interfere with public requirements and the interests of the trade."

Another communication was read from the Secretary to the Nottingham and Notts Chemists' Association, informing the Council that that Association had agreed to support the Bill clause by clause.

PHARMACEUTICAL MEETING.

Wednesday, April 6, 1881.

MR. THOMAS GREENISH, PRESIDENT, IN THE CHAIR.

The sixth Evening Meeting of the Session was held on Wednesday last, the chair being taken at half-past eight.

The minutes of the previous meeting having been read and confirmed,

Mr. Postans rose to make a correction in respect to the specimen of oil of aloes exhibited at the last meeting, which should have been reported to have been sent by Messrs. T. and H. Smith, of Edinburgh.

A paper was then read, entitled—

"Wanika," a New African Arrow Poison: its Composition and Properties.

BY A. W. GERRARD.

This paper is printed on p. 833, and gave rise to the following discussion:—

The Chairman said the meeting was much indebted to Mr. Gerrard for the valuable paper he had just read, which was one of a series of equally valuable papers with which he had favoured them. The subject was one which required further materials before definite results could be arrived at. He should like to hear a few remarks from Professor Bentley on the subject.

Professor Bentley said he had been much interested in the paper, and by the way the poison had been investigated by Mr. Gerrard. He also felt great interest in the physiological experiments of Dr. Ringer. Whether the botanical source of the poison would turn out to be as stated was, of course, a question which could only be decided when sufficient specimens of the substances used in its preparation were obtained. The source of the poison could not be ascertained from a bit of the root, and there was very little information as to the plant from which it had been derived. The investigation of these poisons might ultimately lead to important results. In the paper, Mr. Gerrard had stated: "Judging from the taste of the roots forming the antidote, they do not appear to possess any active property." Now that was the case with the Calabar bean, about which very little was known, except that it was a poison, until it was investigated by Sir Robert Christison. It did not at all follow, because there was no special taste, that the substance was a less intense poison, and therefore the only real test was the physiological action. He did not understand Mr. Gerrard's statement that he had but little doubt, "that the chief ingredient of the new poison was a *Strophanthus*, either *Strophanthus hispidus* or *Strophanthus Kombé*, natural order Apocynaceæ, thus closely allied to the genus *Strychnos*." There was no very close alliance between *Strophanthus* and *Strychnos*, although they belonged to neighbouring orders, both of which contained many very poisonous plants. He hoped Mr. Gerrard would continue his investigations, and, if possible, obtain some good specimens of the plants from which the poison was obtained, and it might lead to their obtaining, as had been the case with many of these poisons, valuable therapeutical agents. They must not be discouraged if they did not get definite results at first.

Mr. Holmes then drew attention to the specimens of *Strophanthus* follicles, referred to by Mr. Gerrard. These were from the Hanbury collection. The poison spoken of by Mr. Gerrard come from the east coast of Africa; the specimen before them came from the west coast, and was collected by Dr. Baikie, during the Niger expedition, and it was possible that the same species extended across the continent and was used as a arrow poison by various tribes. Professor Bentley had alluded to a distinction between the properties and characters of the Loganiaceæ and Apocynaceæ. He, however, held the opinion that they were not very widely separated in properties. The South American species of *Strychnos* and *Gelsemium sempervirens* both appeared to possess a somewhat similar action to the *Strophanthus*. Moreover the *Gelsemium* had been placed by some botanists in the Apocynaceæ and by others in the Loganiaceæ. He had on the table a specimen of *Tanghinia venenifera*—the ordeal poison of Madagascar; he did not know exactly whether it had the same poisonous character as the *Strophanthus*, but at all events it was interesting as belonging to the same natural order. Several plants belonging to the Apocynaceæ appeared to be used in various parts of the world as poisons. In Jamaica a powerful poison was obtained from *Urechites suberecta*—also an Apocynaceous plant. This he believed had also a similar paralysing action. The active principle had only a short time since been described by Mr. J. J. Bowrey, in a paper read before the Royal Society. Mr. Gerrard had spoken of the poisonous action of the "Wanika" when applied subcutaneously, and he should like to know whether it had a similar effect when taken internally. Of course, in studying poisons it was a most important thing first to obtain a knowledge of physiological action, and then to find an antidote that might be used when fighting with tribes who used these poisons. He should like to know whether any experiments had been made to see if atropine would act as an antidote, as it had, he believed, an opposite action on the heart to that of the "Wanika" poison.

Mr. Plowman inquired if Mr. Gerrard had tried whether the glucoside when isolated was freely soluble in a mixture of 20 volumes of alcohol and 30 volumes of chloroform.

The Chairman then said that the paper had been a very interesting one, but there appeared to be some difficulties in connection with the matter, and what appeared to him to be contradictions. According to Dr. Ringer, the antidote possessed no value at all, whereas, Mr. Felkin said if applied within five minutes it was successful. It was difficult to understand, how, when a poison was injected subcutaneously, carbonized matter like the antidote, taken by the stomach, could do any good. Mr. Felkin had stated that he had cut out the flesh in some instances together with the arrows and had seen that nearly all the poison had been absorbed, but he did not state whether death had followed or not. He should like to see some person who had seen the arrow shot, and the animal die within a given time. There seemed to be a deal of mystery about these arrow poisons which had not been cleared up. They were much indebted to Mr. Gerrard, and he hoped he would continue his investigations and possibly he might arrive at some valuable result.

Mr. Gerrard in reply remarked that it was quite true that the subject was surrounded with much mystery, and there were apparent contradictions, but as far as he had been able to obtain materials he had brought them before the Society for the purpose, if possible, of finding out the truth. In answer to Mr. Holmes's question as to the internal dose, the amount of the poison given internally was about nine times larger than that given subcutaneously, and it had scarcely any poisonous effect—there was simply vomiting and nausea produced. They had not at present made any experiments to see whether belladonna would act as an antidote. They believed that the poison caused death ultimately by asphyxia, and it might probably be that death could be retarded by performing the operation of artificial respiration. That was the conclusion arrived at from the *post mortem* appearances. Dr. Ringer had used the glucoside in his experiments, and the dose which acted as a poison to a frog was one-fourth that of the extract. He had not tried whether the glucoside was soluble again in the same solution, but he should infer that it was. As to the efficacy of the antidote, Mr. Felkin had expressed himself decidedly in its favour, but it was possible he was mistaken. He was sorry that he was not there to explain the matter, but he had been prevented from attending by another engagement.

Professor Redwood then brought to the notice of the meeting a small balance, made by Mr. Stone, of Gloucester Street, Queen Square, which he considered much more suitable for pharmaceutical purposes than the scales generally used. What was wanted was a small balance, which could be used in all important cases, for weighing out the active principles now employed in medicine, such as strychnia, where great accuracy was required in adjusting doses, and which would not be too expensive. The balance before him, as then adjusted, was sensible to the one-hundredth of a grain, but by a simple arrangement the centre of gravity could be altered so as to make it sensible to the fiftieth of a grain, and by an alteration of the bearings to the twentieth of a grain. As the great difficulty in the way of introducing more accurate instruments arose from the cost, he felt perfectly justified in drawing attention to this balance, which was especially adapted for pharmaceutical purposes, and which could be obtained for 35s. It was quite notorious that the weights generally sold for dispensing purposes were very inaccurate, and he knew from experience that nearly all the weights used by pharmacists were incorrect to an extent which was perfectly unjustifiable. He thought it was the duty of pharmacists to endeavour bring to about an alteration in that respect, as there was no reason why the weights used for dispensing purposes should not be as accurate as those used for analytical purposes.

The Chairman thought a balance accurate to the tenth or twentieth of a grain would be a great boon to pharmacists, but these hitherto offered had been very expensive. It would be an advantage to have the beam and pillar nickel plated, and the weights of aluminium, as they would not oxidize, and would therefore continue accurate for a much longer time.

Mr. Allchin asked whether he understood Professor Redwood to say that these balances should be used for ordinary dispensing, as it would take a much longer time to dispense powders and pills with them than with scales which were not so sensitive.

Professor Redwood said that a balance sensitive to the hundredth part of a grain would not be suitable for ordinary dispensing purposes. He agreed with the Chairman that a balance sensitive to the tenth or twentieth of a grain would be sufficient for ordinary purposes; but there were many cases (such, for instances, as where solutions had to be made for subcutaneous applications), where it was of the utmost importance that both sensitive balances and accurate weights should be used. He had had some experience in dispensing, and he did not contend for the use of a balance of that description to the entire exclusion of the ordinary dispensing scales, where a dispenser had become used to the latter. He believed, however, that ultimately they would come to the replacement of the ordinary hand scales by balances of that description, which could be kept in better order and were more uniformly suitable for pharmaceutical purposes. He saw no reason why every pharmacist should not be provided with a balance suitable for use in all cases requiring a delicate instrument. With reference to weights, they were often so inaccurate that 5 grain weights weighed 6 or even 7 grains. He had no idea of the extent of the inaccuracy of the weights supposed to be adjusted, until recently. He had been obliged to reject hundreds, because he found them very inaccurate and such as could not be sanctioned by law. He had every reason to believe that the law would be made more stringent as those in authority became aware of the extent of the evil which existed.

Mr. Plowman wished to join in a protest against the idea that accuracy was not required in pharmacy, and would welcome the introduction of a balance which would weigh accurately. In some cases he had been obliged to use a chemical balance, but it was very inconvenient to do this and took up considerable time. He had tested some weights and found them as much as 30 per cent. out.

Mr. POSTANS said he supposed that the object of bringing that balance before the meeting was not for the purpose of leading them to believe that all other scales were useless. The hand scales answered exceedingly well for ordinary dispensing, but there were times when the fractional parts of grains were required and for that purpose a more delicate instrument was wanted.

Mr. ALLEN inquired what was the difference between the delicacy of the ordinary hand scale and the present balance.

Professor REDWOOD replied that the ordinary hand scales could be made so as to turn to the one-fourth of a grain or the one-fifth of a grain, but it was very rarely indeed that any could be found affording indications even to that extent, and there were too many of them, he was sorry to say, which were not sensitive even to half a grain.

A gentleman inquired whether the object of having stamped weights was not that they might be relied upon.

Professor REDWOOD was sorry to say that their being stamped was no guarantee of their reliability. There were some inspectors who had passed such as were very defective.

The CHAIRMAN believed that if pharmacists supplied themselves with accurate instruments, so as to show the public that prescriptions would be prepared with greater accuracy by trained pharmacists than by others, it would be a great advantage to themselves.

Mr. GERRARD suggested that some rules should be laid down as to the scales to be used for dispensing purposes. Where the doses did not exceed five grains, he thought a balance accurate to a tenth of a grain should be used. Where the dose was from five grains to sixty grains, a balance accurate to one-fourth of a grain, and for large quantities, a balance accurate to a single grain. In making up doses for physiological purposes it was essential that a very accurate balance should be used, as a fraction of a grain would make the greatest difference in physiological action.

Mr. HOLMES then called attention to the specimens on the table which he said clearly showed that their friends abroad had not forgotten the Society at home. Dr. Dymock, who had long been a most liberal contributor to the museum, had sent them several specimens, among others, the ginger plant, for the herbarium, which was rarely seen in flower at Bombay. In this plant, as in others of the same order, the flowers were borne on a scape arising directly from the rhizome, and not on the ordinary leafy stem. Another specimen was a kind of peppermint, cultivated at Bombay, for yielding oil of peppermint. This plant had nearly sessile leaves, and the flowery spikes were long and tapering, like those of *Mentha sylvestris*, being thus quite different to those of peppermint. In China the oil of peppermint was obtained from another species of mint, which botanically was allied to the *Mentha arvensis*. It was interesting to find a plant so nearly approaching the *Mentha sylvestris* as this Bombay plant, yielding such an oil. Dr. Dymock had also sent a specimen of the oil of the *Nardostachys Jatamansi*, specially prepared for him by Messrs. Kemp and Co., of Bombay. It had an odour somewhat resembling valerian and tea combined, and not a particularly pleasant one. This plant had been stated to be the spikenard of Scripture, which, in his opinion, was more likely to have been the ginger grass, the oil of which was a marketable, and in other countries an expensive, article of commerce, while the oil of *Nardostachys* was not in commerce, he beleived. He had also sent a specimen of the oil of *Naregamia alata*. *Naregamia alata* was a drug used by the Portuguese, at Goa, in doses of 12 to 20 grains, as an emetic, and did not possess the property of producing tightness of breath and other disagreeable symptoms which were induced in some persons by ipecachuanha. He had also sent some Indian henbane seed. It had occurred to him (Mr. Holmes) that henbane grown in India might be more powerful than that grown in this country, and he had inquired of Dr. Dymock, who said he did not know, but had forwarded some seeds for experiment. He had sufficient to distribute small quantities for growing purposes, and should be happy to give some of those seeds to anyone who would like to grow the plant to see whether it was superior to our own. Next he would call attention to a few specimens sent by Baboo Ram Chundra Dutta, second assistant to the Professor of Chemistry at the Calcutta Medical College. A letter had been received from Professor Warden, in which he says:—"A few mails ago, the second assistant in my laboratory, Baboo Ram Chundra Dutta, forwarded to your address, per Overland Parcel Post, a small box containing the following articles:—Bark of *Wrightia antidysenterica*, or Kurchi bark; False Kurchi bark, *e.g.*, bark of *Strychnos Nux-vomica*; Kurchicine, an alkaloid contained in Kurchi bark; Indrayava, or the seeds of Kurchi oil extracted from the seeds. The Baboo wishes you to offer the above mentioned drugs for the acceptance of the Museum Committee. The existence of an alkaloid in Kurchi bark appears to have been forgotten, and none of the authorities on Indian drugs make any mention of it; Baboo Ram Chundra Dutta, therefore, deserves the credit of having re-discovered kurchicine." With regard to that alkaloid it was described in the Journal of February last, and was said to be not inferior to quinine in its antifebrile action. He might mention that one reason these seeds had not been largely used in this country was that in the bazaars in India there was to be found another seed, that of *Wrightia tinctoria*, known as sweet inderjow, not having the same action and without bitterness. The bark of this tree also was sometimes substituted for the true drug. Kurchi bark and seeds were valuable in fever as a tonic, and in dysentery, and deserved a trial in this country as the alkaloid was stated to be not inferior to quinine in activity. A number of the specimens on the table had been lent by the Rev. Mr. Peake, who had been a missionary in Madagascar. First was a horn used by the natives of that island in one of their ceremonies on New Year's Day. An infusion of bitter grasses and honey was put into the horn, and in the ceremony of blessing the people they were sprinkled with the infusion. There was a specimen of grave cloth, used for wrapping round the dead before burial, which was dyed with a yellow bark. Some years ago, that bark came to this country under the name of Mongumo bark, and was then supposed to possess a medicinal character. It yielded a brick-red dye, and rendered the material almost indestructible. Next was a specimen of the root of the tapioca plant. There was also a pair of scales and weights used by the natives of Madagascar, in connection with their materia medica. The weights appeared to be made of iron. For grain weights they used ordinary grains of rice with the husk on, two of them being considered equal to an ordinary grain weight. Mr. Peake had also lent a specimen of the ordeal poison of Madagascar, and stated that the native Government of that island had issued a proclamation forbidding its use. The last time the poison was used the fines imposed amounted to 7000 dollars. Not only the person using the poison was fined, but also the entire community where the poisoning occurred. There were two earthenware pots, such as were employed in the ordinary preparation of medicine, a larger pot, used by the ladies of Madagascar to hold pomatum, and a horn spoon, by which the pomatum was extracted, a brush and comb combined, made of fibre, and a tobacco pouch; the tobacco, coarsely powdered, being sucked between the lower lip and the front teeth. Referring to other specimens, he was sorry to say they indicated that adulteration of drugs was still carried on. A sample of liquid styrax when brought to him appeared to be pure, only weaker in odour than usual; but after heating it, it gave off a decided odour of resin. When worked in water, it had somewhat the consistency of plaster, and seemed quite different from the ordinary drug. Dissolved in spirit, it gave a dark coloration with ferric salts. The genuine remained uncoloured. The specimen of false sassafras on the table seemed to consist of chips of some other wood slightly perfumed with sassafras. The crystals of iodocyanide of mercury and potassium before them were prepared by Mr. W. Copney, who also prepared the beautiful crystals of alum in the museum. Mr. Copney said, with reference to this specimen, "although under ordinary circumstances unchangeable (that presented was prepared in 1851), the affinities of its constituents are of the feeblest: very weak acids sufficing to reduce it to the red iodide. Exceptions to this are the hydriodic and hydrocyanic acids, for the latter of which it thus becomes a delicate test. It is soluble in water, 1 in 25, 60° F. Therapeutically it should be of value as an external application, but the determination of this must be left to the medical pratitioner." Lastly there was a specimen of resorcin presented by Mr. Martindale, which was perfectly white and pure. He had seen somewhere an interesting account of this substance, and one suggestion made was that it should be used in the form of a stick as a substitute for nitrate of silver, because it did not discolour the skin, but formed a white scar instead of a black one.

Mr. JACKSON then made a few observations on some of the specimens.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

FARADAY LECTURE.

A crowded audience of Fellows and visitors assembled at the Royal Institution, on Tuesday, April 5, to hear the Faraday lecture.

It was delivered by Professor HELMHOLTZ—

On the Modern Development of Faraday's Conception of Electricity.

The President of the Society, Dr. Roscoe, occupied the chair.

The lecturer first referred to the exactness and precision of the words of Faraday, and the way in which, by a kind of intuition, he arrived at a large number of general theories, without the aid of mathematics. The great fundamental problem which Faraday called up anew for discussion was the existence of forces working directly at a distance without any intervening medium. He saw, with wonderful sagacity, how, by the systems of tensions and pressures produced by the dielectric and magnetic polarization of the space which surrounds electrified bodies, etc., all the phenomena of electrostatic, magnetic and electromagnetic attraction, repulsion and induction could be explained without having recourse to forces acting at a distance. The lecturer then turned to the second fundamental problem aimed at by Faraday, the connection between electric and chemical force. Faraday's experiments contradicted the theory of Berzelius that the quantity of electricity collected in atoms was dependent on their mutual electro-chemical differences, and proved the truth of the well-known law of definite electrolytic action. Since that time, our methods of observing and measuring electrical phenomena have enormously improved; currents which would require a century to decompose a milligram of water can be very well observed. Kohlrausch has proved that in dilute solutions of salt, etc., every atom under the influence of currents of the same density moves on with its own peculiar velocity, independently of other atoms, the total amount of chemical motion being represented by the sum of the equivalents of the cation gone forwards and the anion gone backwards. This established, Faraday's law tells us that the same definite quantity of either positive or negative electricity moves always with each univalent ion. The most startling conclusion from this is that if elements are composed of atoms, electricity also, both positive and negative, is divided into definite elementary portions, which behave like atoms of electricity. Now, it can be shown that electrolytic conduction is not limited to solutions of acids and salts, but that solid bodies, such as glass, behave like electrolytes. The lecturer then proceeded to consider the forces which produce these motions, and showed how enormous was the quantity of electricity, as measured by its electrostatic force, required to decompose a small quantity of water; thus the electricity of 1 milligram of water separated and communicated to two balls 1 kilometre distant would produce an attraction between them equal to 25,000' kilos. From various considerations we are driven to the conclusion that the motion of the ions through the interior of the liquid is resisted solely by the mutual attractions of the electrical charges of the ions. As soon as the ions are to be separated from their electrical charges the current meets with a powerful resistance, the overpowering of which requires much work. The lecturer then surveyed the mutual relations between heat, electricity and chemical action, and stated, as the facts leave no doubt, that the mightiest of chemical forces are of electric origin. He concluded, with Faraday, that the forces termed chemical affinity and electricity are one and the same.

Correspondence.

"*Ferrum.*"—We think that as "Spiritus" is the more important word of the two it should be taken as indicating the intention of the prescriber.

O. A. S.—The principle to be followed in dispensing a mixture where quinine is thrown out of solution has been laid down several times in connection with the "Dispensing Memoranda." See before, p. 798.

G. W. F.—Sulphide of calcium is used as a remedy for boils, a tenth of a grain being given hourly or every two or three hours. It is said not only to cure existing boils, but to prevent the formation of fresh ones.

A. Oldfield.—*D'Unger's Formula for Tinct. Cinchon. Rub.*—Red cinchona bark powdered and exhausted with proof spirit, so that one ounce of fluid shall contain the active principles of one ounce of the bark.

W. Barron.—There is considerable difference of opinion as to the proper strength for Tincture of Gelsemium. See the discussion reported in the present volume, before, pp. 242 and 243.

Ignoramus.—Probably the name is a misreading for "apomorphia."

R. S. T.—Ruspini's Styptic, according to Gray, is "said to be a solution of gallic acid in spirit, scented with rose."

Nabob is recommended to apply to the Secretaries of the respective societies.

C. Ray.—We are not acquainted with such a work.

Associate.—Cooley gives the following recipe for a storm glass solution:—Camphor, 2 dr.; nitre, 1¼ dr.; sal ammoniac, 1 dr.; proof spirit, 2¼ fl. oz.; dissolve.

Student.—We are unable to say; the subject is one for experiment.

J. F. H.—The fountain is not a continuous one, but when properly constructed, to use the words of the writer to whom you refer, it "lasts some time."

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Dyer, Hunter, Robinson, Covell, Verity, Illingworth, Young, Lees, Brown, Craig, King, Reynor, Buckley, John, One who has been Sold, Nabob, Ignoramus, Eardley, 374.

A MALAGASY MATERIA MEDICA.

Both archæologically and medically, the medicines and other remedies used by the natives of any country (especially those of countries so little known as Madagascar) are a matter of interest to Europeans, especially as we owe the greater number of our most powerful remedies to the often unwritten pharmacopœias of other countries. From the following list of Malagasy remedies, drawn up by Dr. G. W. Parker, a medical missionary sent out by the London Missionary Society, it will be seen that (as might be expected) the Malagasy "doctors" are herbalists, and that, while many of their remedies are useless or even disgusting, there is some wheat among the chaff. Where specimens were sent the plants have been identified at Kew, by Mr. J. G. Baker, and the result has been placed at our disposal by the Assistant Director, Mr. W. T. Thiselton Dyer. Although a few European remedies appear in this list, yet only their peculiarly native use is given, while the rest are purely native remedies:—

1. *Sprains and Dislocations.*

Màrovèlo (a plant).—Scraped.—Infusion drunk.

2. *Broken Bones.*

Haràto.—Splints made of split bamboo or anything else at hand, applied to the limb, then bandaged.

3. *Mandàlo* (*Colic*).

Atsòro (root of a plant).—Chewed, and saliva swallowed.

Làvaràvina [a species of Rumex.]—Pounded leaves. —Infusion drunk.

Voanantsindrana ("Cape Gooseberry.")—[Physalis peruviana].—Pounded leaves.—Infusion drunk.

4. *Recent Sores.*

Soot; iron filings; scrapings of a cow's horn.—Any of these applied to the sore, dry.

Nìfinakànga [Zornia diphylla; Commelina madagascarica sent also with the same name]; Sòfintotòzimaniry.—Entire plants.—Infusion drunk.

"Cape-Lilac" [Melia azederach] leaves; Alum.—Boiled together.—As a lotion for the sore.

5. *Accidentally drinking an Insect called Tsingàla.*

Soot.—Mixed with water.—Drunk.

Harahara (Lignum Vitæ (?)).—Scraped and infused. —Drunk.

6. *Angatra* (*Gonorrhœa*).

Vòafòtsy [Aphloia theæformis]. — Leaves. — Any bitter tasted plant. — Made into decoctions.— Drunk. Evòhana mafàna, or warm water vapour baths.

7. *Màniràno* (*Ascites*).

Vòafòtsy [Aphloia theæformis]. — Leaves. — Made into a decoction.— Drunk.

8. *Vòankànina* (*Indigestion*).

Ròvy (said to purge).—Infusion.—Drunk.

Sòngosòngo [Euphorbia splendens.] Vavoróka (Vahy Voraka ?).—These two plants, poisonous in any but very small doses, are given by guess.—Decoctions or infusions.—Drunk.

Tànatànana (Castor oil seeds).—Boiled in water.— Drunk.

9. *Hàngatra*: *Vày* (*Abscesses*).

Pounded Rice mixed with Chillies. Hòfika (fruit): scraped or pounded. Vòriràvina (leaves): chopped up. Fàntsinakòholàhy (leaves): broiled over a fire.—Any of these as poultices.

10. *Tòmboka* (*A disease peculiar to animals*).

Turmeric.—Pounded.

Fàntsinakòholàhy (a plant).—As decoction.—Drunk by the diseased animal.

Tanatanana [flowers of the castor oil plant, Ricinus communis].—?.

Tamènakatòdiakoho.—?

11. *Hàzaka* (*Eczema*).

Taimbìtsy (a tree) [Psorospermum sp.].—As decoction.—As a lotion.

12. *Tsevo-drano* (*Onychia*).

Alum and Chilies.—Mixed and wetted.—As poultice.

Red Vòamànga (a plant).—Scraped.—As a poultice.

Kapílam-bòatàvo (dried gourd rind).—Scraped.— As a poultice.

Hèry (root of a plant).—Skin scraped off.—Rubbed on the finger.

13. *Kitròtro* (*Measles*) *Nèndram bòalàvo* (*Chicken Pox*), *Bòmbòngl.*

Taìmbòrontsilòza.—Entire plant powdered, boiled in an earthern pot, and then used as a vapour-bath.

Evòhana akòho.—A fowl cut up, and treated in the same way as the Tàimbòrontsilòza above.

14. *Nèndra* (*Small pox*).

Fowls.—As diet.

Voasary (Lemon or orange leaves); Fanèfitra (a plant).—These two, boiled together in an earthern pot, are used as a vapour-bath.

Note.—The Fanéfitra is equally a protective against small pox, if a piece of it, tied to a bit of string, is worn hung round the neck; but of course you must not use also "the foreigner's charm, *i.e.*, vaccination.

15. *Kibày* (*Bubo*).

Taimbỳ (iron slag pounded), 1 part; Fià-pàry (chewed sugar cane), 2 parts.—Mixed, then burned together. —As poultice or as ointment with lard added.

Lemon juice.—Either simply expressed and used as a lotion or slices not squeezed applied to the boil or sore.

16. *Tety*; *Fàrasisa* (*Condylomata and other Syphilitic Tumours*).

Hanidraisòa (leaves and root); Autsointsòina (leaves). Zàhana [Phyllarthron Bojerianum.] (leaves). Lavaravina (whole plant). Bòngo (leaves and root).— Fresh leaves bruised, or dried leaves burned to ashes.—As poultices.

Màhatànàndo (entire plant).—As decoction.—Drunk.

Tsiavàramònina (leaves and root).—As decoction (first mixed with Hànidraisòa.—Drunk.

Tsingàntsa.—?

Note.—This last is said to be the most efficacious remedy for syphilis.

17. *Kifòngo* (*Carbuncle*).

Fotsiavàdika [Gnaphalium luteo-album, Helichrysum sp.] (entire plant).—Burned to ash.—Mixed with lard as ointment.

18. *Hàtina* (*Scabies*).

Dingadingana [Jussiæa repens].—Pounded fresh.— As a poultice.

Angàvodiana (a tree) [Agauria salicifolia.].—Decoction.—As a lotion.

Tambìtsy (root) [Psorospermum sp.]. Haròngana (a tree) [Haronga paniculata].—Pounded.—As poultices.

19. *Tandòmotra* (*Urticaria*).

Kiadrìatra (a plant) [Anthospermum plicatum.]—Boiled and used as a vapour-bath.

20. *Anga-dràno* (*Scurf or psoriasis on the head*).

Mòita: boiled in water. Ox-gall: mixed with water.—As hair washes.

21. *Olitra* (*Toothache*).

Alum; Ginger; Soot; Chilies; Tobacco; Sulphate of Copper.—Any one or more of these used for plugging the hole in the tooth (the ginger being chewed first).

22. *Tsàkodhìna* (*Hiccough*).

The patient is startled by a sudden noise or movement.

23. *Stumbling.*

The injured or bruised part is urinated upon by another person.

24. *Cuts and Bruises.*

Zozòro [Cyperus papyrus.]—Burnt to ashes.—Used as an ointment, mixed with lard.

25. *Mahèry mivàlana*; *Manèhitra* (*Diarrhœa*).

Haròngana [Haronga paniculata]. Guava [Psidium pomiferum]. Voanònoka, Kelifodra.—Leaves of any of these.—As decoctions.—Drunk.

26. *Mivàlan-drà* (*Dysentery and Dysenteric Diarrhœa*).

Vòlombòdipòna [Dyospyros sp.] (ebony chips). Haròngana (leaves). [Haronga paniculata]. Volomborona (leaves or chips): "borona" is Tetradenia fruticulosa. Any of these as decoctions.—Drunk.

27. *Tsy mivàlana* (*Constipation*).

Ginger rhizomes.—Scraped, wetted with water.—As a poultice to the nates.

28. *Ròhana* (*Rheumatism, Gout and Periostitis*).

Fàndrotràrana [Cynodon Dactylon] (entire plant). Sòdifafàna leaves.—Either of these pounded, soaked in cold water early in the morning and used as poultice.

NOTE.—Ròhana is also the term used to describe the state of a child which ought to be able to walk, but does not. The remedy for the child's disease is to bury him (or her) in sand up to the waist, in order to frighten the child into moving his legs.

29. *Pìa* (*Pains of childbirth*).

Vòanònoka (leaves). Sampivato (leaves). Vòatàvo (leaves of any cucurbitaceous plant).—Any of these as decoctions.—Drunk.

30. *Bèvohòka mandòa* (*Vomiting of pregnancy*).

Sìrampàtana (the white ashes from the hearth.—Eaten.

Tàvimbilànitàny.—Black earthern plate (not very tough), either pounded roughly or eaten just as it is.

31. *Miòlana am-pandrìana* (*Stiffness of the muscles of the neck, due to lying too long in one position*).

The stiffened muscles must be rubbed by some person who is known to be one of a pair of twins. No other person will do.

32. *Accidentally drinking tsibòbòka* (*tadpoles*).

Soap.—Scraped and made into suds with water.—Drunk.

33. *Tòrana tàmpoka* (*a sudden feeling of faintness*).

Onions; Turmeric; any alcoholic liquor.—The two former are pounded, then spirit added.—Drunk.

NOTE.—This remedy is said to be equally efficacious without the spirit (most Malagasy would prefer the spirit alone).

34. *Maràrin-dràno àmy ny vàva* (*Sores on the lips, causing dribbling of saliva*).

Salt.—Chewed, and saliva allowed to flow over the sores.

Banana (leaves).—Dried ash mixed with suet.—As a poultice.

35. *Manèvika* (*Neuralgic pains*).

Iron filings.—Drunk with water or used as a poultice.

36. *Anakàndro*: *Hòdi-mòna* (*Leprous spots in the skin*).

Tsivòangívy.—Angivy is Solanum Indicum, or Melongena.—Juice to be squeezed out upon the skin.

Hàriàndro (entire plant).—?

Atòditsindràno (eggs of a green grasshopper).—Kill the animal by pulling off its head, then squeeze out its eggs upon the skin.

37. *Pànda* (*Freckles, Sunburning*).

Sulphur and lard.—Mixed.—As an ointment.

Mango tree resin. Ròitra hàzo, the juice which exudes from several kinds of wood used as fuel.—Either of these simply rubbed on the face.

38. *Tambavy* (*a vague term for any disease in a child*).

Frog-soup.—Drunk by the child.

NOTE.—The proper animal from which the soup should be made is a large *toad* of a brown colour, about 8 inches in length, called "Sàmba-kàka." The efficacy of this frog-soup seems to be due to the difficulty of procuring this animal!

39. *Tèha-dòlo* (*Swollen Eyelids*).

The swollen eye is gently slapped several times with the corner of a cloth; this remedy acting on the homœopathic principle "*like cures like,*" *a slap from the wing of a ghost* being the supposed cause of this disease.

40. *Màso vòalay* (*any foreign body entering the eye and there setting up irritation*).

Fàndrotràrana [Cynodon Dactylon] (entire plant). Anamàmy [Solanum nodiflorum] (young stalks).—The closed eye is gently rubbed with either of these remedies.

41. *Headache.*

Màfavè (a plant).—Leaves smoked in a pipe.

42. *Sore Throat.*

Anamàmy [Solanum nodiflorum, Jacq.] (entire plant). Fiandrìlavenona [Malva sylvestris]. —Either of these pounded, mixed with honey, and eaten.

43. *Ngòrongòsy* (*Jaundice*).

Turmeric or Rice.—Boiled in milk.—Eaten.

Vòakètsihètsy (leaves).—Infusion or decoction.—Drunk (purgative).

Tsikobokobondanitra (entire plant.—Infusion or decoction.—Drunk.

44. *Tàzo* (*Malarial Fever*).

Màfavè (entire plant or leaves).—Smoked in a pipe.

Nìfinakànga [Zornia diphylla] (entire plant). Kìranjày (entire plant). Landemo (leaves).—Decoctions.—Drunk.

45. *Kàukana* (*Round Intestinal Worms*).

Taimborontsiloza. Kodìadìavòrona [Oxalis corniculata]. Kotrokotrobata [Kitchingia n. sp.].—Pounded and infused, or as decoctions.—Drunk.

Vòatamènaka (a fruit).—Roasted and pounded, or scraped.—Eaten.

Tantèrakala.—Decoction.—Drunk.

> Note.—"The first of these I *know* to be efficient; the fourth is also much used; but the fifth is said to be the most certainly successful."

46. *Foròna* (*after Circumcision*).

Oil of any sort.—Simply rubbed on the cut surface.

Villantsàhona.—Infusion or decoction as a lotion for the cut surface.

47. *Kòhaka* (*Cough*).

Sanàtry (fresh).—Scraped into water and drunk.

Tòho (a fish).—A quantity of these are boiled in water, with some ginger, and the water drunk.

48. *Kòhaka lòvaremy* (*Whooping Cough*).

Afèrontàny [Mollugo nudicaulis].—Decoctions.—Drunk.

49. *Màmpiàmpaka* (*Blistering Remedies*).

Tòngotrambòabè (Bruised fresh leaves.) Songosongo [Euphorbia splendens] (Juice).—As local applications to part to be blistered.

> Note.—"The former I have seen to blister quite as well as cantharides plaster; the latter is nearly as efficacious."

50. *Vòtsy* (*Warts*).

Tràbotràbokèna.—The lungs of an animal (usually of an ox) crushed, and applied raw to the wart.

51. *Angamàty* (*Strangury, Partial Suppression of Urine*.

Banana fruit: one slice roasted; Voànantsìndrana [Physalis peruviana] (fruit): crushed.—Mix, boil together and eat. Follow up this draught with another draught, composed of one fowl's egg beaten up in milk, and boiled, then drunk.

Vòafòtsy (leaves); [Aphloia theæformis].—R. Vòafòtsy leaves, ½ pint; water, 1½ pints.—Boil till water equals ½ pint only; then drink at one draught.

Names and Supposed Properties of the Chief Hova "Ody" or Charms."

1. Rovy?—If an infusion or decoction be drunk it will cure colic and indigestion.

2. Sanàtry (stalk of a climbing plant).—This will prevent you from being killed by another man's "charms."

3. Mandràvasàrotra: "remover of difficulties" (bark of a plant).—Usually taken along with No. 1 above, as both have the same action.

4. Fanàlasompatra.—Acts like Nos. 1 and 3.

5. Alàkamisy (chips of yellow wood).—Acts like Nos. 1 and 3.

6. Sènasèna?—Action unknown.

7. Hòlatàfa.—Action unknown.

8. Tsilaìtra "unbearable."—Action unknown.

9. Manàvodrèvo.—Action unknown.

10. Voantangena [Tanghinia venenifera (fruit)].—Used in the "Ordeal by Tanghena;" described in Ellis's 'History of Madagascar.'

11. Fanèfitra.—Tied to a bit of string, and hung round the neck; this will keep off small pox.

12. Kisòmpy (the stalk of a plant). 13. Fànazàva "enlightener."—The former has a bitter taste; but both have the same property of enlightening your road in the dark.

14. Raisàonjo "father of an arum."—This, added to any other "charm," neutralizes the effects completely.

15. Odyfàdy (what one might call "essence of common sense."—This will prevent you from eating or drinking whatever is not good for you.

16. Mamònjy "saving."—To save anything from being lost by yourself or by any other person, or to save any person from any accident or calamity, you drink this.

17. Hàzo-mànga "blue wood."—Called also "the grandfather of all charms." Tied to the horns of cattle it wards off cattle diseases.

18. Mànanjàra "having a share."—Called "the strongest charm," because it is a very hard wood; used for making walking sticks, idols, etc.

CONTRIBUTIONS TO A CLOSER KNOWLEDGE OF SOME LITTLE KNOWN LEAVES.*

BY DR. HEINRICH PASCHKIS.

II. HENNA LEAVES AND POWDER FROM LAWSONIA ALBA.

Under the name "henna al henna" ("chenna") a powder is used by Persians, Arabs and Egyptians, as a cosmetic, which I have submitted to a close investigation.

For this purpose I used three specimens, one of which had been for a long time in the Pharmacological Institute of Vienna; another had been recently sent there by Dr. Polak; the third was kindly furnished to me by Professor Dr. J. Neumann (the last was obtained from the Persian Embassy). All three specimens corresponded with one another both in appearance and microscopical features. The henna powder is greenish-brown, tolerably uniform, feeling somewhat sandy between the fingers. In the glass vessels in which it has been preserved for a long time it has acquired upon the surface, under the influence of light, a reddish tinge. Microscopically examined it was recognized as a powder of *Lawsonia* leaves rendered somewhat impure by forameniferous sand. The general elementary forms which are described subsequently, as well as entire leaves and abundant crystals of oxalate of lime, were also found in it.

Of the leaves themselves I have had two kinds before me: one coming from Persia, the other from the French colony of Senegal; the former was placed at my disposal by Herr Professor Vogl, the latter by Dr. Moeller. The Persian leaves correspond with two herbarium specimens of *Lawsonia alba*, Lam. (*L. spinosa* and *L. inermis*, Linn.) in the Pharmacological Institute in Vienna, and with those of *L.*

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* Reprinted from the "Zeitschrift" of the Austrian Pharmaceutical Association, and communicated by the author, to whose courtesy we are indebted for the use of the wood engravings illustrating the paper.

spinosa, except some variation in the size. The Senegal leaves are only distinguishable from the others by being larger (1 to 2 centimetres longer). The Persian leaves are ovate, acute, mucronate, disappearing at the base into the short petiole. In length they attain 2 centimetres; their greatest breadth is 1 centimetre. The margin is entire, somewhat revolute. The coriaceous shining upper surface is greenish-brown; the under side is rather lighter coloured. There is one principal nerve; the lateral nerves anastomosing not far from the margin.

The epidermis of the upper side consists of polygonal cells, crowded together, leaving between them an extraordinary number of stomata. Among the epidermis cells occur, in tolerable abundance, but irregularly distributed, single cells which are remarkable on account of their size (0·033 mm. by 0·018) and the strongly refracting property of their contents (mucilage). These appear equally striking in a transverse section of the leaf. The mesophyll consists under the upper surface of a double palisade layer, and below that of cells containing chlorophyll crowded together. (Fig. 12 and 13). Among these cells occur numerous rosettes of oxalate of lime. The epidermis of the under side scarcely differs from that of the upper; an almost equal number of stomata occur in it. In solution of potash a section assumes uniformly a beautiful yellow colour. Chloride of iron reveals in the mesophyll a tannin turning green with salts of iron; the epidermis cells also, with the exception of the before-mentioned protoplasm cells, easily turn green. The microscopic sugar test gives a negative result; as also treating with chloride of zinc, which only colours the epidermis violet. Leaves kept a long time in alcohol became a somewhat pale reddish colour; under the microscope, sections treated with potash solution appeared of a very beautiful delicate rose colour. The Senegal leaves scarcely differed in structure from the others.

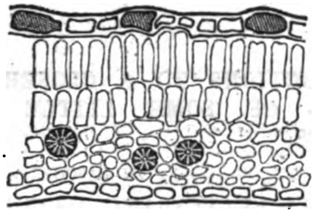

Fig. 12. **Lawsonia alba. Transverse section.**

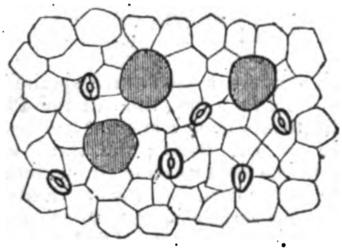

Fig. 13. **Upper surface.**

For the purpose of chemical investigation, 50 grams of the powder were digested with 1 litre of water, filtered, and the filtrate evaporated to dryness, forming a dry extract, dark brown in colour, bitter tasting, and smelling of caramel; a specimen gave sugar when tested. A very small portion of the extract was soluble in alcohol with a yellow-brown colour. In ammonia the greater part was soluble, with a beautiful Malaga brown colour.

The residue from the treatment with water was digested with 96 per cent. alcohol, filtered, the filtrate concentrated by distillation, again filtered (the residue consisting of black viscid drops, containing wax and chlorophyll), and then evaporated in the air. The supernatant water was poured off. The fine granular wood-brown residue was afterwards dissolved in hot alcohol; after cooling, and remaining some time, another small quantity of odourless and tasteless dark brown residue remained, which behaved as described of the last residue. The last alcoholic solution gave upon evaporation a brown resinous mass, which in a suitable quantity of alcohol was soluble with a golden brown colour, and could be diluted with water, showing a slight turbidity. It was decolorized by hydrochloric or nitric acid, and became a very deep brown colour with solution of ammonia or soda. This substance was further scarcely soluble in cold water, and only to a small extent in hot water (the dirty yellow turbid solution being coloured blackish-green with chloride of iron). In benzine, carbon bisulphide, amylic alcohol, ether and chloroform it was partially soluble, and in petroleum spirit and turpentine almost insoluble. The alcoholic solution, diluted with water, gave the following reactions:—With hydrochloric acid, an opalescent turbidity; nitric acid, a yellowish turbidity; chromic acid, a dirty yellow-brown turbidity; caustic soda or ammonia solution, a clear dark Malaga brown; stannic chloride, dirty greenish-yellow rusty brown flocculent precipitate; solution of alum, a dirty yellow turbidity; chloride of iron, dark greenish brown; lime water, turmeric yellow, with a slight brownish precipitate; chloride of lime, light yellow, with a slight brownish precipitate; cyanide of potassium, citron yellow, clear; acetate of copper, sea-green, with a slight red-brown precipitate.

This last resinous mass and the above-mentioned residue were washed frequently with hot water, and then completely dissolved in boiling ether. Upon the evaporation of the ether there was obtained a very acrid mixture of two resins; one an acrid soft resin; the other a hard resin, appearing under the microscope in turmeric-yellow scales. The wash-water, which was of a beautiful flesh red colour, contained tannin (coloured green with chloride of iron) and colouring matter (becoming intensely brown with ammonia or soda solution), the separation of which in such small quantity was impracticable.

In a second experiment 25 grams of coarsely powdered leaves were mixed with caustic lime,—upon which they gave off a very disagreeable odour resembling trimethylamine,—and dried. The product was digested with alcohol, filtered, the lime precipitated with sulphuric acid, the liquid concentrated by distillation, again filtered and soda solution added to an alkaline reaction. A slight turbidity resulted, and as the liquid did not clear, it was shaken with amylic alcohol, and the greenish-yellow solution in amylic alcohol evaporated. Placed in a watch glass there shot out some very delicate tufts and needles of brownish-yellow crystals, which dissolved in water and separated again from the aqueous solution in the same form. These crystals were evidently only sodium salts, which separated out from the water removed with the amylic alcohol.

Lastly, 100 grams of powder[*] were digested with potash solution and water with heat and the infusion distilled. The water clear distillate showed distinctly an alkaline reaction and had a very disagreeable smell. It was reduced to one-half by redistillation and the resulting strongly alkaline liquid was treated with dilute sulphuric acid and evaporated upon a water-bath. The liquid, at first water clear and colourless, assumed upon warming a tint of rose red, and at the close was of a brownish colour; but at this temperature it could not be brought to dryness. Upon the advice of Professor Schneider, the small quantity of liquid was neutralized with potash solution, which caused considerable effervescence; there was given off, at first, an indefinite disagreeable (aromatic) odour, and then a clearly ammoniacal pungent vapour, having a strongly alkaline reaction. The liquid, diluted with distilled water, was now again submitted to distillation, and the vapour conducted into a well-cooled receiver moistened with hydrochloric acid. A dense white mist was developed. The distillate was then evaporated at a very low temperature upon a water-bath, when there resulted a white deliquescent, faintly ammoniacal smelling salt. A portion was dissolved in a very small quantity of absolute alcohol, which upon evaporation left it as a white deliquescent salt similar to that previously obtained. A portion of this latter product treated with solution of potash gave off at first a penetrating fishy smell, which was very similar to that of trimethylamine, gradually passing into a pure ammoniacal odour. The solution with caustic potash became, after standing a few minutes, a delicate rose colour. These phenomena I think I may refer to a volatile, easily decomposable amine base, if not directly to trimethylamine. The preparation of it in a pure state and in sufficient quantity and its analysis being impracticable with the small quantity of material at my disposal, I reserve its further investigation until subsequently.

Henna has been in use among orientals from the most ancient times until the present day for colouring the finger nails, the soles of the feet and palms of the hands; also the points of the beard and the hair. As to the method of producing the dye statements differ. According to a communication made to me orally the powder is stirred with water to make a paste and this is spread directly upon the place to be coloured, which is thus tinged orange-red. Experiments that I have made upon myself lead me to doubt the activity of a paste so prepared. My finger was only soiled, but not coloured. With some alkali, however, I obtained, not a yellow or a red, but a brownish colour, which corresponded with my experiments. In the dyeing of hair black, the henna should be used in combination with indigo, an innocent, if not very handsome dyeing material.

Finally, it may be mentioned that in the East the ends of the manes and tails of old horses are coloured red with henna. Besides this, henna is used in India, as "mayndie," in the dyeing of leather, and in recent times, in France, for the dyeing of silk.[†] Further, the root is used in pharmacy, as "red alkanna," for colouring ointments and pomades.

The earliest and, at the same time, clearest notice of the use of henna I find in Prosper Alpinus,[*] who, under the designation, "Ligustrum Ægyptium, Elhanne vel Tamarhendi," gives a very good figure and description of the plant. He says, "They make from the leaves a powder which is called 'archenda.' This the women use as a beautifying material, by staining their hands and feet with it of a golden yellow colour. Not by mixing with the juice of Lanaria or of Struthium, but simply with water, they produce a golden yellow water which dyes the same colour. If our women had used this substance for rendering their hair golden (*pro de aurandis capillis*), which might be used without injury, they would not have allowed their heads to be singed by the sunbeams and injured in every possible way." According to him, also, the powder is used for sweaty feet, and for ulcers of the mouth, gums and genitals, and the flowers are used as a remedy against headache. Similar statements occur in Loureiro[†] and in Vietz.[‡] Finally, in a more recent work[§] I have found statements that correspond with those of old Alpinus. In India the plant is used as a remedy against all possible diseases and also as a dye material. For this latter purpose the powdered leaf is made into a paste with catechu.[||]

THE PREPARATION OF FORMIC ETHER.[¶]

BY HENRY TRIMBLE, PH.G.

Having occasion to prepare considerable quantities of this ether, and finding the process in which sodium formate is employed a long and tedious one, it occurred to me that it might be made by adding alcohol to the acid during its formation from oxalic acid and glycerin. I have since found the fact mentioned in an English textbook on chemistry, but as no formula is given I offer the following, with the hope of benefiting those who have never met with the statement:—

Ten parts each of oxalic acid and glycerin with 1 part of water are heated in a flask, connected with a condenser, for about twelve hours at a temperature between 100° and 110° C. When effervescence has ceased a small quantity of liquid will be found in the receiver, but as that is largely water it may be rejected. To the mixture in the flask, consisting of glycerin and formic acid, is added 4 parts of alcohol, and the whole kept at a temperature not exceeding 60° C. for several hours. It is then submitted to distillation, continued until the thermometer indicates 120° C. The distillate is found to consist of two layers. The upper ethereal one is separated, washed with water containing a little sodium hydrate, and distilled.

The yield is about 4 parts, specific gravity ·910 at 15·5° C., while theoretically it should be 8 parts, a loss which may be accounted for. By adding 5 parts of water to the contents of the flask and distilling, a moderate quantity of formic acid will be obtained. It was thought that if alcohol were added instead of water an additional amount of the ether might be obtained; but this is not the case, because the acid is so diluted by the glycerin that it will not combine with the alcohol. There is always a great loss when the ether is manufactured from sodium formate, therefore this process is offered as not only being cheaper but also as furnishing a purer product with less trouble and in less time. It may not be out of place to mention that amyl formate may be prepared in the same way, therefore, in all probability, the formates of the other radicals.

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[*] This quantity was supplied to me by the kindness of Dr. A. Braun. The microscope showed in this, as in all the other powders, an enormous admixture of sand. A preliminary incineration gave more than half (62 per cent.) of incombustible residue.

[†] Wiesner, 'Rohstoffe des Pflanzenreichs,' p. 674.

[*] 'Historia Ægypti Naturalis,' written in 1592, pub. Ludg. Batav., 1735. Pars. ii., De Plantis Ægypti, p. 23, cap. xiii.

[†] Loureiro, 'Flora Cochinchinensis,' Berlin, 1793, p. 281.

[‡] Vietz, 'Icones Plantarum,' Vienna, 1818, vol. vii., p. 70.

[§] Drury, 'Useful Plants of India,' p. 285.

[||] Dymock, "Notes on Indian Drugs," *Pharm. Journ.*, [3], vol. ix., p. 894. After an historical notice which goes back to Solomon, Dymock gives also a notice upon the uses, which corresponds with the above. Synonyms: Mehndee (Hind. and Bomb.); Marutouri, Aivanam (Tam.); Mehedi (Beng.).

[¶] From the *American Journal of Pharmacy*, March, 1881.

THE BENEFICENT AND TOXICAL EFFECTS OF THE VARIOUS SPECIES OF RHUS.*

BY T. J. W. BURGESS, M.B.

The most noteworthy example of this genus in Canada, and the one to which the greater part of my remarks will apply, is commonly called poison ivy. So far as my own knowledge extends, but little is known of this plant to the profession at large, except through cases of poisoning by it presented for treatment. Now, when we consider how common it is, and the number of persons liable to exposure to its noxious influence,—the labourer engaged in railway work and in clearing bush-land, the farmer working about his fences, one of its favourite lurking places, and the child so often employed in gathering the wild flowers with which our woods abound,—I cannot impress on you too strongly the necessity for a thorough knowledge of the various species, their appearance, and that of the plants with which they are most likely to be confounded, and their physiological effects, with the prevention and cure of these. Some of the varieties being used for domestic purposes, and others in the practice of medicine, I will also draw your attention to their uses in the arts, and their pathological effects, with the class of cases in which they have been found most beneficial when employed as medicines.

The only representative of the large order, *Anacardiaceæ*, the Cashew family, in northern North America, is this genus Rhus, a name derived from the Greek verb *ρεω* (reo) "to flow," so called because it was thought to be useful in stopping hemorrhages. And, truth to tell, the name was not inaptly applied by our forefathers, all the varieties being possessed of more or less astringent properties, some of them in a very marked degree. The genus, to the non-botanical commonly known as sumach or shumach, is composed of trees or shrubs having a resinous or milky acrid juice; alternate leaves; small, regular, greenish-white or yellowish flowers, and a fruit forming a sort of dry drupe.

No less than fourteen varieties of Rhus are, or have been, used in the arts and sciences (the term including medicine), and these I shall, for convenience of description, divide into two classes, native and foreign, dismissing the latter with but a brief mention of their uses.

Of the foreign species there are six:—

Rhus cotinas, sometimes cultivated in our gardens for ornamentation, under the names "smoke plant," "purple fringe tree," and, from the curious appearance of its seed vessels, which look like a powdered wig, "perriwig-tree," is known in commerce as Venice sumach. It is a small tree with purplish-green flowers, supported on hairy peduncles, and is a native of Siberia, Austria, and Northern Italy. It is not used in medicine or pharmacy, but yields one variety of a wood known in trade as *fustic*, which has been largely employed for producing a yellow dye. A noticeable peculiarity about this species of Rhus is, that its leaves are simple, like those of the elm and maple, and not compounded, like the horse-chestnut and ash, as is the case with the rest of the genus.

Rhus coriaria.—Of this, both the leaves and berries have been used as astringents and tonics, and the ground twigs as a dye-stuff. It is a native of the Ukraine, in Russia, and has been regarded by the inhabitants of that country, combined with a decoction of *Genista tinctoria* leaves, as a preventive of hydrophobia. It is employed both internally and locally, and the peasantry have great faith in its curative virtues, but extended trials in other parts of Europe have shown it to be useless in this much-dreaded affection.

Rhus succedanea is indigenous in Japan. From its berries is expressed a wax sometimes used in pharmacy, known as Japan wax. It is of medium quality, ranking between beeswax and the ordinary vegetable tallows.

Rhus vernicifera, varnish or Japan sumach, inhabits India and Japan, where it is highly prized for its yielding, from incisions made in the stem, a gum from which is made one of the best of varnishes.

Rhus Metopium is found in the West Indies, chiefly Jamaica, and is said to be one of the sources of "hog-gum," so extensively used by bookbinders in the process of marbling paper. This peculiar, and certainly not euphonious, name is derived from the fact that hogs, when wounded, are reputed to rub themselves against this tree, so as to cover the wound with its juice, and form a protection against the irritation of insects.

Rhus semialata, a native of China and Japan, yields a gall largely used, especially by the Chinese, in dyeing their celebrated yellow silks. It is also highly esteemed by them as an astringent medicine.

Of the native species of Rhus there are eight, and, not to afflict you with their scientific distinctions, I will classify them as poisonous and non-poisonous, chiefly confining my botanical descriptions to the poisonous class, it being most important, both in a diagnostic and prophylactic point of view, to be able clearly to distinguish these from certain non-poisonous plants resembling them. The eight species are equally divided, four being innocent and four highly noxious. And first, let me draw your attention to the non-poisonous varieties, meaning by this, non-poisonous by contact with the plant, for, if administered internally, in large doses, even the innocuous ones act as irritants.

Rhus aromatica—fragrant sumach—is a straggling bush with three foliate, hairy leaves; the pale yellow flowers, in clustered spikes like catkins, precede the leaves, which are sweet-scented when crushed. It extends from Lake Superior westward and southward, in dry rocky soil, a variety, the *Rhus trilobata* of Nuttall, chiefly affecting the Rocky Mountains and Sierra Nevadas. This plant has, during the last two years, whether justly or not I cannot from my own experience say, obtained a high reputation as an astringent, and is at present being lauded in journals devoted to materia medica. In hæmaturia and chronic cystitis, where the ordinary remedies—ergot, gallic acid, and muriated tincture of iron—have failed, it is said to have been used with the happiest results. In phthisis, though not advanced as at all curative, it has a favourable effect in checking the hemorrhage, night sweats, and diarrhœa, often so exhausting and distressing. Five to 20 drops of the fluid extract may be given every hour in extreme cases of hemorrhage, and lessened as relief is obtained. For the diarrhœa, 15 drops may be given after each stool, while the night sweats are best treated with a dose of 10 to 20 drops each night at bed-time. In the diarrhœa of children, where the stools are frequent, the pulse soft and feeble, the skin pale, the eyes sunken, and there is loss of flesh and general sense of lassitude, it is by some regarded as invaluable. Its use is also advocated in menorrhagia, dysentery, and diabetes insipidus, but it is in enuresis (incontinence of urine) that it has gained its highest reputation. Dr. Cooper, of Bellefontaine, Ohio, regards it almost as a specific in this complaint, and in the November, 1879, number of *New Preparations*, records a number of cases cured by its use. From the strong testimony to its value, I would urge upon you, who are much more likely to see cases of this not uncommon affection than one engaged in asylum practice, to give it a fair trial if you have not already done so. It is given in 15-drop doses four times a day, the last being administered just before retiring, till improvement takes place, when only the night dose is given, and continued until the habit is cured. At the same time, the patient should strictly adhere to the rules of drinking but little during the evening, and voiding urine just before going to bed. The best form for use is the fluid extract, and a nice formula for its administration is:—

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* Read before the Canada Medical Association at Ottawa. From the *Canadian Journal of Medical Science*.

℞ Fl. Ext. Rhus Aromatica . . . . ℥j.
Glycerine . . . . ℥ss.
Aquæ . . . . ad ℥iv.
M. Sig. ʒj four times daily.

Several medical friends, who have used this drug in various affections, have furnished me with records of cases treated by it, which may be thus tabulated:—

Disease.	No. of Cases.	Result.
Chronic Cystitis . .	1	Much improved.
Phthisis . .	5	In all, attacks of diarrhœa and night sweats were relieved.
Diarrhœa of Children .	9	Six cured; three died.
Diarrhœa of Adults .	2	One cured; in the other the drug seemed to have no effect whatever.
Menorrhagia	5	In all there was a wonderful effect in checking the discharge at the time. In three cases, after use at two menstrual periods the discharge was normal, and has since, now five months, continued so. The fourth case is improving, but the fifth shows no radical change.
Enuresis . .	3	Two cured; one improved.

This record speaks strongly in favour of an extended trial of the remedy in the class of cases enumerated, though its greatest benefit would seem to be shown in menorrhagia and enuresis.

Rhus glabra, variously known as sleek, smooth, Pennsylvania and upland sumach, officinal in the United States' Pharmacopœia, is found over the greater part of North America, south of the Arctic circle. It is a shrub 2 to 12 feet high, with straggling branches, covered with smooth, light grey or somewhat reddish bark. The compound leaves, consisting of eleven to thirty-one leaflets, whitened beneath, in autumn change to a beautiful red. Growing along fences, borders of woods, and in rocky fields, its flowers open about July, and the fruit, often eaten by the country people, ripens in early fall. Excrescences produced on the under surface of the leaves have been used as a substitute for the officinal galls obtained from the oak, *Quercus infectoria*. Like galls, these excrescences are due to puncture of the young shoots by a hymenopterous insect to deposit its eggs. This irritates the part, and a tumour arises, the result of morbid growth. The eggs enlarge with this growth, and are converted into larvæ, which feed on the vegetable matter. Finally the larvæ become flies, and escape by eating their way out. For use, these excrescences should be collected when of full size, just before the eggs are hatched. All parts of this plant contain a large amount of gallotannic acid and the bark is often used in tanning. The berries have a sour astringent taste, and owe their acidity to malic acid, which, according to Mr. Cossens, is not contained in the berries themselves, however, but in the pubescence which covers them. An infusion of the fruit has been used as a refrigerant drink in febrile complaints, and as a detergent astringent gargle in common and ulcerated sore throat. It has also been employed with great success in mercurial ptyalism; but for this, an infusion, or still better, a fluid extract of the inner bark of the root, is best adapted. The fluid extract also possesses tonic properties, and may be used in doses of ½—1 ʒ.

Rhus copallina, dwarf sumach, mountain sumach, or the gum copal tree, is a shrub with running roots, 1 to 7 feet high, inhabiting rocky hills. Its branches are downy, and the petioles between the leaflets are wing-margined. Gum copal, so largely employed in making varnishes, is the product of a number of different trees, one of which, according to some authorities, is the *Rhus copallina*. This plant possesses similar, but less strongly marked, medicinal properties to *Rhus glabra*, and may be used as a substitute for it.

Rhus typhina, staghorn sumach, grows very commonly throughout Canada along railway tracks and on sterile hill-sides. It forms a tree 10 to 30 feet high, with orange-coloured wood. The branches and stalks are densely velvety hairy, with serrate leaflets, pale beneath. This, the fourth and last of the innocuous native species, also possesses properties similar to *Rhus glabra*, and may be substituted when that plant cannot be had.

Of the four indigenous species which possess poisonous properties, one is an inhabitant of the Southern States, and a second of California, while the third and fourth are common in all parts of North America, between the 35th and 60th parallels. Since their poisonous, and probably their therapeutic, effects are similar, I will first give a short description of each species, and devote the remainder of my remarks to the physiological and therapeutic actions of *Rhus toxicodendron*, the common form of poison ivy in Canada.

Rhus pumila, growing only in the Southern States, and very common in North Carolina, is a pubescent shrub, about a foot high, said to be the most poisonous of the Eastern varieties. Its pinnate leaves, consisting of about eleven oblong, coarsely-toothed leaflets, are downy beneath. The three upper leaflets are often confluent, the terminal one, when distinct, being attenuate at the base. The flower panicles are nearly sessile, while the drupes are covered with a red, silky pubescence.

Rhus diversiloba of Torrey and Gray, or *Rhus lobata* of Hooker, approaches very nearly to *Rhus Toxicodendron*. It is generally a shrub, but sometimes a climber, and is said to be the most poisonous of all the Rhuses. It is chiefly a native of California, where it is known by the Spanish name of "Hiedra." Its leaves consist of three, rarely five, obtuse, lobed leaflets; its flower panicles are shorter than the petioles, and its fruit is white and pubescent. With her usual generosity, Nature, according to Dr. Canfield, provides an antidote to poisoning by this species, in the shape of another Californian plant, the *Grindelia hirsutula*, of which either the bruised plant itself, or a decoction, is applied to the parts.

Rhus venenata, formerly called *Rhus vernix*, is known by the different names of poison dogwood, poison elder, poison ash, poison sumach, swamp sumach, white sumach, and varnish tree. Affecting rich, swampy ground in shaded situations, it is a shrub or small tree, usually growing from 6 to 18 feet high, and one of the largest of our native species of Rhus. The trunk seldom exceeds 3 inches in diameter, and, branching at a height of 3 to 5 feet, usually makes a repeatedly two-forked ramification, the final twigs terminating in thick clusters of leaves. The smooth bark is dark grey on the trunk, lighter on the branches, and reddish on the twigs and petioles. The leaves, expanding in May, are at first dark yellow in colour, but become deep green with a paler under surface when mature, and, finally, at the first touch of frost, assume a beautiful deep crimson hue, that can fairly vie with the maple for brilliancy of effect. The seven to thirteen leaflets forming the compound leaves are obovate oblong in shape, and entire. The small yellowish flowers are arranged in loose and slender axillary panicles, forming large masses of fragrant bloom at the ends of the branches, which attract innumerable swarms of bees. Whether the honey derived from this source possesses any poisonous properties I am unable to say, but, as at various times there have been reports of poisoning by honey in particular localities, it would be a point well worthy of investigation whether this form of poison ivy does not also abound there. The berries, ripe in October, are whitish or dun-coloured, with striate stones, and look somewhat like bunches of small grapes—a similarity, however, which is immediately dissipated by the slightest glance at the leaves, in the grape *simple*, in the Rhus *compound*. Taken altogether, this tree makes one of the handsomest shrubs imaginable when in blossom, but is, unfortunately, one of the most deadly. *Rhus venenata* has been thought to be identical with the *Rhus vernicifera* of Japan, and when incisions are made into its bark there is a copious flow of viscid fluid, yellowish at first, but soon changing to a deep black, which, when boiled, makes a fine varnish. The poisonous properties of this tree are said to be more powerful than those of *Rhus Toxicodendron*; persons exposed to its influence being more apt to suffer, and more severely. I have known several cases of poisoning due to this plant being mistaken for the common elder, an error which could never arise were the fact borne in mind that both varieties of elder found in this country have the margins of the leaves toothed, whereas in *Rhus venenata* they are entire. In addition, the elders have dense masses of flowers, and a fruit which, when ripe, is either red or black, while this form of poison ivy has slender, scattered bunches of flowers, and a fruit whitish in colour when mature.

Rhus Toxicodendron may be made to include *Rhus radicans*, as botanists are now pretty well agreed that it is merely a variety of the former; its differing form and characters, viz., more entire leaflets and high climbing stem, being dependent on the circumstances of its *habitat*. *Rhus Toxicodendron* was first described in 1635 by Cornutus, in his works on Canadian plants, as a species of ivy. The Indians were well aware of its properties, and its effects were mentioned by Kalm and other travellers in North America. Poison oak, poison ivy, poison vine, poison creeper, and sometimes poison mercury, are names applied to it. It is found within the same range of territory as the *Rhus venenata*, and is by far the commonest form throughout Canada. It generally grows in fertile and low grounds, but will thrive in barren and elevated places, and attaches itself to any bodies in its vicinity by numerous thread-like rootlets given off from the stem. Sometimes it climbs spirally to the tops of our tallest trees, attaining a height of 40 or 50 feet. Again, it is met with along the sides of fences, which serve as a convenient support, or crawling over brush, or rocks, or along the ground, in which cases it never exceeds from 1 to 3 feet in height. This low form sends off many small branches, the pendulous extremities of which often give the plant a bushy appearance. The stems are from ¼ to 2 inches in thickness, and covered with a greyish-brown bark. The leaves, which are said to be eaten by cattle with impunity, are trifoliate; the leaflets being rhombic ovate, pointed, pubescent beneath, and variously notched, of a shining red when they first appear in the spring, but bright green at maturity. The flowers are small, greenish-white in colour, and disposed in simple axillary racemes. The fruit is a round dry berry, as large as a pea, of a pale green colour, ripe in October. Like *Rhus venenata*, from the bark, when wounded, exudes an acrid, milky juice, which, exposed to the air for a few hours, changes to an intense black, and will leave indelible stains on linen or cotton, not effaceable by any known chemical. It has been used as a marking ink. According to Dr. Joseph Khittel, the principal chemical constituents of poison ivy are gallotannic acid and a volatile alkaloid, to which it owes its poisonous and medical properties. The later researches of Professor Maisch, however, have proved that the acridity of the juice is due to the presence of a hitherto unknown volatile acid, analogous to, but distinct from, formic and acetic,—toxicodendric acid, which, when isolated, is found to affect the skin, either by direct contact or by its vapour, exactly as the fresh plant itself does, proving beyond doubt that the poisonous properties of the plant are due to it. This principle is in great measure dissipated in the process of drying, and hence dried preparations of the plant are much less apt to act noxiously, though even these should be handled with great care by such as are susceptible to poisoning by it. The plants for which *Rhus Toxicodendron* is most often mistaken are the Virginian creeper or American ivy (*Ampelopsis quinquefolia*), with which the climbing variety often entwines itself, and *Aralia nudicaulis* and *A. quinquefolia*, commonly known as wild sarsaparilla and ginseng, often found growing with the low form. The plants are very easily distinguished if one will take the trouble to remember a single simple distinctive mark, viz., five leaflets on a single leaf-stock, whereas *Rhus Toxicodendron* has only three. Other distinguishing marks are, that the *Aralias* have regular serrate leaves, and in *A. nudicaulis* the flower stem is separate from the leaf-bearing one.

THE MUSK-DEER IN TIBET.*

As some degree of doubt seems hitherto to have prevailed among naturalists whether the musk-deer (*Moschus moschiferus*) occurs on the Tibetan plateau, or whether it is confined to the wooded districts of the Alpine Himalaya, Mr. R. Lydekker has contributed to the *Journal of the Asiatic Society* of Bengal a brief paper, in which he gives the result of his recent investigations into the subject. Mr. Lydekker says that during the summer of last year he met in Lahul a Tibetan, who had formerly occupied a high official position of Lhasa, and who informed him that the musk-deer was of common occurrence on the Tsanpu River, in the neighbourhood of Lhasa. He has also learned from Mr. W. H. Johnson, British Commissioner in Ladakh, that it is found in the country below, and to the east of Lhasa, along the course of the Tsanpu River. The musk brought from this district, Mr. Johnson says, has wrongly acquired the name of Khoten musk; this appears to have originated from the fact that Khoten being a large Buddhist city and important trading place, the musk was carried there from Lhasa, and thence to India. Mr. Johnson also observes, that the musk-deer occurs only where the birch tree grows. This evidence, added to what he has collected from various works on Tibet and the neighbouring regions, appears to Mr. Lydekker to show that a species of *Moschus* occurs in Tibet, though he has no means of knowing whether it be the same as *M. moschiferus*. The musk-deer is of common occurrence in Bhutan, and it appears to him probable that it extends north of that district, in most of the open countries up to Tibet, and thence across or round the Gobi desert into Siberia. The occurrence of the musk-deer far in on the Tibetan plateau is a fact of considerable importance, in Mr. Lydekker's opinion, as it is the only instance of any of the large mammals of the forest-clad Alpine Himalaya extending its range into the dry and desert regions to the north.

GIGANTIC RHUBARB.

According to the *Journal de St. Petersburg*, Colonel Przewalsky, while making his way from Sining-fu to the sources of the Yellow River, passed through a plateau where a rhubarb plant grows wild, and attains an extraordinary development. Roots were found which were 16 in. long, 12 in. broad and 7 in. thick, and weighed 26 lbs.

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DR. GREENHOW'S REPORT ON THE EXAMINATIONS.

THE publication of the report presented to the Privy Council by the Government Visitor on the examinations conducted by the Pharmaceutical Society again brings prominently forward a circumstance which has frequently been discussed from various points of view. We refer to the number of failures to pass the several examinations and the very large proportion those failures bear to the total number of candidates presenting themselves for examination. At first sight it is evident from the returns of the Boards of Examiners that there are serious grounds for regretting the misdirected efforts which lead to these results. At one time it was not unusual to hear the rejection of candidates for the necessary examinations spoken of as the infliction of injury upon the trade, inasmuch as many were thus debarred from taking up the business of a chemist and druggist. We cannot acknowledge having any sympathy with this view of the matter, and having regard to the nature of the Minor examination as well as the Preliminary examination, we should be disposed to look upon the rejection of candidates for those examinations rather as a circumstance of positive benefit to the trade than otherwise.

Taking, in the first place, the Minor examination as the means by which legal qualification to carry on the business of a chemist and druggist is obtained, we find that Dr. GREENHOW expresses his opinion that it is sufficient for the purpose, and that it is conducted by the examiners with much tact, great kindness and forbearance towards the candidates, affording nervous or weak men ample opportunity for passing. It is, however, impossible to overlook the apologetic tone of his remarks upon the scope and stringency of this examination or to avoid the conclusion that the opinion expressed as to its adequacy as a gauge of pharmaceutical qualification has only reference to actually existing conditions.

As regards the Preliminary examination there is even more positive indication in Dr. GREENHOW'S report that the demands made upon candidates are only just equal to the very lowest standard that is recognizable consistently with the object it has in view. At this examination, however, there still continues to be as large a proportion of rejections as hitherto, although, as Dr. GREENHOW remarks, it is in every respect one which boys having no higher education than that obtainable in good national schools would be able to pass with ease and credit.

As a further indication that the examination which confers all the privileges of the Pharmacy Act, though affording a sufficient guarantee of competence to keep an open shop for retailing, dispensing and compounding medicines, is not to be regarded as all that is desirable for certifying the qualification of a pharmacist, we may refer to Dr. GREENHOW'S comments upon the small number of young men who go up for the Major examination, after having passed the Minor or qualifying examination. Dr. GREENHOW expresses regret that this is the case, and being decidedly of opinion it is desirable on public grounds that a greater number of persons should hold the higher qualification, he suggests the propriety of considering whether some means cannot be devised that may have the effect of inducing a larger number of candidates to present themselves for the Major examination. He suggests also that the requirements for passing this examination might in due time be set at a higher standard, including attendance upon a fixed curriculum or special course of study at a school of pharmacy.

The general tendency of these remarks appears, therefore, to be in favour of raising the standard of pharmaceutical qualification, and though it is admitted this can only be hoped for at some future time, even in the case of the honours qualification conferred by the Major examination, we may accept them as evidence that the examinations are far from being unnecessarily severe. Still under these conditions the failures amount to upwards of one half of the number of candidates presenting themselves for the several examinations, and it is impossible to doubt that this fact points to the existence of very serious deficiencies in the means by which youths are supposed to be trained for conducting the business of pharmacy. Though the rejection of such a large number of candidates in the Preliminary and Minor examinations may be looked upon as having a beneficial, rather than injurious influence upon the interests of the trade, it is unquestionably a great evil as regards those who find themselves thus prevented from following out the career they looked forward to, and in the interest of pharmacy it becomes a most important question to consider how the existing system can be purged of those defects which are the cause of so much disappointment and misfortune.

Dr. GREENHOW'S report offers some suggestions in this respect which are deserving of careful consideration. Objection is in the first place made to the admission of candidates to the Minor examination without any sufficient interval between it and the Preliminary examination. This affords opportunity for imperfectly educated youths to obtain employment either as apprentices or otherwise in chemists' shops with the intention of being there educated up to the standard of the Preliminary examination during the three years they must have been actually engaged in dispensing medicines before being admissible for the Minor examination. In such cases Dr. GREENHOW thinks that the greater portion of the leisure time which ought to be devoted to preparation in the technical and practical parts of the business would be occupied with preparation for the Preliminary examination with the result that if this be passed successfully, failure in the Minor examination is probable. It is suggested, therefore, that the passing of the Preliminary examination should be required before the commencement of apprenticeship or the equivalent period of studentship, and that in addition to this no evidence of time employed in dispensing medicines should be received, except that of having served as an articled apprentice or student with a legally qualified chemist and druggist.

By this means, Dr. GREENHOW considers that the admission of imperfectly educated youths into the business as apprentices would be prevented, and that by thus eliminating at the outset from the intending candidates for the Minor examination those who are unable to pass the Preliminary examination, the probability of failure in the Minor examination would be considerably reduced. Certainly it seems likely that such a system would have the effect of improving the class of apprentices, and the fact of the apprentice having passed one of the examinations necessary for pharmaceutical qualification might be expected to involve a degree of responsibility on the part of the master for his pupil's success in the Minor examination, which Dr. GREENHOW thinks does not always exist now.

A further suggestion is offered by Dr. GREENHOW in reference to the required period of practical training, and he thinks that, since candidates are not now admissible for the Minor examination until they have attained the age of twenty-one years, there would be no hardship in extending the period of practical training to five years. He would not require that the whole of this time should be passed in apprenticeship in one place, but that in the case of youths apprenticed in the country the last two years of the period should be spent in a pharmacy either in London or in some large town.

These suggestions for amendment in the system of early pharmaceutical training and for improving the educational standard of the youths admitted to that training, are not by any means startling in regard to novelty, for the desirability of adopting such a plan of improving the quality of what may be called the raw material of British pharmacy has long since been advocated in these columns; but now that it is recommended by the official representative of the Privy Council, we may, perhaps, expect to find it command more attention, as being necessary not only in the interests of pharmaceutical students, but also for improving the future of pharmacy. The number of those now engaged in this business is disproportionately in excess of the opportunities for its successful prosecution as a semi-professional occupation, and under the conditions of retail trade that are now developing there seems to be a specially urgent need for raising pharmacy as a business above the range of competition with grocers and general dealers. One of the most obvious conditions of success in the endeavour to bring about such a result is the limitation of the number of persons engaged in the business, and the increased demands of qualification by which that is effected may most reasonably be relied upon for making the business better worth the attention of highly educated and competent men than it is at present.

In Dr. GREENHOW'S report mention is made of the proposals, which have lately been discussed, in regard to the establishment of a pharmaceutical curriculum, and the opinion he expresses is not in favour of its necessity. But his opinion on this point is not so much based upon aspirations for the higher development of pharmacy as limited by regard to the actual scope and intention of the Pharmacy Act, and since its objects are in great measure accomplished under the system now in force, it does not appear to him necessary in the interests of the public to require any higher qualification to entitle a person to registration as a chemist and druggist. It is quite natural that as a Government official charged with the duty of seeing that the provisions of the Act in regard to legal qualification are properly carried out, he should take such a view, and that, looking upon the Act merely as a measure for restricting the sale of poison and otherwise protecting the public, he should accept the Minor examination as affording a sufficient guarantee of fitness for registration under the Act. Neither does he, from this point of view, think it desirable to raise the standard so high that special study at a school of pharmacy would be required. Moreover, he adds, that as a fact the greater number of the candidates for legal qualification do actually study at a school of pharmacy, with the very frequent and obvious result of being crammed up for examination without having acquired practical skill and experience.

From this it may be gathered that any such improvement in the system of pharmaceutical education as shall be conducive to the advancement of the material interests of pharmacists, and the improvement of their position as regards other trades and the medical profession, must be sought by the development, from within their own body, of a high standard of qualification and not by trusting to the incidental protective influence of enactments intended less for the benefit of their class than for that of the general public.

Transactions of the Pharmaceutical Society.

NORTH BRITISH BRANCH.

The sixth and last meeting of the session was held in the Society's rooms, Edinburgh, on Wednesday, March 30, Mr. J. B. Stephenson, President of the Branch, in the chair.

The minutes of the former meeting were read and confirmed.

The Honorary Secretary announced the following donations:—

To the Museum.—(1) Aloin in crystals, presented by Messrs. T. and H. Smith, Edinburgh; (2) Fine crystals of cream of tartar presented by Mr. J. R. Hill, Edinburgh; (3) Large crystals of sulphate of magnesia, presented by Mr. James McGlashan, Edinburgh.

To the Library.—*The Pharmacist and Chemist*, for March, from the Chicago College of Pharmacy; *The Journal of the Chemical Society*, for December and January, from Mr. Mackay.

Dr. William Craig then read the following communication on the "Medicinal Plants of England and Ireland" with illustrations.

THE MEDICINAL PLANTS OF ENGLAND AND IRELAND.

BY WILLIAM CRAIG, M.D., F.R.S.E.,

Lecturer on Materia Medica, Edinburgh School of Medicine.

In April 1877, I had the honour of addressing the North British Branch of the Pharmaceutical Society on the "Medicinal Plants of Scotland," and in selecting a topic for this evening, I thought I might follow up the subject of my lecture to you four years ago, by addressing you on the medicinal plants of England and Ireland.

In describing the medicinal plants of England and Ireland, I shall follow the natural orders as given in the last edition of Balfour's 'Manual of Botany.'

Ranunculaceæ.—Only two plants are officinal in this natural order, and one of them, *Aconitum Napellus*, Linn., is mentioned in all floras as an English plant. It is a true native of moist and shady pastures in subalpine districts in the Alps of Europe—Russia, Central Asia, and America. Most botanists believe it to be an introduced plant into England, but even this is by no means certain. Bentham speaks of it as "apparently wild in some shady places in Western England and South Wales." Babington speaks of it as a plant having the appearance of being a true native. It is extensively cultivated as an ornamental herbaceous plant, and it is frequently met with as an outcast or escape from gardens. It is not regarded as a native of Ireland.

The plant is easily distinguished from other British plants by its short tapering root, its deeply divided leaves of five pointed segments, and its raceme of blue flowers with peculiar hooded sepals.

Its leaves and root are officinal and form very important articles of the materia medica. It is a sedative to the heart's action and alleviates pain when applied locally.

PAPAVERACEÆ.—This order contains only two officinal plants, *Papaver somniferum*, Linn., and *Papaver Rhœas*, Linn., both of which are found in England. The first, *Papaver somniferum*, is generally believed to be an introduced plant, although, in several places it has the appearance of being wild, especially near the sea and in the fens of the Eastern counties of England. It is easily known by its being glabrous and glaucous. It is the most important plant used in medicine. The only part officinal is the capsule. This is used in the ripe state as poppy heads, *Papaveris Capsulæ* of the B.P., and in the unripe state as the source of opium.

Papaver Rhœas, Linn.—Commonly called corn or red poppy, is a common corn-weed in many parts of England, Ireland and Scotland. It is easily known from the other British species by its smooth globular capsule, and by the hairs of the peduncle being spreading. The only species at all possible to be confounded with it is *Papaver dubium*, Linn., but this species has an oblong capsule and the hairs of the peduncle adpressed. The petals are officinal and are chiefly used for colouring purposes

CRUCIFERÆ.—Three plants of this natural family are officinal and all of them are found in England and Ireland, but one only as an introduced plant, the horse-radish, *Cochlearia Armoracia*, Linn.; *Armoracia rusticana* of other botanists. It is generally supposed to be a true native of South Eastern Europe, but is undoubtedly perfectly naturalized in many places in Britain. In Hooker and Arnott's 'Flora' we find these words—"Said to be wild near Swansea, also in some part of the North of England." The officinal part is the root. In all text-books on materia medica we find this root contrasted with aconite root. The two roots are never confounded by students of materia medica although they are, sometimes, by ignorant cooks or butlers; true aconite root has been mistaken for the root of horse-radish, but only because they have been grown together in gardens, and in winter the one has been dug up by an ignorant person in mistake. The root is used in medicine chiefly to cover the taste of nauseous medicines, as creasote.

The other two cruciferous plants are *Sinapis alba*, Linn., and *Sinapis nigra*, Linn., white mustard and black mustard Both of these plants are more abundant in England than in Scotland, and both occur also in Ireland. They are generally found in waste places and under hedges. There are three species of *Sinapis* found in Britain, the two officinal ones and *S. arvensis*. They are very easily distinguished from each other by the seed vessel: *Sinapis arvensis* has smooth spreading pods, *S. nigra* has smooth adpressed pods, and *S. alba* has spreading hairy pods. The seeds of both the black and white mustard plants constitute the *Sinapis* of the Pharmacopœia, but the seed of the black mustard only furnishes the *Oleum Sinapis.*

LINACEÆ.—This order has only one officinal plant.

Linum usitatissimum, Linn., common flax.—This plant has been in culitvation from the earliest times, and at the present day is nowhere known in a truly wild condition. It is, however, found in England, Ireland and Scotland, in corn-fields, road-sides and waste places, as an escape from cultivation. The seeds are officinal, and are used on account of their oil, and for their mucilaginous properties.

RHAMNACEÆ.—In this order only one plant is officinal

Rhamnus catharticus, Linn., common buckthorn.—This is a small tree, 10 or 12 feet high, with spreading branches. It is a native of both England and Ireland, but is a rare plant in both countries. The fruit is a black berry or drupe, and its juice is the part used. It is possessed of purgative properties.

The *Rhamnus Frangula*, Linn., the alder buckthorn, is not officinal in our Pharmacopœia, but is officinal in the German and other Pharmacopœias. It occurs in England, Ireland and Scotland, but more frequently in the two former countries. Its bark is used as a purgative. It is easily distinguished from *R. catharticus*, by the flowers in *R. Frangula* being hermaphrodite, and the parts in fives; its leaves being entire on the margin, and its branches being without spines.

LEGUMINOSÆ.—This order contains at least fifteen officinal plants, but only one of them is indigenous, namely, *Sarothamnus Scoparius*, Wimmer, the *Spartium Scoparium* of other botanists, the common broom. This plant is a shrub, 5 to 8 feet high, and is easily recognized by its angular twigs and by its bright yellow scented flowers. This is a very common plant in England, Ireland and Scotland, growing chiefly on dry hilly waste and busy places. The twigs or "tops" are officinal, and are easily known by their angular character and their bitter nauseous taste.

ROSACEÆ.—This order contains at least eight officinal plants, and of these, only one (*Rosa canina*, Linn., common dog rose) is found in England and Ireland. It is also very common in Scotland. This is by far the most common of all our wild roses, being abundant in hedges and thickets everywhere. The fruit is officinal. After being deprived of its seeds it is made into a confection with sugar, and is used for making pills. According to the B.P., the fruit of the other wild British roses may be substituted.

Another plant in this natural order is sometimes placed by botanists as a British plant, the *Prunus domestica*, Linn., the plum tree, whose dried fruit forms the *Prunum* of the B.P. It is doubtful if the plum tree be now known in a truly wild condition, and the belief entertained by the most eminent botanists of the present day is that it is a cultivated variety of the common blackthorn or sloe, *Prunus vulgaris*, a tree common in all parts of the United Kingdom. An intermediate form is *Prunus insititia*, Linn., the bullace tree, the origin of the well-known fruit, damsons.

UMBELLIFERÆ.—Of the ten officinal plants of this natural order, one, *Conium maculatum*, Linn., is found in England and Ireland, and also abundantly in many parts of Scotland. It is easily recognized from all other umbelliferous plants by its smooth dark purple-spotted stem, and its peculiar odour, an odour greatly increased if the plant be rubbed up with solution of potash, owing to the disengagement of conia. The plant is very generally distributed, growing on waste places, by the sides of streams, ditches and borders of fields.

Carum Carui, Linn., common caraway.—Occurs in both England and Ireland. It grows in meadows and pastures and is generally distributed; in many cases undoubtedly an escape from cultivation, but frequently having the appearance of an indigenous plant. Bentham speaks of it as well naturalized, if not truly indigenous. The plant has long been cultivated on account of the aromatic properties of the fruit. The fruit is officinal, and is easily recognized by its odour.

Other two umbelliferous plants are occasionally met with in England, but only as introduced plants, *Coriandrum sativum*, Linn., coriander, and *Fœniculum dulce*, D.C., sweet fennel. Neither of these plants can be said to be known definitely in the wild state, and both have been cultivated on account of the aromatic properties of their fruit. In the opinion of many eminent botanists the sweet fennel is only a cultivated variety of the common fennel, *Fœniculum vulgare*, G., a plant believed to be indigenous on some parts of the coasts of England and Ireland. In one edition of Hooker and Arnott's 'Flora,' we find these words, "The true fennel of the gardens, *F. dulce* is scarcely distinct, and may be the Norfolk and Suffolk plant."

CAPRIFOLIACEÆ.—The only officinal plant in this order is *Sambucus nigra*, Linn., common elder. This is a small tree with sweet scented cream-coloured flowers, and fruit like small blackberries It is indigenous to England and Ireland. The fresh flowers are officinal for making *Aqua Sambuci*. The flowers are often used for flavouring jams and jellies, for which purpose they are well adapted.

VALERIANACEÆ.—*Valeriana officinalis*, L.—The only officinal plant in this family is abundant in England and Ireland. It is generally found in moist places by the sides of plantations, ditches, and streams. It is the only British species of valerian with the lower leaves divided. A variety called *sambucifolia*, with fewer and broader segments to the leaves, is common in England, and some botanists describe it as a species, *V. sambucifolia*. The root is officinal. It is a short thick rootstock with numerous rootlets—3 or 4 inches in length—and is easily known by its peculiar odour. It is said that the roots of wild plants are more active than the cultivated ones. The characteristic odour is developed chiefly during the process of drying. It is used as a stimulant and anti-spasmodic.

COMPOSITÆ.—Of the five officinal plants of this order three are found both in England and Ireland.

Anthemis nobilis, Linn., common chamomile. This is a much branched plant, about a foot high. It is indigenous to southern England and Ireland. The flower heads or capitula are officinal. Two varieties, known as the single and double flower-heads, are recognized in the British Pharmacopœia, the latter being the result of cultivation. The plant has bitter and aromatic properties.

Taraxacum Dens-Leonis, D.C., *Leontodon Taraxacum* of other botanists, the common dandelion.—This plant is abundant everywhere in meadows and pastures. It is easily recognized by its toothed runcinate leaves, its smooth hollow peduncle and its yellow flowers. The root is the part used. It possesses tonic and cholagogue properties.

Lactuca virosa, Linn., acrid lettuce.—This plant is a native of England, occurring on banks and roadsides, especially in the south-eastern counties. The whole plant abounds in a milky juice, which is possessed of slightly hypnotic properties.

The genus *Artemisia* furnishes santonica, from which santonin is obtained; of this genus four species occur in England and three in Ireland. It is probable that santonin is contained in the flower-heads of all of them.

ERICACEÆ.—This order contains only one officinal plant, and it a native of England and Ireland. It is the *Arctostaphylos, Uva-ursi*, Sp. This is a trailing shrub with evergreen leaves, somewhat resembling those of the common box. This plant is very abundant in the Highlands of Scotland. It is also found in the North of England and in the north-west of Ireland. The leaves are officinal and are used in urinary affections. The leaves are easily recognized from every officinal substance, but they are apt to be confounded with those of *Vaccinium Vitis-idæa*, L., but these are easily distinguished by their revolute margins and by their being dotted beneath. In the B.P. a negative character is given for uva-ursi leaves "not toothed on the margin," and almost all writers on materia medica have fallen into an error in explaining this. It has been supposed that this is meant to distinguish the leaves of uva-ursi from *Vaccinium Vitis-idæa*. For example, in one of the most recent text-books on materia medica, the new edition of Dr. Scoresby Jackson's work by Dr. Moinet, we find the following regarding the leaves of *Vaccinium Vitis-idæa*:—"They are known by their serrated margin." The leaves of this plant are neither *serrated* nor toothed on the margin, but the leaves of *Arctostphylos alpina*, Spreng., a species in Britain limited to the Scotch Highlands, has its leaves serrated on the margin.

SOLANACEÆ.—This order is very important, not only for the medicinal plants it contains but also on account of its containing the common potato, *Solanum tuberosum*, which furnishes a very important article of diet. This order contains six officinal plants, some of them furnishing most useful articles of the materia medica. Of these, four are found in England and three in Ireland. I shall briefly refer to each of them.

Solanum Dulcamara, Linn.—Bitter, sweet, or woody nightshade. This is a climbing shrub, with the upper leaves auricled at the base. It has purple flowers and red berries. It is a common plant in England and Ireland, in woods, hedges and waste places. The stem is officinal, but it is not possessed of much medicinal value. The only other British species, *S. nigrum*, L., is easily distinguished by its leaves having no auricles, by its white flowers and its black berries. This plant is also common in many parts of England and Ireland.

Atropa Belladonna, L., deadly nightshade.—This is a herbaceous plant, with a perennial root. It is 3 or 4 feet high and is easily recognized by its entire leaves and by its dark shining pulpy fruit, about the size of small gooseberries. It occurs in waste stony places, generally near old castles and ruins. At one time it was very abundant near the ruins of Furness Abbey, in Westmoreland. It is a doubtful native of Ireland. The leaves and roots are officinal in the B.P. It is a valuable hypnotic and subduer of pain, and is the most efficacious medicine known for checking the nocturnal sweating of wasting diseases. It also powerfully dilates the pupil. It owes its activity to an alkaloid, *atropia*.

Hyoscyamus niger, L., common henbane.—This is a biennial plant. It is 2 to 3 feet high. The whole plant is clammy and has a disagreeable odour. Its flowers are yellow, with dark purple veins. Its fruit opens by an operculum. It is found in waste places, borders of fields, especially on calcareous soil near the sea. It is found in England and Ireland. The leaves are officinal, and are possessed of properties similar to those of belladonna, but weaker. It owes it activity to an alkaloid, *hyoscyamia*.

Datura Stramonium, L.—Common thorn-apple, so-called on account of its prickly fruit. This plant is an annual, about 2 feet high, with large sinuate leaves and conspicuous white funnel-shaped corolla. Like the preceding plants it has a special affinity for waste stony places. In England it is rare and exists only as an introduced plant. It is not recorded from Ireland. The leaves and seeds are officinal. In many cases, however, what is sold as leaves of stramonium consists solely of chopped up stems of the plant. It is used chiefly in asthma. It owes its activity to an alkaloid, *daturia*.

SCROPHULARIACEÆ.—Only one plant of this order is officinal, and it is abundant in England and Ireland. It is the *Digitalis purpurea*, L., common foxglove. This is one of the prettiest of all our British plants, and is very common in many parts, growing on dry hilly places and roadsides. It is easily known by its beautiful raceme of purple flowers. The leaves are officinal, and are distinguished from all other officinal leaves by their crenate margin, by being downy beneath and narrowed into a foot stalk. It is used principally for its action on the heart and as a diuretic.

LABIATÆ.—Of the four officinal plants, only two are found in England and Ireland, *Mentha piperita*, L., peppermint, and *Mentha viridis*, L., spearmint. Both these plants are found in many marshy places in England and Ireland, in some cases, however, as escapes from cultivation. They have both been long cultivated on account of their aromatic qualities. In both cases the fresh plants are officinal on account of the volatile oil obtained from them. The two plants are easily distinguished from each other by their leaves. The leaves of peppermint are stalked, while those of spearmint are sessile.

THYMELÆACEÆ.—This order contains two officinal plants, and they are both natives of England, but unknown in Ireland. *Daphne Mezereon*, L., *Mezereon*, and *Daphne laureola*, L., spurge laurel. The former is a very rare plant in England, but believed to be truly wild in some of the southern counties. Its flowers appear before the leaves in early spring, are of a pink colour and sweet scented. The spurge laurel is more abundant, growing in woods and thickets, preferring a calcareous or clay soil, and is not uncommon. It is a very different plant from *Mezereon*. It has evergreen leaves, and the flowers are axillary and of a green colour. The bark of both species is officinal under the name of *Mezerei Cortex*, and is easily recognized by its extreme toughness, its silky white interior and its cinnamon-brown colour externally.

CANNABINACEÆ.—This order contains only three species, two of which are officinal, and of these one is a native of England, the hop plant, *Humulus Lupulus*, L. This plant is easily known by its twining habits, its rough three to five-lobed leaves, and its peculiar green coloured globular fruit, called a strobilus. The plant is truly indigenous in many counties in England, and is also recorded from Ireland. It has long been cultivated on account of its fruit, which is so largely used in the manufacture of beer. The fruit is officinal. It contains a volatile oil which is narcotic, and a bitter principle which is tonic.

ULMACEÆ.—Only one plant in this order is officinal and it is found in both England and Ireland.

Ulmus campestris, L. The elm.—There appears to be considerable confusion in regard to the officinal species of elm. Few writers on materia medica are correct in regard to this plant. There are two species of elm recorded in British floras, the one often called the English elm and the other the Scotch elm. The general belief is that the English elm is the one officinal in our Pharmacopœia. And certainly this is the one described in most text-books. This, however, is erroneous. We find that even the authors of the 'Pharmacographia' have committed the same mistake. By a reference to the B.P. it is found that the *Ulmus campestris*, L., is officinal, and this species is still further described as "broad-leaved elm," a phrase which is only applicable to the Scotch elm, often called wych-hazel. It is further said to be indigenous, and the English elm is generally believed to be an introduced tree. The question comes to be, what species is meant by *U. campestris*, L. All botanists who have examined this subject have come to the conclusion that it includes the Scotch elm. Some maintain that it includes also the English elm. There can be no doubt that the Scotch elm, *Ulmus montana*, With., is officinal, and if Babington be correct in saying that *Ulmus campestris*, L., includes the English elm, *Ulmus suberosa*, Ehrh., then that tree too is officinal; but all those who maintain that the English elm *alone* is officinal are undoubtedly wrong. This mistake arises to a great extent from confounding *Ulmus campestris*, Smith, with *Ulmus campestris* of Linnæus. The inner bark is officinal and is possessed of astringent properties, but there is not much necessity for retaining it in the B.P.

CORYLACEÆ or CUPULIFERÆ.—Two oaks are officinal, but only one is a native of Britain, *Quercus pedunculata*, Wild., *Quercus Robur*, L. This is a very common tree all over Britain. Two varieties are generally noticed by botanists, one called *Sessiliflora*, with a longer petiole, and having no stalk to the fruit, but Babington confesses that he has "failed in learning to distinguish them." The officinal part is the bark, which is used as an astringent.

CONIFERÆ.—Of the officinal pines none can be said to be truly indigenous in England, although we have it on the authority of Hooker and Arnott that *Pinus sylvestris* and *Pinus Pinaster* "are becoming established by spontaneous dissemination over the vast moorlands and bogtracts of West Hants and Dorset." The former is abundant in the Highlands of Scotland and the latter is a true native of the South of Europe. In Ireland there is good evidence that *Pinus sylvestris* was originally a true native and even yet is indigenous. It is generally believed that various species of pines were originally found in Ireland, as is manifested by the cones found in some of the peat bogs of that country.

Juniperus communis, L.—Common juniper is a very abundant plant in many parts of England and Ireland. It grows on dry barren hills. Its leaves end in a prickly point and its fruit is a berry of the size of a large pea and of a dark purple-blue colour. The fruit is officinal; from it we obtain an oil which is a powerful diuretic.

MONOCOTYLEDONES.—Of the fifteen officinal monocotyledonous plants only one is found in England and Ireland. It is the *Colchicum autumnale*, L., meadow saffron. It is abundant in meadows and pastures in some parts of England and Ireland. The flowers appear in autumn and the leaves and fruit in the following spring. The seeds and corm are officinal and used in gout and rheumatism. It belongs to the *Melanthaceæ*.

All the cryptogamous plants officinal in the B.P. are found in England and Ireland. These may be said to be four in number.

FILICES.—The male fern, *Aspidium Filix Mas*, *Lastrea* of other botanists. This fern is very common in England and Ireland and is easily distinguished from all other ferns by the position of the sori and its rigid bipinnate fronds. The rhizome is officinal and is used as a remedy for tapeworm.

LICHENES.—*Cetraria islandica.*—Iceland moss. This is a very abundant plant in Iceland but is also frequent in the Scotch Highlands, and is also found on the mountains of England and Ireland. The whole plant is officinal and has tonic and nutrient properties.

FUNGI.—Two of these may be said to be officinal, *Claviceps purpurea*, the ergot fungus, and *Torula Cerevesiæ*, the yeast plant. The former is a very important medicinal plant, inasmuch as its compact mycelium or spawn constitutes ergot. Ergot is no part of the rye plant, although it is generally obtained from it. This fungus is often found growing on the rye, but there are upwards of thirty British grasses on which the ergot fungus has been found, and the ergot of these plants is very active. It is used for its effects on the uterus and as an astringent to the blood vessels.

I have thus gone over the various officinal plants of England and Ireland. It will be found that one third of the officinal orders are represented in England and Ireland, and about one in fifteen of all the medicinal plants are found in England, some of them furnishing very important articles of the materia medica.

In conclusion I would earnestly recommend students to make a collection of all the indigenous medicinal plants.

Mr. J. Falconer King, City Analyst, Edinburgh, next read a paper on:—

THE ADULTERATION AND FALSIFICATION OF DRUGS, IN CONNECTION WITH THEIR SALE UNDER THE FOOD AND DRUGS ACT.

Mr. King remarked that the object of his paper was principally to explain to the meeting the different instances of adulteration or falsification of drugs which had come under his notice, directly or otherwise, and to endeavour to elicit by discussion the opinion of members, who were certainly the best qualified to form a sound judgment on the matter, whether these were really cases of adulteration within the meaning of the Act.

The cases adduced were mostly those which have on various occasions been fully reported in the Journal; *e.g.*, sophisticated paregoric, sweet spirit of nitre, quinine and iron citrate, milk of sulphur, violet powder, etc., etc.

A good deal of discussion followed the reading of the paper.

Dr. Craig said there was no doubt that the British Pharmacopœia was the standard by which they were to be guided. Whatever articles were in that book were drugs in the truest and in the legal sense of the term.

Mr. Nisbet was inclined to regard most of the cases Mr. King had adduced as extreme and exceptional. He had, he said, been many years in the trade, and had never come across adulterated drugs, except in museums.

Mr. Mackay also thought the cases mentioned were very exceptional. The time, he said, had gone by for adulteration. Wholesale dealers had their characters at stake.

Mr. Young took a similar view of the matter.

The Chairman endorsed what had been said by Messrs. Nisbet, Mackay, and Young, and believed adulteration of drugs was not at all common in Scotland.

Mr. King having replied, a vote of thanks was awarded him for his paper.

A similar compliment was awarded Dr. Craig.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

April 6, 1881.

Present—President, Professor Tichborne; Vice-President, Dr. Aquilla Smith; Sir G. B. Owens, Messrs Allen, Bennett, Brunker, Collins, Doran, Draper, Grindley, Hayes, Hodgson, Pring and Simpson.

The minutes of last meeting were read and signed.

A letter was read from the Secretary of the Pharmaceutical Society of Great Britain relative to communication of January 12, and which was referred to the Pharmacy Act Amendment Committee.

A letter was read from Mr. William Thomas asking if his having passed the Modified examination in England would entitle him to be allowed the Preliminary examination.

The Vice-President said that the Privy Council having approved of the regulations, no alteration could be made by the Council.

The President directed that a reply should be sent stating that as no Preliminary examination had been passed as required by the Society he would have to conform to the regulations.

A letter was read from Mr. Henry Bell requesting the Council to inform him if in conformity with the Pharmacy Act (Ireland) he could reside abroad, and have his business conducted by a partner not qualified under the Act, and requesting information as to any legal hindrance.

The President remarked that the course proposed in the letter was illegal, but considered that the letter did not give definite information.

Mr. Doran asked if Mr. Bell wanted to carry on as a druggist.

Mr. Draper thought that from the letter Mr. Bell was not qualified, and if so he did not come within the Act.

Mr. Hodgson, referring to the query as to going into partnership, said he might take as many partners as he liked, provided he did not dispense or sell poisons.

The President said that in that case a firm with one unqualified partner was illegal.

Mr. Pring considered that they should direct him to consult a solicitor and suggested sending him a calendar.

Dr. Collins said that this being a legal question it was not for them to advise.

Sir G. B. Owens considered some definite advice should be given, or if not, withheld altogether.

Mr. Grindley thought the query not put painly enough.

Mr. Brunker then proposed and Sir G. B. Owens seconded—

> "That in reference to Mr. Bell's letter, the Council reply that a person qualified under the Irish Act could not legally act in the manner proposed by him."

The resolution passed unaminously.

A letter from a member, reporting a case of illegal dispensing, was read.

Mr. Brunker said the letter had already been read in Committee.

Mr. Allen remarked it could be referred to when the report of the Committee was considered.

Mr. Hodgson suggested that both should be read together.

The report of the Law Committee was then read, and a long discussion took place upon the recommendation to prosecute in the case reported, which was finally referred back to the Committee, upon the motion of Mr. Bennett, seconded by Mr. Pring—

> "That the report of the Law Committee be accepted and they be authorized to carry it into effect."

A letter from Messrs. Ennis and Son, relative to the late prosecution of Mr. Brownrigg, was read, stating that as he had not paid anything they had directed that the warrant for his arrest should issue.

Mr. Grindley reported the proceedings of the Dinner Committee, after which a discussion took place resulting in the matter being postponed, as October was considered a better time to hold a dinner than May, the month which had been proposed.

Messrs. Yeates and Son's account for apparatus supplied for the use of the examiner in chemistry was ordered for payment.

The reports of the examiners were laid upon the table.

At the Preliminary examination twelve candidates had presented themselves, of whom nine passed.

For the licence of Pharmaceutical Chemist, seven candidates had presented themselves, of whom the following six passed:—

Charles William Brooks ......Longford Terrace, Merrion.
Samuel Thomas Johnston ...19, North Earl St., Dublin.
William M'Carthy ....Athy (Re-examination).
George Lane M'Cormack ...75, North Strand Road.
David John M'Kinney.........Cookstown, County Tyrone.
Meredith Rountree Whitla...Diamond, Monaghan.

The meeting then adjourned.

Provincial Transactions.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The sixth meeting of the session was held in Anderson's College, 204, George Street, on Wednesday, March 30, Mr. Robert McAdam (Glasgow Apothecaries' Company), in the chair.

After the minutes of the previous meeting had been read and adopted,

The President called upon Mr. John C. Hunter, Honorary Secretary, to give his paper on "Rambles among Lead Mines, with Specimens of Ore."

Mr. Hunter began his remarks by referring to the late Mr. Adam Smith's celebrated work on 'An Inquiry into the Nature and Causes of Wealth of Nations,' in which work Mr. Smith brings out the importance of the farmer as a source of wealth to any state. But since Mr. Smith's time hundreds of other sources of wealth than that produced by the cultivation of land have come into existence by the progress of the mechanical and chemical arts, so that some parts of a county poor in surface crops are yet rich in golden and other metalliferous crops found far beneath the surface of the soil. A description of Laxey Lead Mine, situated in the Isle of Man, was then given, special reference being made to the great water wheel, said to be the largest in the world, used to keep the mine free of water. Reference was also made to the workings of the mine, and the stamping and washing of the lead ores before being taken to the smelting furnaces. Mr. Hunter then gave a description of the lead mines in Scotland situated at Wanlockhead and at Leadhills, where a mining community live and work 1400 feet above the level of the sea; this is said to be the highest place in Great Britain where all the year round any community dwells. This region is very bleak, barren and wild, surrounded as it is by high hills and nearly destitute of trees, but amidst all the dreariness the district was the birthplace of Alan Ramsay, the poet, author of the 'Gentle Shepherd,' and other poems; also builder at his own expense of the first theatre in Edinburgh and founder of the first circulating library there. Leadhills mining village was touched upon, also the interior workings of the mine, as well as the way the ore is sent to the stampers, and finally to the smelting house to be decomposed by heating the galena or lead sulphide with coal into pure bar lead. The chemical changes from sulphide of lead or galena to pure bar lead were then explained. A special note was made of a long chimney running up the hillside to condense the vapours of arsenic and antimony present in lead ores; afterwards, Pattison's process for desilverizing lead was mentioned. In conclusion, Mr. Hunter made reference to the action of water, both pure and aerated, upon new lead pipes, causing, if not observed, sometimes cases of lead poisoning, through the cumulative action of lead when absorbed into the system. Lastly, mining speculations, their riskiness, and fluctuations in their profits, were touched upon. On the table were laid specimens of copper, lead, gold and silver ores, which were referred to by Mr. Hunter during the course of the paper.

After a few remarks from Mr. Kinninmont and Mr. Robert Brodie on poisoning by lead being absorbed into the system, the President called for a hearty vote of thanks to Mr. Hunter for his very instructive paper and his amusing stories of mine speculations. This was duly given by the members.

The Secretary mentioned a donation to the library of the booklet 'On the Estimation of Phosphoric Acid in Phosphates and Manures,' by M. H. Joule, translated by Mr. J. Barker Smith, and given by him to the Association.

LIVERPOOL CHEMISTS' ASSOCIATION.

The twelfth general meeting of the thirty-second session was held at the Royal Institution, on Thursday evening, March 31, 1881, the President, Dr. Symes, in the chair.

The minutes of the previous meeting were and confirmed, and the following donations were announced:—The current numbers of the *Pharmaceutical Journal*, from the Society; and the *Canadian Pharmaceutical Journal*, from the Editor.

The President exhibited a new pill-coating machine, and gave a detailed description of the manner in which it was to be used.

Mr. Edward Davies, F.C.S., F.I.C., read a paper on "Protoplasm."

The paper was ably discussed by Messrs. Chubb, Farmer, Tate and others.

Mr. Davies replied at length to the points raised in the discussion, and at the conclusion was awarded a hearty vote of thanks.

BRISTOL PHARMACEUTICAL ASSOCIATION.

A general meeting was held on Friday, April 1, at the Bristol Museum and Library, Queen's Road, Mr. G. F. Schacht, President, in the chair.

After the preliminary business, the President said the chief objects of the meeting were, as the notice cards had already informed the members, to receive some detailed accounts of their possessions, both actual and virtual. Certain of their friends had for some time been engaged in very close work for the Society's benefit; and the Council had now thought it time to invite the members and associates to a full knowledge of the results. He was happy to say he could congratulate them sincerely upon the highly satisfactory condition of their collections both of materia medica and of books. For this they were largely indebted to the kindness of the Council of the Pharmaceutical Society who, as would no doubt be remembered, had presented them with most of their specimens and nearly all of their books. They were also much indebted to their friend Mr. Arthur Little, who had devoted both time and knowledge to the arrangement of their collection; and finally they were under great obligation to the Council of the Bristol Museum and Library, by whose good favour and help their own Council had been able to make arrangements calculated to afford much encouragement for study to all their younger friends.

Mr. Schacht then called upon Mr. Arthur Little to explain the scope of their collection of materia medica, and the arrangement he had thought best to adopt.

Mr. Arthur Little reminded the members that the collection of which he should presently speak was well stored in upright glass cases that conveniently occupied a distinct compartment in the Bristol Museum. Though quite distinct, it was immediately surrounded by noble collections, botanical, zoological, and mineral, and was, therefore, capable of being studied in connection with either of these departments of science—a matter of no small advantage to the real student. He thought few such opportunities for good pharmaceutical study existed anywhere as were now available in Bristol.

This recently arranged collection of materia medica originated in a few dozen typical specimens of the more important drugs, got together many years ago by the late Mr. Stoddart and other friends. This small nucleus, growing and increasing by additions and contributions from various sources, was subsequently much enlarged by a grant of specimens from the Pharmaceutical Society; and early in the present year, in response to an application for specimens necessary to complete the collection, a further large donation was received from the parent Society.

As now arranged in the Association's cases, the collection—at present confined entirely to organic materia medica—presents for examination more than two hundred and fifty typical specimens. These have been distributed among the seventy natural orders to which they respectively belong, the sequence of the orders corresponding with that given in the ordinary text-books. Much assistance was derived in settling this and other points, especially in reference to the vexed question of nomenclature, from the 'Pharmacographia' of Hanbury and Flückiger, and from Mr. Holmes's admirable catalogue of the Bloomsbury Square Collections, a copy of which latter work is placed in the materia medica cabinet for reference.

Special attention has been paid to the more important drugs, their several qualities and varieties, and the substances employed in adulterating them. These have been arranged side by side in groups for comparison, the adulterant being in all cases placed beside the substance it is employed to adulterate, even when it does not belong botanically to the same natural order. In this way, several very instructive and valuable series of specimens have been obtained, among which may be mentioned the following:—

Pareira brava.—1. *Chondodendron tomentosum* (root and stem); 2. *Cissampelos Pareira*; 3. Common false *Pareira brava.*

Cinchona.—1. Pale bark, in quills, from South America and from India; 2. Calisaya bark in quills from Ceylon, and flat pieces from Bolivia; 3. Red bark in quills from the Himalayas; 4. Hard Carthagena bark (*Cinchona cordifolia*); Maracaibo bark (*C. Tucujensis*).

Ipecacuanha.—1. *Cephaëlis ipecacuanha* (brown and blackish-grey); 2. *Psychotria emetica*; 3. *Ionidium Ipecacuanha.*

Cardamoms.—1. Malabar; 2. Madras; 3. Aleppy, and 4. Ceylon.

Sarsaparilla.—1. Jamaica; 2. Honduras; 3. Lima; and 4. Mexican.

Senna.—1. Alexandria (*a*, elect; *b*, adulterated with argel leaves, *c*, with *C. obovata*); 2. East Indian; 3. Tinnevelly.

Rhatany.—Peruvian and Savanilla, etc., etc.

The collection, although thus extensive and valuable, is still wanting in a few drugs, without one, at least, of which it cannot be considered in any sense complete. That one is opium, which, with the exception of a single sample of Trebizond opium, just placed upon the table by the President, Mr. Schacht, is entirely unrepresented. Specimens of scammony resin, Socotrine aloes, elaterium, and the balsams of Tolu and Peru, are also among the *desiderata.* Lastly, a few coloured drawings or dried and mounted specimens of the chief indigenous medicinal plants would form a very desirable and useful addition to the collection.

At the request of the Chairman, Mr. Algernon Warren, the Honorary Secretary, then said he thought he should be doing the Association good service by offering in a concise form some idea of the literary treasures placed within their reach by the arrangements concluded between their own Council and that of the Bristol Library. Their own books occupied a compartment in the extensive library in which they were then sitting, and they were being so well used by the members and associates that there was little need for him to say much about them, except a few words of gratitude to the Pharmaceutical Society for the gift; but he thought a rapid account of the general disposition of the mass of books about them, all of which were open to their perusal, would be of use.

The large outer reading room contained many of the leading works of fiction and standard books on travel, history, archæology and philosophy. In the room above were found the varied creations of the poets, works on antiquities, on natural history, on military matters, on theology and parliamentary history.

The inner room contained treatises upon geology, astronomy, etc., the works of classical authors, current scientific and medical magazines and works on art, including some in the French and German languages. The galleries of this room displayed numbers of medical and scientific works, and series of the standard reviews and magazines.

During the explanations thus hastily summarized, Mr. Warren constantly referred to individual works of special merit or of unusual interest, and finally observed that his recent investigations enabled him to say with some confidence that from a literary point almost every variety of taste could be met and fairly satisfied from the resources of that library.

After ample discussions of the subjects suggested by those two communications, Mr. Little and Mr. Warren were warmly thanked, and the proceedings terminated.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, April 7, Dr. Russell in the chair.

The following certificates were read for the first time:—T. P. Venable, A. J. Shilton.

The Chairman then called on Mr. W. JAGO to read a paper—

On the Organic Matter in Sea Water.—On p. 133 of the sixth report of the Rivers Commission it is stated that the proportion of organic elements in sea water varies between such wide limits in different samples as to suggest that much of the organic matter consists of living organisms so minute and gelatinous as to pass readily through the best filters. At the suggestion of Dr. Fankland the author has investigated this subject. The water was collected in mid-channel, between Newhaven and Dieppe, by the engineers of the London, Brighton and South Coast Railway, in stoppered glass carboys. The author has used the combustion method, the albuminoid ammonia and in some cases the oxygen process of Professor Tidy. To determine how the various methods of water analysis were affected by a change of the organic matter from organic compounds in solution to organisms in suspension, some experiments were made with hay infusion; the results confirm those of Kingzett (*Chem. Soc. Journ.*, 1880, 15), the oxygen required first rising and then diminishing. The author concludes that the organic matter of sea water is much more capable of resisting oxidizing agents than that present in ordinary fresh waters and that the organic matter in sea water is probably organized and alive. Several tables accompany the paper. The author promises some further work on the subject.

In answer to Mr. Piesse, the author stated that no determinations of phosphoric acid were made.

Mr. W. M. HAMLET then read a paper—

On the Action of Compounds Inimical to Bacterial Life.—After criticizing the experiments of Crace Calvert (*Chem. News*, xxii., 281), in which the solutions were exposed freely to the action of the air and were in some cases even allowed to dry up, the author details his method of experimentation. Flasks similar to those of

Pasteur (*Etudes sur la Bière*, 81) holding about quarter litre were used. The liquids employed were Pasteur's fluid, with sugar, beef-tea, hay infusion, urine, brewers' wort, and extract of meat. Each flask was about half filled and boiled for ten minutes, whereby all previously existing life was destroyed. The flask was then allowed to cool, the entering air being filtered through a plug of glass wool or asbestos. The flask was then inoculated with a small quantity of previously cultivated hay solution or Pasteur's fluid. Hydrogen, oxygen, carbonic oxide, marsh gas, nitrogen, and sulphuretted hydrogen were without effect on the bacteria. Chlorine and hydric peroxide (about 7 per cent. of 5 volume solution) were fatal to bacteria. The action of various salts and organic acids in 5 per cent. solution was tried; many, including potash, soda, potassic bisulphite, sodic hyposulphite, potassic chlorate, potassic permanganate, oxalic acid, acetic acid, glycerin, laudanum and alcohol, were without effect on the bacterial life. Others, the alums, ferrous sulphate, ferric chloride, magnesic and aluminic chlorides, bleaching powder, camphor, salicylic acid, chloroform, creasote, and carbolic acid, decidedly arrested the development of bacteria. The author has made a more extended examination of the action of chloroform, especially as regards the statement of Muntz that bacteria cannot exist in the presence of 2½ per cent. of chloroform, which substance is, therefore, useful in distinguishing physiological from chemical ferments. The author concludes that amounts of chloroform, phenol, and creasote, varying from ½ to 3 per cent. do not destroy bacteria, although their functional activity is decidedly arrested while in contact with these reagents. To use the author's words, bacteria may be pickled in creasote and carbolic acid without being deprived of their vitality. The author concludes that the substances which destroy bacteria are those which are capable of exerting an immediate and powerful oxidizing action, and that it is active oxygen, whether from the action of chlorine, ozone or peroxide of hydrogen, which must be regarded as the greatest known enemy to bacteria.

Mr. Hamlet, in replying to some remarks of Messrs. Kingzett and Williams, said that in all cases the solutions which he had used had been completely sterilized by exposure to a temperature of 105° for ten minutes. The indiarubber tubing he had used was steamed. Carbolic acid solution must contain at least 5 per cent. of carbolic acid to be fatal to bacteria. He was quite aware of the importance of distinguishing between the action of the two substances on various kinds of bacteria, and was quite prepared to say that a treatment which would be fatal to one kind of bacterium might not injure another.

The Society then adjourned to April 21, when a paper "On the Estimation of Hydric Peroxide by means of Potassic Permanganate," by W. E. Adeney, and one on "The Oxidation of Sulphurous Acid," by H. B. Dixon, will be read.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association on Wednesday, March 23, Mr. F. W. Branson, President, in the chair,

Mr. G. F. Snow read a paper on "Sulphur," in which the subject was treated historically, physically and pharmaceutically. The history of sulphur was traced from the earliest periods to the present time. The different physical conditions of sulphur, and their values in the arts and medicine, were illustrated and explained, and the author next referred to its use in pharmacy. The various kinds known as sulphur vivum, lotum, sublimatum and præcipitatum were described, the former as being now used principally for veterinary purposes; sulphur lotum was considered as having somewhat fallen into disuse. Sulphur sublimatum and its preparations were noticed, especially in connection with the conf. sulphuris, B.P., in which it was observed that the cream of tartar generally crystallized when kept any length of time. The omission of sulphur sublimatum in the p. glycyrrh. co. of the B.P. was spoken of as a mistake, as the demand for the p. glycyrrh. co. of the German Pharmacopœia, so much prescribed by medical men, justified the belief that the objections which have been urged against the introduction of sulphur into this preparation were not well founded. Sulphur præcipitatum was next noticed, and it was contended that its connection with the lac sulphuris, Pharmacopœia, 1721, might be traced through several Pharmacopœias; analogous cases were noticed, such as sal volatile, tincture of steel, etc. A more reliable preparation for the production of ung. sulph. hypochlor. than the present powder in use was considered necessary. Although a liquid chloride of sulphur is sometimes used, mixed with ung. sulphuris, B.P., yet this method somewhat lacks the exactness demanded. In conclusion, the author said the amount of sulphur imported into this country during the last three years, was, in 1878, 43,604 tons; in 1879, 41,012 tons; and in 1880, 46,895 tons.

Some very fine specimens of native, refined and plastic sulphurs were shown from the firms of Messrs. May and Baker and Brandram Brothers.

A good discussion followed, in which the Chairman, Messrs. Stuart, Hartridge, Parkinson, Killick and Princip took part, after which a vote of thanks was proposed by Mr. Stuart, and seconded by Mr. Parkinson.

The next paper read was a—

Note on Oleate of Bismuth.—By Mr. C. R. KILLICK.—In the search for a compound of bismuth which should be soluble in a fatty basis there has yet been found no substance giving so much promise of usefulness as the oleate. In 1876 a solution of the normal nitrate, $Bi(NO_3)_3$, in glycerine, was suggested as partially supplying the want, but it was doubtless due to the partial decomposition of the salt that its use has been abandoned. There have been several forms given for making the oleate, but the resulting compounds either contained a large excess of oleic acid, or else occupied a great amount of time in their preparation. The method adopted by Mr. S. C. Betty, and laid before an evening meeting of the Pharmaceutical Society, was that of gradually incorporating finely divided oxide of bismuth with oleic acid, heating to nearly the boiling point of the mixture, then allowing it to stand at a temperature of 60° F. for four days, when solidification takes place. By this means a product containing 20 per cent. of the base was obtained, but subsequent experience showed that under apparently similar conditions uniform results were not obtained. Dr. McCall Anderson suggested a process similar to that sometimes used in the manufacture of zinci oleas, viz., digesting 1 oz. of the B.P. oxide in 8 oz. of oleic acid, allowing to stand for two hours, then heating on a water-bath until dissolved. The method which the author found most successful was to decompose a definite weight of the nitrate by boiling with liq. sodæ, washing with aq. dest., afterwards depriving of water by washing with spirit. The precipitate is transferred to the oleic acid and heated on a water-bath with constant stirring until combined. The oxide thus obtained is much more readily soluble than that which has been dried by heat, and the spirit being miscible with oleic acid, offers no obstacle to combination. After becoming solid the temperature is gradually raised until liquefied, and the spirit, together with any water which may be liberated during the operation, is driven off. The product may be made by this process to contain 30 per cent. of the base; it somewhat resembles the oleate of lead in appearance, but is of softer consistence, and may be mixed with vaseline or a fatty basis to form an ointment.

Specimens of the oleate made by different processes and of the ointment were shown.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, March 24, Mr. D. Hooper, Vice-President, in the chair.

Mr. Henry Allen read a paper on "Heat in relation to Chemical Action," which will be published in a future number of this Journal. The paper was copiously illustrated by diagrams, showing the principal forms of calorimeters used for the determination of the heat given out during chemical combinations, and also by tables giving the thermal equivalents.

A discussion followed the reading of the paper, in which the Chairman, Secretary, Messrs. Branson, Parker and Senier took part.

After a vote of thanks had been passed to Mr. Allen for his interesting paper, the meeting adjourned.

Parliamentary and Law Proceedings.

Death of an Opium-Eater in Leeds.

Mr. Malcolm held an inquest on Monday, April 4, at the Town Hall, on the body of Alice Poole, aged 51 years, the wife of John Poole, brick and tile maker.

The evidence of the deceased's husband was to the effect that his wife was a confirmed opium eater contrary to medical advice. He had frequently bought her a shilling's worth of opium at a time. On the 25th ult. he purchased eightpenny worth for her from Mr. Wright, chemist, Kirkstall Road.* The deceased died on Friday last.

Emily Poole, daughter of the last witness, deposed that on Thursday night last she purchased sixpenny worth of opium for her mother. This was in addition to the quantity bought by her father on the previous Friday. On Friday last her mother was taken very ill, and Mr. Bacon, surgeon, was called in. He had attended her previously, and knew she was an opium eater.

Mr. Bacon stated that when he saw the deceased she was in a dying state. She had a very livid appearance, and the pupils of her eyes were much contracted. She died the same evening (Friday) from chronic opium poisoning. The piece of opium produced (the remains of that purchased by the daughter) was about sixty grains in weight, the usual medicinal dose being from a half to one grain. The opium was obtained at the shop of Mr. Wright.

There being no doubt as to the cause of death, the jury returned a verdict in accordance with the medical testimony.—*Leeds Mercury.*

Alleged Thefts of Government Stores at Stonehouse.

At the Stonehouse Petty Sessions, on Friday, April 8, before Messrs. W. E. Matthews (in the chair), C. Simpson, H. H. Tremayne, Admiral Watson and Major-General Fowler-Burton, county magistrates, George Prout, private R.M.L.I., and Samuel Sprague, marine store dealer, of Stonehouse, were charged with stealing a quantity of Government stores, namely, a tin of castor oil, a tin of cod liver oil, a jar of phosphorized oil, and eight rolls of sticking plaster; John Williams, private R.M.L.I., was charged with stealing a quantity of Government drugs, namely, a bottle of juice of hemlock, one of phenic acid, and another of carbolic acid, and also a jar of cod liver oil and some quinine.

Mr. W. Eastlake, solicitor and Deputy-Judge Advocate of the Fleet, who prosecuted, said he had received instructions from the colonel-commandant to prefer the charges, and having called evidence should ask for a remand.

Fleet-Surgeon Henry Loney said he had charge of the Royal Marine Infirmary and the medical stores. A sergeant named Smale looked after the building, and kept the keys under his instruction. On Wednesday afternoon he received a communication from Corporal Denley, in consequence of which he went to the stores, and found a quantity of cod liver oil and castor oil missing, and it had since come to his knowledge that some rolls of plaister and some phosphorized oil were also missing. On Thursday he went to the shop of Mr. P. C. Maitland, chemist, of Chapel Street. He saw some Government stores there, one of the jars bearing the hospital mark, and containing phosphorized oil. There were also two large drums, one containing castor oil and the other olive oil. These bore no mark, but they were similar to those kept at the infirmary. The prisoner Prout was formerly a servant to witness, but had been discharged, and Prout was now a servant of one of the other surgeons of the same department. Of the articles found at the shop of Mr. Netting, chemist, of Manor Street, Stonehouse, he recognized one bottle, which contained juice of hemlock.

William Denley, Corporal R.M.L.I., said he was dispensary man at the infirmary, and on Monday he missed some spermaceti oil, a bottle of cod liver oil, and some iron. On Wednesday he missed some castor oil, olive oil, and phosphorized oil. He went to Mr. Maitland's shop, and there saw two drums, which were in every respect similar to those at the infirmary. The plaister he saw at Mr. Maitland's was also similar.

Mr. Pelham C. Maitland, chemist, 31, Chapel Street, Stonehouse, stated that the prisoner Sprague came to his shop on Wednesday afternoon and offered some castor and cod liver oil for sale. He asked prisoner where he obtained it, and Sprague replied that he had bought it from a vessel in the docks which carried a large number of passengers and two surgeons. He further asked prisoner if the man of whom he had purchased the articles had any right to sell them, and the prisoner replied "Yes." Witness bought the castor oil and refused to buy the other, saying he would consider it. About 6 p.m. the the same day Sprague returned with the prisoner Prout, and asked witness to buy the other oil, which he did, giving 37*s.* for the both. He paid the money to Sprague.

Police Constable Egan said that on Thursday he apprehended Prout about 4 p.m., charged him with stealing a quantity of Government stores, and in reply he said he knew nothing about it; Sprague gave it him to sell, and a glass of ale for doing so, and that he could prove. Witness afterwards went to Mr. Maitland's, and asked him if he had bought any Government stores, and he produced the articles referred to, and witness took charge of them. Later in the day he apprehended Sprague, and charged him with the same offence, and he in reply said Prout gave them to him to sell, and promised to divide the receipts. He received 37*s.*, and they shared that sum.

Sergeant McNellan stated that on Thursday he went to the Royal Marine Barracks, and by order of the colonel-commandant he took the prisoner Williams into custody. He charged Williams with stealing Government stores, and the prisoner replied that he bought them from a mate of a vessel in the docks. That morning Williams had said he did not buy them of a mate, but Prout gave them to him. Witness went to Mr. Netten's, chemist, of Manor Street, Stonehouse, where he found the articles produced.

Charles Henry Foot Menhennick, assistant to Mr. Netten, said last autumn the prisoner Williams came to his shop and offered for sale two or three bottles of quinine, two bottles of pill masses, and one bottle of confection of roses. He asked the prisoner where he obtained the articles, and he replied at Malta, where he had been a doctor's servant, and when he was leaving the doctor gave them to him. Witness told the prisoner that the proprietor was not then in, and asked him to call the next day. The prisoner then said he was going away, and witness thereupon gave him a sovereign for the lot.

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* No entry corresponding with this name and address appears on the Register of Chemists and Druggists.—Ed. Ph. J.

In answer to Mr. Matthews the witness said that he did not make any entry in the day-book of this, but accounted for it to the proprietor on his return.

Mr. Mathews thought it was rather a loose way of doing business, and further remarked that the profit on buying the goods at such a low rate was large.

This was all the evidence now offered, and the prisoners, who asked no questions, were remanded until Thursday.—*Western Morning News.*

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[527]. This prescription presents two obstacles to the eye of a novice, first, the somewhat obscure "Kerm. min.," which, however, is simply an abbreviation of Kermes mineral (an odourless, tasteless and very dark crimson powder, which is employed in continental practice as a substitute for James's powder), and then the equally abstruse "loch. pectorialis," simplified by calling it lohoch or linctus pectorialis, a composition of equal parts of oxymel of squills, simple syrup and mucilage of acacia.

I think the most practicable method of dispensing it would be:—

(*a*) To triturate the Kerm. min. with a part of the linctus.

(*b*) To pour into the bottle and shake together.

(*c*) To add the tr. veratriæ virid., and finally the remainder of the linctus.

Bedford. H. W. Nichol.

[529]. Tinct. Iodi c. Am.—"Islander" will find the following become colourless in twenty-four hours:—

℞	Tinct. Iodi	℥ss.
	Liq. Ammon., s. g. ·960	ʒj.
Misce.		

G. Brown.

[529]. I believe it is the general custom in preparing tinct. iodi c. ammonia, to simply decolorize by the addition of liquor. ammon. fort. the tincture of iodine of the British Pharmacopœia. I have found ʒj. to ℥j. of tincture and two or three days' exposure to the light quite sufficient. The resulting so-called colourless tincture is a complex mixture; when kept for some time it smells strongly of garlic and deposits colourless crystals.

G. S. Illingworth.

Notes and Queries.

[699]. AQUA MELLIS.—"Nemo" wishes for the formula for aq. mellis. I have great pleasure in forwarding him one:—

℞	Ess. Bergam.,	
	Ess. Moschi	āā ʒij.
	Ol. Rhodii,	
	Ol. Caryophylli	āā gr. vj.
	Aquæ Rosæ	℥viij.
	Sp. Æther. Nit.	ʒj.
	Sp. Vini Rect.	Oij.
	Croci Stig.	gr. iij.
M.		

T. Lees.

[701]. RANGOON OIL.—"Fowne" says, "amongst the several naphthas there is one called Burmese naphtha (or Rangoon tar). It consists principally of liquid homologues of marsh gas, associated with small quantities of hydrocarbons of the benzol series, paraffin and hydrocarbons analogous to colophene." I should think Rangoon tar and Rangoon oil are the same.

374.

[702]. GLYCERINE OF PEPSINE.—Which is the best way to dissolve pepsine in glycerine, and in what proportion will it dissolve?

A solution of pepsine in glycerine is required in place of pepsine wine.

H. G.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

Pharmaceutical Titles.

Sir,—A paragraph anent the Major qualification, in Dr. Greenhow's report which was submitted to the last Council Meeting, recalls an appeal I made some six years ago to the more prominent and influential members of our Society to endeavour to make the title conferred on passing the Major examination more respected and sought after.

From a good general knowledge of the feelings of the trade, I thoroughly endorse Dr. Greenhow's statement that probably "the title of pharmaceutical chemist is not sufficiently distinctive to induce candidates to undergo the expense and trouble of passing another examination in order to obtain it." I say it with all respect, but I am convinced that the founders of the Society made an unfortunate blunder when this title was chosen, and it is to be regretted that the Society has hitherto been content merely to endorse that selection.

I think it will readily be granted that a title indicating scientific attainments is a marketable article which even "professional" men do not scruple to buy: how much more, therefore, ought this aspect of the question to have commended itself to a trading class? Yet we find that through excess of modesty or a feeling of being above dependence on a "handle" to their names, the founders of the Pharmaceutical Society threw away the opportunity of securing the power to confer (on examination) a title with the proper ring about it, and ever since 1868, after Parliament put all power into their hands, the Society has continued to barter the head and shoulders of their weakling to an unexamined class who are willing to pay two pounds down and subscribe a guinea a year.

To again quote the words of Dr. Greenhow, "It is, therefore, a question worthy of consideration whether some other and more distinctive title than that of 'Pharmaceutical Chemist,' such for example as 'Fellow of the Pharmaceutical Society,' might not be advantageously substituted for the present name," and the doctor goes on to say that, "on public grounds it is very desirable that a greater number of persons should hold it." I, therefore, submit that one main incentive to students to push on to a higher degree would be to grant a title more suggestive of examination, and in proof that this is a felt want, I have but to point to the too frequently seen addendum "by examination," which I hold is but a clumsy mode of supplying a defect in the original title. The American degree, "Graduate in Pharmacy," which we see much more frequently on the pages of the Journal than our own more valuable "Pharmaceutical Chemist," is an example of the sort of title I would suggest, although to consistently make use of such a title in England the holder ought perhaps to have gone through a college curriculum. But a better name may be originated by ourselves, and, merely as a suggestion, I mention, "Licentiate of the Pharmaceutical Society." Further, since now-a-day "doctor" has ceased to have its contracted and origina meaning of "teacher," and besides doctors of divinity, law and medicine, we have doctors of music, doctors of science, and doctors of philosophy, why not "doctors of pharmacy?" I am aware that this latter suggestion takes us into quite a new country, and through which we would have to fight every step. Without doubt, pretension to such a title as doctor of pharmacy would stir opposition in many quarters, but we ought to remember that we are pharmacists first, and physicians' helps afterwards; and further, grant a searching examination, following, if need be, Dr. Greenhow's suggestion of "attendance upon a fixed curriculum, or special course of study at a school of pharmacy, and the class of men likely to take the degree would be found the most unlikely to trench upon the physician's domain, and dabble in counter practice." I wish I were sure of no opposition from our own ranks, from members, who, themselves safe on the top shelf, seem to think that they are above the rough and tumble every day hustle, and pooh-pooh, as "scientific pretension," the laudable ambition of the struggling pharmacist to reap all possible benefit from the examinations.

I do not think that the adoption of "Fellow" for "Member" of the Society would be any advantage. Perhaps Dr. Greenhow does not appreciate the necessity of having a title apart from membership. Not every Major man is connected with the Society, and being myself not a stranger in Burlington House, I know how really little "Fellow" may mean.

If an improvement of the title conferred by the Society can be brought about without going to Parliament, I commend the subject to the attention of the Council, and hope also for some interchange of opinion through your columns; but remembering the foolish personalities into which the last correspondence degenerated, I would beg that it be taken for granted that we know all about the "self-exaltation" aspect of the question, and that arguments for or against be directed to the main issue.

G. L. Huet.

Relations of Medicine and Pharmacy.

Sir,—Before the correspondence on "the Relations of Medicine and Pharmacy" closes it might not be out of place to give again the reply of the committee of the Rochdale Chemists' Association to the query of the medical men relative to counter-prescribing. It was published in your columns on July 12, 1879, and is as follows:—

"Ever since the incorporation of the Pharmaceutical Society, chemists generally have discouraged prescribing, in the hope that they would ultimately have the duty of dispensing the prescriptions of medical men. Where this practice prevails, there is no prescribing done by the chemists, except for such simple ailments as the medical profession do not care to treat, or the public do not think of asking their advice about. The result may be thus briefly summed up. The more dispensing by chemists, the less prescribing; the less dispensing, the more prescribing."

Nearly all, if not quite all, the medical men who took part in the discussion of this question, at the conference between the medical men and chemists of this town, acquiesced in this view of the subject, and some went so far as to say they were glad that chemists relieved them of those cases where the patient would object to pay their usual fee for consultation, when only a worm powder, or a little medicine in simple ailments of children, was required.

Let us hope that as soon as the correspondence on the subject closes, an effort will be made to arrange for a conference between representatives of the two bodies, as being the most likely means of leading to practical results.

Rochdale. Ralph Robinson.

The Benevolent Fund.

Sir,—The pathetic appeal of the Secretary for help towards the Benevolent Fund, which accompanied his reminder to me of the non-payment of my annual subscription, provoked me to give vent to a few crude suggestions which occurred to me at the moment. Mr. Bremridge suggests the ventilation of those ideas through your eloquent mediumship, and I, therefore, repeat to you the same remarks in a somewhat similar strain, but backed by the approval of the Secretary of the Society.

Imprimis, let me say that it is a disgrace to a Society whose members are universally considered gentlemen (save the mark), and only a little lower than the angelic profession of medicine, to have their corporate benevolence represented by such a paltry sum as that which figures in the annual statement.

To remedy this, I suggested three plans. The first was to convert the Benevolent Fund into an insurance society, to include amongst its provisions, one to secure an annuity to a person after a certain age, as is done by several societies of the same kind. This would give everyone connected with the Society some object in subscribing to the Fund.

My second suggestion was to inspire the sleeping genius of men who, as a rule, received a fair education, and amongst whom there must be some talent. This talent I propose to utilize in providing entertainments in London and the provinces, to induce the benevolent to become helpers to poor chemists, and at the same time to provide an evening's amusement to people who, in small out-of-the-way towns, are bored to death with *ennui*.

To show I do not speak rashly I may say I can give the name of one gentleman of the cloth who has many a time entertained a fashionable audience for an evening with recitations which went far to rival the best attempts of Bellew.

My third idea was arrived at by doing a simple sum, which shows that if each one of the 13,000 members were to drop daily, on taking the till, one penny into a box provided for the purpose by the Society, the same box to be forwarded on the 1st of January in each year to the Secretary, the sum so provided would amount to the fairly handsome total of about £20,000. Besides this, such a box, placed in a conspicuous place in the pharmacy, would place many a penny at the disposal of the Fund. I am not so Utopian or Quixotic as to suppose that every member of the 13,000 would comply with such a suggestion. But I venture to prognosticate that the amount so obtained the first year would exceed £10,000.

21, *Paddington Street, W.* Alfred Beaven.

Chemists' Prices.

Sir,—I noticed, in a local paper, the letter referred to by Messrs. Nind and Dymott, and criticized in your recent leader. According to our "price list" the price of 2½ ounces of a compound ointment, by prescription, is 1*s.* 8*d.*; and when several ingredients are prescribed, the dispenser requiring a warm mortar, slab, etc., in order to turn out an elegant ointment, I think the "price list" rate is not too high; but the committee recommend that, "in cases where the composition of the medicine is very simple, or where the pecuniary circumstances of the patient call for abatement, the dispenser may make a reduction at his discretion," and I am of opinion that the ointment in the letter referred to was charged too high.

Edinburgh. "John."

W. M. Covell.—There are unfortunately a large number of persons who appear to think with yourself, but we are not of opinion that any good would be done to the trade at large by giving your views greater publicity than has already been done.

T. M. Stiles.—In order to be eligible as a Bell Scholar a candidate must already have entered the calling of pharmacy to the extent that he must have passed or been engaged not less than three years in the pharmacy of a registered chemist and druggist. What career may be open to him subsequently we do not venture to prognosticate.

W. L.—The offensive odour communicated to the breath by some specimens of bismuth has been attributed to the presence of tellurium as an impurity. See *Pharm. Journ.* [3], vol. vi., pp. 501 and 561, and other places in the same volume.

J. T. Bilney.—An aniline black marking ink is described in vol. v., p. 912, of the present series of this Journal. The passage is too long for reproduction.

Communications, Letters, etc. have been received from Messrs. Allen, Rost and Tinkers, Fireworks, C. J., W. E. E.

CONTRIBUTION TO THE CHEMISTRY OF NERIUM ODORUM.

PRELIMINARY NOTE.

BY HENRY G. GREENISH.

No attempt having, to my knowledge, as yet been made to isolate the active principle of this drug, the poisonous properties of which are well known in India, I was induced to undertake the investigation, deeming it not improbable that a chemical examination would reveal the presence of a principle similar to the oleandrin of *Nerium oleander* or to the wrightin or conessin of *Wrightia* (*Nerium*) *antidysenterica*.

The following quotation from the Pharmacopœia of India, in which the root is official, will serve to show the uses made of the drug in that country, and the properties assigned to it:—

"*Nerium odorum*, Aiton (*Bot. Mag.*, 1, 2032), the sweet-scented oleander, much cultivated in India for the sake of its flowers, which are used in certain religious ceremonies by the Hindus. All parts of the plant, especially the root, are recognized by the natives as poisonous, and, as such, are used for criminal and suicidal purposes; yet we find in the 'Salief Shereef' (p. 129), and other works on Indian materia medica, it is prescribed in leprosy and other diseases. It is mentioned here chiefly with a view of enforcing caution in any trials which may be made with it, as in overdoses it is productive of serious and even fatal effects. Two interesting cases of poisoning with it are recorded, one by Dr. J. Broughton ('Bombay Med. Phys. Trans.,' iv., N. S., p. 4 in app.), and the other by Dr. A. Greig ('Indian Annals of Medical Science,' vol. ii., p. 295). In the latter, which proved fatal, death, according to Dr. Greig, was due to the directly depressing influence which the drug exercises on the nervous system. A case in which tetanic symptoms followed the exhibition of the root bark is recorded by Mr. Kamicakyá Nath Acherjee (*Indian Med. Gaz.*, vol. i., p. 218, 1866).

Simpson* observes that the hill plant is more poisonous than that cultivated in gardens, and mentions the occurrence of tetanic spasms similar to those caused by poisoning with strychnia; but he notices that strychnia exerts no marked influence on the pulse, whilst in poisoning with oleander "preternatural slowness of the pulse is a well marked feature." "Besides its action on the nervous system therefore," says Simpson, "the poisonous principle of the oleander appears to have a special depressing influence on the heart."

The quantity of the drug at my disposal was about 400 grams. I am indebted for it to the kindness of Mr. E. M. Holmes, Curator of the Museum of the Pharmaceutical Society, to whom I take this opportunity of expressing my thanks. It consisted of pieces, varying in thickness from the size of a goose quill to over an inch in diameter, the majority measuring three-eighths to five-eighths of an inch. Externally the bark presents a greyish wrinkled appearance. On removing the outer layer, the inner is seen to be yellowish-green in colour. The wood is soft, easily cut, and possesses the same yellowish-grey colour as the bark. The latter, which is of medium thickness and adheres tolerably firmly to the wood, is remarkable for its intensely bitter taste, which in the wood is hardly noticeable.

Microscopic Examination.—A transverse section showed the bark to be composed of an external layer of about ten rows of cork cells, followed by parenchymatous tissue traversed longitudinally by numerous laticiferous vessels still containing in many instances the dried latex. On the longitudinal section, the course of the laticiferous vessels may easily be traced, especially after treatment of the section with iodine and chloride of zinc. By this means the parenchymatous cells are coloured blue, whilst the dried latex absorbs iodine and renders itself so more evident by its yellow colour. Bast-fibres are not present. Between the wood and the bark is situated the cambium layer with its thin-walled cells. The wood consists of the usual elements, viz., wood-cells and vessels. They are somewhat thin-walled and of small diameter. Single rows of narrow parenchymatous cells (medullary rays), loaded with starch grains, traverse the wood from the centre to the circumference. The absence of pith shows the drug to be a root.

By treatment of the longitudinal section with iodine and chloride of zinc, numerous sieve-cells in the inner bark are brought to light which otherwise easily escape observation. Crystals of oxalate of calcium are numerous.

Chemical Examination.—The bark being the seat of the greater part of the bitter substance, it was deemed advisable to separate the same from the wood. Ninety grams of root-bark were obtained by cutting and scraping, leaving 280 grams consisting of the wood and small rootlets.

Each portion was reduced to a coarse powder and macerated seven days, with sufficient absolute alcohol to cover it, at the ordinary temperature, followed by two days at a temperature of about 35° C. The alcoholic solution was then filtered off, the residue pressed, and the maceration with alcohol repeated. The united filtrates were evaporated on the water-bath to a small bulk, during which operation a quantity of yellowish fatty oil separated out. This oil was free from bitterness and proved to be soluble in ether and petroleum spirit. To completely remove it the concentrated alcoholic solution was diluted with several times its volume of water, and to the milky fluid thus obtained powdered bole was added. The whole was brought on to a filter and yielded a perfectly clear filtrate, which was then evaporated on the water-bath to a small volume. In extracting the active principles of this root it would be advisable to remove the oily matter by treatment of the powdered drug with petroleum spirit.

I. Filtrate of the Bark.—This, though already slightly acid, was rendered distinctly so with dilute sulphuric acid, and shaken with petroleum spirit, which, however, removed but traces of fatty substance (probably the above-mentioned oil). After the separation of the petroleum spirit the liquid was shaken with chloroform which, in addition to becoming itself coloured, caused the separation of a yellowish-brown oily liquid that floated between the aqueous and chloroformic solutions. This oily substance was removed, heated for a few minutes to 100° C. to drive off traces of chloroform, and finally dried over sulphuric acid. It was then finely powdered, and digested successively with chloroform and ether, washed and dried. It proved to possess an intensely bitter taste, to be easily soluble in cold water, but insoluble in chloroform.

The aqueous liquid from which this substance had been separated was now again shaken with chloroform, and the two chloroformic solutions so obtained, which contained by far the greater part of the substance extracted by chloroform, evaporated to dryness. The residue was yellow, amorphous, very slightly soluble in cold water, more easily in boiling, but easily soluble in chloroform, and possessed an intensely bitter taste.

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* *Pharm. Journ. Trans.*, [3] vol. ii., p. 666.

These two bitter substances are, as I shall presently show, powerful cardiac poisons, and resemble digitalin and digitalein in their behaviour to chloroform and water. I have proposed, therefore, for the substance soluble in chloroform, but difficultly soluble in water, the name "neriodorin;" for the substance easily soluble in water, but insoluble in chloroform, the name "neriodoreïn."

After removing the neriodorin from the aqueous solution by shaking with chloroform, it was found that a bitter substance still remained in solution. The acid liquid was accordingly neutralized with carbonate of barium, evaporated to dryness, and treated with absolute alcohol, which solvent left on evaporation a residue possessing the characters of neriodoreïn, although not quite pure.

II. *Filtrate from the Wood.*—This was treated in a similar manner, but the addition of sulphuric acid to the aqueous liquid after the removal of the fat was avoided. The separation of neriodoreïn as an oily liquid was inconsiderable, and the neriodorin obtained by shaking with chloroform was a shade darker in colour than that from the bark.

Neriodoreïn.—Purified as above described by washing with chloroform and ether, dried over sulphuric acid, and powdered, it was obtained as a pale lemon-yellow amorphous powder. The taste is intensely bitter, and is followed by a numbing sensation lasting a considerable time. It is insoluble in petroleum spirit, ether, benzol, chloroform, bisulphide of carbon, amylic alcohol and acetic ether, both warm and cold, but is easily soluble in cold water, and also in alcohol.

The aqueous solution possesses a neutral reaction. It contains no nitrogen, and when burnt on platinum foil leaves only traces of ash.

The addition of chloroform to a concentrated aqueous solution of neriodorin causes its separation as an oily liquid, part, however, remaining in aqueous solution. Chloroform and ether precipitate it from its alcoholic solution in pale coloured flocks. Glacial acetic acid dissolves it, but on evaporation leaves it behind as a yellow, amorphous, varnish-like mass. Digestion of the aqueous solution with animal charcoal fails to remove the yellow colour. No attempt to crystallize it was attended with success; but I believe it to be crystallizable, since it passes through the septum of a dialyser completely and with facility.

Pure concentrated sulphuric acid produced with dry neriodoreïn a reddish-brown colour, at the edges violet, passing gradually to a dirty yellowish-brown and green.

Sulphuric acid and cane sugar gave at first the same colour, turning subsequently violet-blue. A drop of concentrated nitric acid added to the sulphuric acid solution coloured it yellow. Fröhde's reagent yielded a deep dirty violet colour.

A one per cent. solution in water was neutral in reaction to litmus. It was not precipitated by basic acetate of lead solution, but the addition of a drop of ammonia caused the formation of a voluminous gelatinous precipitate. With tannic acid it yielded a yellowish precipitate. Ferric chloride tinged the solution slightly brown. With potassio-mercuric iodide, cupric acetate and neutral lead acetate no change was observed. Fehling's copper solution was reduced on boiling with the aqueous solution of neriodoreïn, but the ease with which the latter dissolves in absolute alcohol and in a solution of 1 vol. chloroform in 4 vols. of absolute alcohol proves the reaction not to be due to any sugar present as impurity, although that substance had been detected in the root.

A solution of neriodoreïn in water containing 2 per cent. hydrochloric acid, heated for a couple of hours in a sealed tube in the water-bath, was found to have undergone decomposition, rendered evident by the separation of a yellow resinous substance. The tube was allowed to cool, broken open, and the still slightly yellow coloured liquid filtered from the decomposition product. The former was entirely free from bitter taste, but still reduced Fehling's copper solution on boiling. The decomposition product was treated with absolute alcohol, which dissolved a yellow substance leaving a residue consisting of colourless needle-shaped crystals. The latter appeared insoluble in water, ether, alcohol, and alkalies, but soluble in chloroform. The alcoholic solution allowed to evaporate left a yellow amorphous residue soluble in chloroform, alcohol, and boiling water. Treated with Fröhde's reagent this yellow substance yielded a beautiful violet colour, passing gradually to a dirty green. Neither of these substances reduce Fehling's copper solution when boiled with that reagent. Neriodoreïn would seem therefore to be a glucoside, but to settle this point decisively a more minute examination would be necessary than the amount of material at my disposal permitted me to make.

An aqueous solution of neriodoreïn was mixed with milk of lime and evaporated to dryness in the water-bath. The mixture was found to have lost its original bitter taste, and on warming with absolute alcohol yielded no appreciable quantity to that solvent. This decomposition requires further investigation, as also that brought about by heating with dilute acid.

Neriodorin formed a clear yellow transparent tenacious varnish-like mass, which after long standing over sulphuric acid was not brittle enough to allow of its being powdered. It was easily soluble in chloroform, very difficultly in cold water, more easily in boiling, imparting to both hot and cold water its intensely bitter taste. Petroleum spirit, benzol and bisulphide of carbon did not dissolve it; ether dissolved only traces. In alcohol it was tolerably readily soluble. All attempts to obtain it in a crystalline condition proved futile. Like neriodoreïn it was free from nitrogen, and the aqueous solution had a neutral reaction. Copper solution was reduced on boiling. Heated in a sealed tube with 2 per cent. hydrochloric acid it underwent a decomposition similar to that observed when neriodoreïn was subjected to the same treatment, and yielded the same decomposition products, viz., a white crystalline substance, yellow amorphous substance, and, probably, sugar.

The alcoholic solution mixed with milk of lime and evaporated to dryness lost its bitter taste and left a residue from which boiling alcohol extracted a yellow resinous substance insoluble in water, differing in this respect from the similar decomposition product from neriodoreïn, which was insoluble in alcohol but soluble in water.

Concentrated pure sulphuric acid dissolved neriodorin with yellowish-brown colour, which passed to a violet in contact with the vapour of bromine or of nitric acid.

Fröhde's reagent produced a deep violet-red, passing gradually to a beautiful violet-blue, and assuming finally a dirty green tint.

The saturated aqueous solution (produced by boiling a small quantity in water, cooling and filtering) showed a neutral reaction, yielded with ferric chloride a deep reddish-brown colour which was discharged by acids and alkali, with basic acetate of lead gelatinous flocks, and, acidulated with dilute sulphuric acid, gave with solution of potassio-mercuric iodide a copious whitish precipitate.

Neriodorin and neriodorein possess, therefore, considerable similarity to one another, but may be distinguished by their behaviour to solvents (chloroform and cold water) and in aqueous solution to ferric chloride, basic acetate of lead and potassio-mercuric iodide. Curiously enough, although the former is difficultly soluble in cold water, the presence of but small quantities in the neriodoreïn is sufficient to render the latter extremely hygroscopic, a character not possessed by it in a state of purity.

To ascertain the action of neriodoreïn on the system, large healthy frogs were selected for the experiments, and the aqueous solution of neriodoreïn injected hypodermically, the animal's heart being, if necessary, exposed, to permit of the beats being counted.

0·0016 grams caused, in fourteen minutes, diminution of the heart beats from 70 to 12 per minute, followed by a temporary rise to 60; after the lapse of five minutes longer the heart ceased to beat. This cessation of the heart's action was closely followed by cessation of the respiration.

The same dose was administered to two frogs, the heart not being exposed. In one case it proved fatal, but in the other recovery ensued in the course of twelve hours.

0·0008 gram did not prove a fatal dose.

0·0032 gram was followed by death in the course of one hour and a half.

A very slightly alkaline solution of neriodorin proved likewise poisonous, but quantitative experiments were not undertaken with this substance owing to the difficulty of obtaining a solution suitable for hypodermic injection.

In none of these experiments were the tetanic symptoms, mentioned by Mr. Kamickhyá Nath Acherjee,* noticed.

An aqueous solution of neriodoreïn was subjected to dialysis. The action of the last dialysates on the heart was found to be equally powerful with that of the first, and of the intermediate dialysates. It would seem probable, then, that neriodoreïn is a simple substance and not a mechanical mixture.

Since the conclusion of the foregoing experiments, I received from Mr. T. Greenish, in London, a small quantity of the bark of *Nerium odorum*. The sample consisted of small pieces of a thin bark, internally and externally of a greyish-brown colour, bearing some resemblance to mezereum bark, from which, however, its short fracture at once distinguished it.

A transverse section showed much similarity to the section of the root previously described. Small portions of adhering wood showed the same thin-walled wood-cells and vessels. The bark, which is bounded on the outside by several layers of cork cells, consists of parenchyma, containing numerous groups of bast fibres arranged in a ring around the wood. Small starch grains and crystals of oxalate of calcium are numerous. The chemical examination yielded evidence of the same two bitter substances as found in the root.

The above experiments show that *Nerium odorum* contains two closely allied bitter principles, probably glucosides, both possessing the characters of powerful cardiac poisons. Aided by a liberal grant from the Pharmaceutical Conference, I am now endeavouring to obtain larger quantities of the drug, with a view to investigating more closely the nature and composition of these two bodies, and of comparing them with the active principles of the closely allied *Nerium oleander*.*

Dorpat, Russia.

CASTOREUM.†

BY JOSEPH FUCHS.

According to Weber‡ castor is the accumulated skin unguent (*Hautsalbe*) of the præputium penis et clitoridis, and is not secreted by glands, but by the vascular thick skin of the præputium. The castor would contain the gradually accumulating separated epidermis cells of the præputium, new layers of which are continually formed whilst the outer layers fall off. During my pharmaceutical career of forty years I have taken much interest in this subject, and have been so fortunate as to be able to remove the castor from seven beavers, and have also frequently been in the position of having in my hands those occurring in commerce.

Among the beavers from which I removed the castor, were two young beasts, that had nearly attained the size of the old ones; they were well nourished, and when I opened them their flesh was yet warm. They had been caught together shortly before in a tributary of the Danube and at once brought to market. The two pairs of sacs weighed together scarcely 43 grams. Upon slitting them up longitudinally I found the surfaces of the walls entirely and uniformly covered with hard fissured warts, lying close together, the size of a lentil, of dull earthy appearance, light brownish-yellow colour and little smell, which even after drying scarcely resembled the European castor. The sacs were divided into two halves, but no further accumulation of substance was found at the base. They were consequently only thin membranes with a small quantity of castor substance and therefore unsuitable for use as a medicine. They were interesting to me, since I believed I might draw from them the conclusion that the castor at least is produced in the sac itself and secreted by glands, augmenting with the age of the animal, and when it occurs in more considerable quantities it is pressed downwards gradually through the natural movements of the animal and collects into a compact mass, as it is actually ordinarily found in the older beavers. Tolerably large sacs are therefore often met with, which upon slitting longitudinally could be divided quite well into two halves without any large accumulation at the lower end being observed. This fact, however, would not find an explanation if simply the smegma præputii were pressed into the sac. In that case, if the sac were moistened in water the contents would separate from the surface of the inner walls, which, however, is quite impossible without rupturing the walls, and especially is it so in those sacs that can be separated into two halves. Neither would the fact be explained that the castor substance is always traversed by membrane. Further, it is worthy of mention that in the before-mentioned pairs of sacs from the young beasts no folds were yet observable on the inside, but the inner walls were tolerably smooth; therefore it may be assumed that the folds, which are always distinctly present in the older beasts, first originate at a later age after the increase in the substance.

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* *Loc. cit.*

* I should be much indebted to any reader of the Journal who could give me information where I should be able to procure supplies of this and other species of Nerium, especially the Persian *N. Kotschi*.

† *Archiv der Pharmacie*, March, 1881.

‡ *Verhandlungen d. konigl. sächsischen Gesellschaft der Wissenschaften*, vol. ii., 1849, p. 185.

Weber says further, in a section entitled "Simple Glands in the Skin of Castoreum," verbally as follows:—"On a small portion of the castor sac I have, indeed, noticed very simple, round, lenticular glands. They were so small that they could only be observed through the microscope. They were simple round hollows, not divided into several cells, and had a wide opening that was nearly half as large as the circumference of the gland. They did not possess any excretory ducts, but opened immediately upon the surface, and were consequently only shallow depressions. They occurred so closely together that their distance from each other scarcely equalled their diameter. From the lamellar structure it is sufficiently obvious that castor is not exclusively the secretion of these glands, but that the entire skin, through its peculiar formation of cells and lamellæ, which consist of cells growing from beneath, takes part in its production."

The glandules observed by Weber occurred probably in the upper portion of the sac, and could the more easily be seen because at this part only a very small quantity of substance is ever present, whilst at the lower part the mass collects more together, and the glands can no longer be observed, whilst no solvent is known that would dissolve the whole of the substance, so as to remove it from the walls and leave them naked, without rupturing them. From what has been said it follows that it is not necessary to assume that anything beyond the substance produced in the sacs themselves is introduced from any other source.

With respect to the appearance of castor there are two kinds. Some sacs have contents with an earthy lustreless appearance. When this is the case such sacs can ordinarily be divided almost completely into two halves, splitting longitudinally. When the animal is older a larger mass of substance is found, packed together at the lower end, up to which the divisibility extends; sometimes the sacs are almost full. The entire mass has an earthy appearance. Such castoreum always effervesces more or less energetically with acids. The colour varies from light citron-yellow to brown and almost brown-black, in which last colour, however, some lustre can be observed. Further, there are sacs the greater part of the contents of which occur at the lowest part, closely packed together and distinctly permeated by membranes. The dried substance has a fatty lustre, is almost always of a darker colour, mostly black-brown, upon fracture translucent at the angles, and effervesces more or less with acids. The effervescence depends upon the presence of carbonate of lime. Weber says that he has found sacs where the castor contained a considerable quantity of carbonate of lime. Friedrich Muller, Mohr and others have likewise found considerable quantities of carbonate of lime in castor. They were persuaded as to the genuineness of the specimens, and attributed the occurrence to a diseased condition of the animals. Mohr especially mentions cases in which castor contained 40 per cent. of carbonate of lime. I once obtained a pair of sacs for examination which were the largest that I had seen. They weighed 630 grains, and differed from the sacs recognized otherwise as genuine in their ovoid shape. I am able to vouch for their genuineness, since I knew the sender to be an honourable man, and probably the greater part of the castor in the Vienna market came from his district and through him into commerce. The outer skins could be partially removed without difficulty, and the contents formed a compact mass of light yellow colour, and so moist that upon cutting it some liquid appeared. This liquid had a very disagreeable urinous odour with a faint admixture of that of true castor. The substance effervesced with acids and contained, according to my examination and that of another chemist, 83 per cent. of carbonate of lime. On one occasion some castoreum was offered to me for purchase, which consisted of five sacs, and came from the collection of a deceased pharmacist, who had preserved them as a rarity. They were oval, much dried up and hard. In two the outer skin was rubbed off from the lower part so that the contents could be seen. These were ashy grey, had a smell similar to genuine castor, and presented no signs of sophistication. A small quantity taken out effervesced most energetically with acids and left only a very small residue. I agree entirely that so large a proportion of carbonate of lime in castor is to be ascribed to a diseased condition of the animal. Such castor is not fit for use medicinally. Weber expresses himself upon this point as follows:—"Since the præputium and its extensions come into contact with the urine and become moistened by it, the calcareous substance which I on one occasion found in a castor sac from a beaver killed a short time previously was probably a precipitate from the urine."

It is also stated by others that urine can reach the castor sac, and they support their opinion upon the occurrence of ammonia in the substance. But this ammonia might also have been first formed after the preservation of this animal substance for a long time in a moist condition in the drug store, and this is the more likely because it always occurs only in small quantity. Through the rarity of the beaver and the high price of castor it is not to be wondered at that in this respect so few examinations have yet been made by experts, and that therefore much still remains uncertain.

Thus in the most recent pharmacognostical works it is stated that castor occurs in the sacs in the liquid condition and afterwards dries up. This opinion is quite incorrect. In former times, when the beaver was not so rare as at present, pharmacognosists, and consequently also the older pharmacopœias, described the consistence of castor as being like that of an ointment. Also, Weber says that castor is the skin unguent (*Hautsalbe*) of the præputium penis et clitoridis and that this contains a gradual accumulation of decayed epidermis cells of the præputium of which new layers are continually formed, whilst the outer layers fall off. Further, that he took from a fresh castor sac a *small piece* (*Brocken*) on the point of a knife and examined it under water microscopically, etc. It follows, therefore, that Weber could not have seen the castor in a fresh condition as a liquid, but found it similar to the smegma præputii of men and animals, which was confirmed by Lehmann, who at the request of Weber chemically examined the castor, in a communication to the Saxon Scientific Society at Leipzig, "Upon the Chemical Behaviour of Russian and Canadian Castoreum and of the Smegma Præputii of Animals."* Also, in the previously described sacs from the two young animals, I observed the trace of substance as an unctuous smeary mass, and in the other five pairs of sacs which I took from the animals themselves, I found the castor substance always of an unctuous consistence.

Although a liquid has been found by some persons in the castor sacs, this can only have occurred in cases where the sacs were taken from diseased animals; I myself have met with it there, as previously mentioned. From what has been stated I think it may justly be affirmed, that the castor substance is secreted by glands in the sacs themselves, and that it occurs in them not in a liquid but an unctuous condition.

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* *Transactions*, vol. ii. (1849), p. 200. See also *Archiv d. Pharmacie.*

The foregoing is the result of observation of the castor from European and Siberian beavers. Essentially it is correct also respecting that from Canadian beavers, especially as respects origin and consistence. A more important distinction between the Canadian and European, as well as the Siberian castor, consists in the odour. The Canadian has a much weaker and quite different smell—recalling that of old willow bark—from that of European or Siberian castoreum, which has an entirely characteristic very strong smell, considered by several pharmacognosists to resemble that of birch oil or Russia leather. This difference in odour is the most certain distinguishing character of the two kinds of castor occurring in German commerce. Frequently the effervescence with acids is given as a character of the European and Siberian castor, it being said not to occur with the Canadian. In fact, Canadian castor scarcely ever does effervesce with acids. But neither do the European and Siberian castors always effervesce with acids, and the best sorts effervesce the least. Indeed, upon pouring acid upon the substance of either of the two kinds of castor bubbles always adhere to it, but these are only air bubbles. As a rule, I have never observed in the Canadian castor that diseased condition, in which carbonate of lime frequently collects in considerable quantity, as repeatedly observed by myself and others. In this respect my observations differ from those of Weber, since he alleges that he found a larger amount of calcareous substance in the Canadian castor.

Further, the shape of the sac has been indicated as a character by which the two commercial varieties of castor may be distinguished. The European and Siberian sacs are said to be more flat and rounded, whilst the Canadian are more pear-shaped. This is not, however, always the case. Those sacs which allow of being divided entirely or even partially into two halves are ordinarily flat also in the Canadian, but they occur in that kind very seldom; whilst in both kinds the pear-shape occurs frequently, and in the Canadian almost constantly. Certain it is that the egg-shaped sacs are always somewhat suspected in the European as well as the Siberian castor, on account, probably, of a larger contents in carbonate of lime, by which the drug is diminished in value. It may be remarked, however, that the Canadian castor, fair as this occurs in commerce, is frequently adulterated. Sacs are met with from which, after keeping some time, especially in summer, a black mass flows out, which is nothing more than a resinous substance; others contain a lighter gum-resinous substance. From such sacs the outer skin, after moistening in water, can frequently be separated tolerably easily. The artificial sacs, however, do not occur now so frequently as I have observed them formerly. Such falsifications may be guarded against by purchasing the best, and by breaking each sac in the middle and taking only those in which it can be distinctly seen that the substance is permeated by membranes. This is easily done, because the Canadian castor usually occurs in a very dry condition, whilst in the softer sacs a good knife removes every difficulty.

RESORCIN AND HYDROQUINONE.*

In our last volume (see before, p. 435) we gave an abstract of the investigations of Dr. Andeer, on the antiseptic and antifebrile action of resorcin, and we there also briefly explained its chemical constitution and relationship to hydroquinone and pyrocatechin. The following remarks, which are derived from several papers since published, may be considered as a supplement to that article.

The first experiments on the effects of the dihydroxylbenzols (that is the above three bodies) were instituted by Dr. L. Brieger, of Berlin, who found that all three possessed antifermentative as well as toxic properties. It suggested itself, therefore, to use them in place of phenol or carbolic acid, over which they had the advantage of not being caustic, and, therefore, of being capable of being applied in a very concentrated form, where carbolic acid would destroy tissues or occasion great pain. Among them the hydroquinone seemed to be specially valuable on account of its lesser toxic effects. This body gave especially favourable results in gonorrhœa. The pains usually accompanying every fresh gonorrhœa disappeared as soon as the gonorrhœal flow stopped, and the latter was quickly accomplished by using solutions of hydroquinone of 1 to 2 per cent. But it was also employed successfully in infectious eye-diseases, such as blennorrhœa, etc., being particularly valuable, because it exercises no irritating action on the cornea. Resorcin yielded less favourable results; injections of solutions of this body in the urethra caused great pain without at all diminishing the flow.

While Dr. Andeer's experiments chiefly pointed out the usefulness of resorcin as anantiseptic, it was shortly afterwards shown by Professor Lichtheim, in Berne, that it is also a powerful antipyretic, which in magnitude of effect and certainty is in some respects even superior to quinine and salicylic acid. On giving to a patient in high fever a dose of 2 to 3 grams of resorcin, its effects are noticed after a few minutes; dizziness and buzzing in the ears, reddening of the face, lustre of the eyes, acceleration of breathing and also of pulse, but the latter irregularly. After ten to fifteen minutes the skin begins to become moist, gradually the secretion increases, and after about fifteen minutes the patient is in a profuse perspiration. As soon as this appears, the before-mentioned symptoms of excitement disappear, and there ensues a rapid subsidence of the fever. The pulse decreases in frequency and the temperature falls, both being normal about one hour after the drug has been administered. The reduction of temperature amounts in such cases to about 3° C. and more, and the pulse is reduced by more than one third. But while resorcin thus exhibits more powerful effects than quinine and salicylic acid, it has the disadvantage that the duration of these effects is comparatively short. Yet even this drawback alone would not seriously interfere with its common use as an antipyretic, for a drug capable of rapidly causing the subsidence of fever, even for a comparatively short time, would be highly valuable. The real objection is that resorcin causes symptoms of excitement, which in some cases are very prominent. The patients become delirious, their utterances become partly inarticulate and unintelligible, and sometimes a slight convulsive tremor of the hands and fingers is noticed. But these symptoms pass rapidly away, though they are disagreeable enough to retard the employment of resorcin internally as an antipyretic.

These results were also obtained and confirmed by Dr. L. Brieger, particularly so far as resorcin is concerned. With hydroquinone the results were more favourable; doses of 0·2 gram of the latter were sufficient to reduce the temperature without producing excitement; but on raising the dose to 0·8 or 1·0 gram these symptoms made their appearance. The antifebrile effect of both resorcin and hydroquinone passes off rapidly in a short time. Hydroquinone has an advantage for hypodermic employment. Being entirely free from caustic properties, solutions of it produce no more pain or damage than injections of pure water. It is recommended to employ a 10 per cent. solution, and to inject two hypodermic syringes full of this.

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[*] From *Pharmac. Zeitung*, 1880, No. 90, and *Schweiz. Wochensch. f. d. Pharm.* 1880, No. 33. Reprinted from *New Remedies*, April, 1881.

HEAT IN RELATION TO CHEMICAL ACTION.*

BY HENRY ALLEN.

I intend bringing before you this evening a few of the results that have recently been obtained by experimenters in the branch of chemistry or physics known as thermo-chemistry.

The production of heat by the chemical action of combustion, and the presumption of some definite relation existing between the amount of this action and that of the heat produced is, of course, no novelty; but it may, I think, be safely affirmed that not till within the last twenty years had the amount of heat produced in chemical combinations and decompositions been, except in very few instances, at all accurately determined.

Such determinations are in truth very difficult, and require considerable knowledge and manipulative skill, both chemical and physical. The difficulties have, however, been for the most part overcome, and determinations are now made with an accuracy which may be considered wonderful, when the complications entering into them are justly appreciated.

Considerable advance was made in this direction from 1842–1853 by the experiments of Dulong, Hess, Graham, Andrews and Favre and Silbermann; but the results obtained by them have been thrown into the shade by the long continued and delicate researches of two philosophers, viz., the Danish professor, Thomsen, and the French—Berthelot. It is to the latter especially we owe the distinct enunciation of the fundamental principles of thermo-chemistry, and their systematic application to observed chemical phenomena, and it is to these principles and their application I would briefly direct your attention this evening.†

We have to deal then with the convertibility of chemical action into heat, and the first questions are: What is heat? and what is chemical affinity? Heat, long regarded as a form of matter, has been proved to be actually a form of motion, producible from and convertible into other forms of motion. Whenever work is done on a machine without producing equivalent mechanical effects, an amount of heat is emitted equal in value to the work lost, and *vice versâ*. Moreover there is observed a universal tendency of all kinds of energy to degenerate into a uniform diffusion of heat, and so to become less and less available for the production of work. I shall endeavour to show that in these respects chemical energy resembles other forms of energy.

Chemical affinity may be defined as the resultant of forces which tend to unite one element to others, or to keep united the elements of compound bodies. Suppose this "affinity" or energy to come into play in the case of two elementary gases. The molecules of each gas before combination are undergoing motions of translation, rotation and vibration. At the moment of combination these molecules may be supposed broken up into their constituent atoms, which are precipitated with intense rapidity upon the atoms of the other.

Heat results, comparable in amount with that produced by the collision of sensible masses of matter, such as a hammer upon an anvil. The molecules of the resulting compound will generally have motions differing greatly from those of the original gases, while their mutual action and distance will also be altered. The whole of the heat produced may be said, in a certain sense, to be due to the expenditure of chemical energy, and in some very few cases it is actually so. In most cases, however, the compound formed has physical properties very markedly different from those of its components, and physical energy comes into play.

For instance, the compound formed may immediately become a liquid, or even a solid; if it remain a gas its volume may decrease; or its specific heat may be different from the mean of its components: any of which actions will affect the resulting amount of heat produced. In order to obtain the actual heat produced by chemical action, all these interfering actions must be duly allowed for. It is this fact that so complicates calorimetric experiments. Moreover, as we shall see, such determinations can be very seldom made directly, but have to be arrived at from the results of several indirect experiments.

Before passing on to the principles of thermo-chemistry, it will be interesting to give a brief description of some of the principal apparatus used by M. Berthelot in his calorimetric determinations.

(1) is the apparatus used in ordinary determinations. It consists of the calorimeter proper of platinum, containing water, capacity about 600 c.c., supported on three cones of cork, the latter placed on a thin slab of wood inside an envelope of silvered copper. This again is placed on blocks of cork inside a double envelope of tin, containing water between its sides, and provided with a stirrer; each envelope, as well as the calorimeter itself, has a cover. The tin envelope is covered externally with felt. A thermometer is placed within the calorimeter which can indicate a difference of $\frac{1}{500}$° C., and is generally used as a stirrer. Another thermometer is placed in the water contained in the tin envelope.

(2) is the apparatus used for the combustion of solids, *e.g.*, sulphur, carbon, etc. It consists of a thin two-necked glass flask, which is placed within the calorimeter. Oxygen gas is introduced by one tube; another spirally coiled round the flask carries off the products of combustion. The larger neck is furnished with a cork, through which passes a small tube, also corked, down which is dropped a splinter of glowing charcoal to inflame the sulphur. The latter is placed in a little dish of baked clay, supported by a thin platinum wire.

(3) is the apparatus employed for reactions which do not take place at the ordinary temperature of the air, but require a heat of nearly 100° C. It consists of three concentric thin test tubes; two long, and of nearly the same diameter, and the third shorter and broader. The solution to be heated is placed between the two long tubes, and this space is closed at the top, but communicates with a tube, which is coiled spirally, and passes out at the top of the calorimeter. These tubes are fitted by a stopper into the outer tube, which is empty. Heat is imparted by pouring a definite amount of water at a definite temperature into the innermost tube. This water is heated in the apparatus (shown in 3*a*) by steam; about 25 grams of water only are used in a calorimeter containing 800 grams of water, to prevent a rise of temperature of more than 2° C.

Let it be required to determine the heat produced by the decomposition of ammonium nitrite ($AmNO_2$) into N and water. (This decomposition does not take place rapidly under a temperature of 80° C.) Twenty-five grams of water are heated to about 85° C. in 3*a*, and let run into the inmost tube, which is then closed. The space between the tubes only contains water, as this is a preliminary blank experiment. After ten minutes, a thin pointed steel wire is introduced, and a hole is made in the bottom of the three tubes. The air in the outermost tube is liberated by piercing the stopper; the water is thoroughly stirred, and its temperature noted.

The same process is then repeated with solution of ammonium nitrite between the two tubes instead of water. The nitrogen evolved escapes by the spiral tube, and is cooled before leaving the calorimeter.

The amount of nitrite decomposed is estimated either by measuring the nitrogen evolved, or by determining the amount of nitrite left in the tube by means of permanganate solution.

A special apparatus is used for the combination of two gases, such as oxygen and nitrogen binoxide, which combine spontaneously and without explosion. A small flask of known volume is filled with the one gas, sealed, and placed inside a larger flask. The volume not occupied by the small flask is then determined, and altered, if necessary, to some required multiple of the other. The large flask is then filled with the second gas, sealed up, and placed in the calorimeter, being held in position by a spiral wire. It is then shaken so as to break the small flask at a point that had been previously weakened, and the rise of temperature is noted.

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* Read at a meeting of the School of Pharmacy Students' Association, March 24, 1881.

† The data of this paper are taken from 'Essai de Méchanique Chimique fondée sur la Thermochimie,' par M. Berthelot. Paris, 1879.

(5) is an air thermometer, invented by M. Berthelot, for temperatures of over 300° C. It consists of a cylindrical bulb (4 c.c. capacity), furnished with a tube of length 1200 mm. and internal diameter ·2 mm., containing air; the other end is fitted with a capacious reservoir, and contains mercury. The special advantage of this thermometer is due to the large size of the bulb relatively to the content of the tube, the former being about one hundred and thirty times that of the latter; this result is that variations in the temperature and pressure of the external air exercise scarcely any influence on the reading.

We come now to the fundamental principles of thermo-chemistry or chemical mechanics, which I will give in the words of M. Berthelot. They are three:—

"(1). *Principle of Molecular Work.*—The quantity of heat liberated in any reaction whatever measures the sum of the chemical and mechanical work accomplished in that reaction.

"(2). *Principle of the Calorific Equivalence of Chemical Transformation*, or *Principle of the Initial State and the Final State.*—If a system of simple or compound bodies, taken in definite conditions, undergoes physical or chemical changes capable of bringing it into a new state, without giving rise to any mechanical effect exterior to the system, the quantity of heat liberated or absorbed as the effect of these changes depends simply on the initial and final states of the system, and is the same whatever may be the nature and the sequence of the intermediate states.

"(3). *Principle of Maximum Work.*—Every chemical change brought about without the intervention of an extraneous energy tends to the production of a body or a system of bodies which liberates the greatest heat."

As a deduction from which, "Every chemical reaction that can be effected without the assistance of preliminary work and apart from the intervention of an energy extraneous to that of the bodies present in the system, necessarily takes place, if it produces heat."

It may render the matter clearer to trace the analogy between these three principles and the familiar phenomena which occur in the case of falling bodies. When a body falls to the earth, the heat evolved by impact on the ground will bear some definite relation to the height from which it fell: and heights might be actually measured in this way, if there were not far readier methods available. Here we have the counterpart of the first principle just enunciated, which asserts that the heat evolved in any reaction measures the amount of work done, *i.e.*, the loss of chemical energy; but in this case the determination of the heat evolved is the only method of ascertaining this loss. Of course it is hardly necessary to say that the production of this heat in no way explains why the reaction takes place, any more than the heat emitted when a body strikes the earth explains the force of gravitation.

Again, whatever be the path taken by the falling body, the work done by its fall is always the same. It may fall perpendicularly, or down an inclined plane, or may describe a parabolic path in the air, but the work done is in every case measured by the perpendicular height of its fall. This is identical with our second principle, which asserts that the heat produced depends only upon the starting point and the result of any series of operations, whatever be the intermediate steps.

Finally, a body will always tend to fall as far as it can, and if it is free to fall it will fall. This is the counterpart of the third principle, the "Principle of Maximum Work," which states that the reaction which will evolve the greatest amount of heat always tends to occur.

I shall now endeavour to show the application of these principles, (1) to the determination of the heat equivalents of reactions; (2) to the prediction of various chemical transformations.

There are extremely few cases in which the chemical energy expended in the formation of a chemical compound can be determined by one direct operation and uncomplicated by any simultaneous physical action. Hydrochloric acid is an example. Here 1 vol. of H and 1 vol. of Cl combine to form 2 vols. of HCl; all three bodies are gaseous, and there is no condensation. The heat of combination is easily found to be 22 units. I will explain the meaning of this expression. The unit of heat here adopted is the amount of heat required to raise 1 litre of distilled water from 0° to 1° C.; 22 units then would raise 22 litres of water 1° C. This heat is generated by the combination of 1 gram of hydrogen with an equivalent weight, *i.e.*, 35·5 grams of chlorine. Again, the heat of formation of common salt is 97·3, *i.e.*, 1 equivalent or 23 grams of sodium in uniting with 35·5 of chlorine evolves heat sufficient to raise the temperature of 97·3 litres of water 1° C. Generally, however, some indirect method must be adopted and the second principle is applied. This principle admits of very simple experimental verification, *e.g.*, charcoal burnt in excess of oxygen to form CO_2 gives +47 units: when it forms CO it evolves only +12·9: but CO combines with oxygen and liberates 34·1: but 12·9 + 34·1 = 47: or the total heat is the same whether CO_2 is formed by two operations or one. Take a simple case:—The heat of $SO_3 + BaO = BaSO_4$. The mutual action of two solids is very irregular, and the heat evolved cannot be therefore directly measured with accuracy. The method of procedure is this:—Combine SO_3 with water, combine BaO with water, and mix the two solutions; we have as a result merely $BaSO_4$ and water; but

$$SO_3 + H_2O = \text{sol. } H_2SO_4 \ : \ +18{\cdot}7$$
$$BaO + H_2O = \text{sol. } BaHo_2 \ : \ +13{\cdot}9$$
$$BaHo_2 + H_2SO_4 = BaSO_4 + 2H_2O \ : \ +18.4$$
$$\overline{51{\cdot}}$$

∴ $BaO + SO_3$ in combining evolve 51 units.

In other cases use is made of the difference of heats, *e.g.*, to determine the heat evolved by the solution of CO_2 in water, a solution of KHo and a solution of CO_2 (each of definite strength) are mixed: heat evolved $= a$.

Then a similar solution of KHo is mixed with water and a vol of CO_2 added, so that the resulting solution of K_2CO_3 is of a like strength to that obtained in the previous case; heat evolved $= b$: then $b - a$ gives the heat of solution of $CO_2 = 2{\cdot}8$ units.

I will now bring before you a complicated determination, which I hope to be able to make clear, viz., the heat of formation of hydrocyanic acid from its elements. As you are aware, hydrocyanic acid treated with concentrated hydrochloric acid produces formic acid and ammonium chloride.

$$HCN + HCl + 2H_2O = H_2CO_2 + NH_4Cl \ : \ +11{\cdot}15$$

From the starting point of

$$C + H_5 + N + O_2 + HCl \text{ sol.} + \text{water}$$

to the final stable condition

$$CO_2 + H_2O + NH_3 . HCl \text{ sol.} + \text{water},$$

there are two paths; the one by direct oxidation of the carbon and hydrogen, and the union of hydrogen and nitrogen to form ammonia, which combines with the hydrochloric acid; the other by the union of carbon, hydrogen, and nitrogen to form hydrocyanic acid, the decomposition of the last into formic acid, and the combustion of[*] the formic acid into CO_2 and H_2O;—each should give the same quantity of heat.

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[*] $H_2CO_2 + O = H_2O + CO_2$

(1)

$$C+O_2=94·$$
$$H_2O=69·$$
$$\text{N and } H_2 \text{ and Ag}=35·15$$
$$NH_3+HCl=12·4$$
$$\overline{\quad 210·55 \quad}$$

(2)

$$HCy=x$$
$$2H_2O=138·$$
$$\text{HCy into Formic A.}=11·15$$
$$\text{Combust. of Formic A.}=69·8$$
$$\overline{\quad x+218·95 \quad}$$
$$x=-8·4$$

i.e., 8·4 units are absorbed in the synthesis of HCy.

The method of substitution can often be used with advantage, *e.g.*, to determine the heat of HBr and HI: chlorine liberates Br and I from these compounds, forming hydrochloric acid.

$$Cl+HBr=HCl+Br\ (\text{liquid})=+12·5$$
$$\text{but } HCl=22.\ \therefore HBr=22-12·5=9·5$$
$$Cl+HI=HCl+I\ (\text{solid})=+28·2$$
$$\therefore HI=22-28·2=-6·2$$

∴ 9·5 units are *evolved* in the formation of HBr; while 6·2 units are *absorbed* in the formation of HI.

Enough has now been said to show generally the methods adopted in heat determinations, and I now proceed to show the use that can be made of these results, in accordance with our third principle, which asserts that such reactions as evolve the most heat always tend to take place.

The first happy investigation of the physical conditions which determine chemical reactions was made by Berthollet, who, in 1807, in his 'Statique Chimique,' propounded the theory, founded upon numerous observations, that chemical reaction is determined by the insolubility or volatility of the products. A more extended investigation shows that while this theory is corroborated in numerous cases, there are others, and not a few, which the theory cannot explain, if it be not entirely contradicted by them; such are the decomposition of insoluble phosphates by strong acids, the decomposition of alkaline cyanides by oxide of mercury, and the decomposition of sulphates by hydrochloric acid, etc. In fact, the theory may be said to hold good as long only as the conditions of the principle just mentioned, viz., the principle of maximum work, are satisfied.

The application of this principle to a few simple and well know reactions I will now notice.

Nitric oxide combines immediately with oxygen, forming the teroxide or the tetroxide, according to the proportions present; *i.e.*,

$$2NO+O=N_2O_3 : +20 : 2NO+O_2=2NO_2 : +34.$$

The latter reaction disengages more heat and, therefore, will take place when there is sufficient oxygen present. A comparison between the heats of formation of the several oxides of nitrogen is instructive.

It will be seen that all these numbers are negative, *i.e.*, heat is absorbed in each case; the oxides, therefore, do not admit of direct synthesis from their elements; the heat, too, of nitrous oxide is less negative than that of the others; it is, therefore, the most stable and is not attacked by oxygen.

$$\tfrac{1}{2}N_2O=-\ 9$$
$$NO=-43·3$$
$$\tfrac{1}{2}N_2O_3=-32·8$$
$$NO_2=-24·3$$
$$\tfrac{1}{2}N_2O_5=-22·3$$
$$HNO_3=+12·3$$

The difference between the fourth and fifth members of the group is small, and this explains the fact that the pentoxide does not admit of direct production from the tetroxide; the latter, however, is easily converted into nitric acid in the presence of water, as the numbers indicate. These oxides of nitrogen are all familiar bodies; upon what principles can we then explain their formation? The first two can be produced by heating ammonium nitrate, the formation of which evolves 75 units; when it is heated it decomposes in various manners.

$$NH_3.NO_3=N_2O+2\ H_2O : 118-18-75=25$$
$$=N_2+O+2\ H_2O : 118-75=43$$
$$=N_1+NO+2\ H_2O : 118-75-43=0$$

In each decomposition, except the last, heat is evolved, they are, therefore, all possible; the heat required for the formation of the oxides being supplied by that evolved by the production of water.

The formation of water develops much heat; oxygen and hydrogen will not, however, combine spontaneously; some preliminary work has to be done upon them, by heat, etc., which is perhaps spent in resolving the molecules into their constituent atoms. The amount of heat = 29·1 for water in the gaseous state, 34·5 in the liquid state, 35·2 in the solid state, the difference being due to the latent heat of steam and water respectively. The production of hydrogen peroxide evolves only + 23·3 units, and therefore this body is never formed when hydrogen burns in excess of oxygen; to produce it oxygen is made to combine with $BaO=+5·9$ and BaO_2 is then decomposed by HCl giving + 11. The energy required is thus supplied indirectly.

It is interesting to note the part played by the excess of energy contained in such bodies as hydrogen peroxide and others that absorb heat in their formation. This oxide is a powerful oxidizing agent, and its potency is often explained by saying that the oxygen liberated by its decomposition, being in the nascent state, has a greater tendency to enter into combination than when it is in its ordinary condition. Without denying the existence of this "nascent state," it may suffice to say that such an assumption, both in this and many other cases, is perfectly gratuitous. For instance, hydrogen dioxide decomposes into water and free oxygen with the production of 11·2 units of heat, or 44·8 units for each molecule of oxygen produced. This heat, if confined to the products of the decomposition, would raise them to a temperature of about 1000° C., and is therefore quite sufficient to explain the superiority of the body under consideration over free oxygen as an oxidizer. It is possible, however, to regard this amount as being the heat produced in the formation of a molecule of oxygen from its atoms, less the heat absorbed in the decomposition of the dioxide. The peculiar reactions of ozone can be, perhaps, best explained in the same way. $\left\{ \tfrac{1}{2} : 2O_3=3O_2 : +29·6 \right\}$ Again, it is known that hydrogen dioxide acts in a peculiar manner upon oxide of silver, the reaction being

$$Ag_2O+H_2O_2=H_2O+Ag_2+O_2 :$$

the decomposition has been explained upon the ground of the attraction of the atoms of oxygen for each other, which is thought sufficient to upset the unstable compounds in which they were existing. But if it is considered that the heat of Ag_2O is only + 3·5, while that of H_2O_2 is − 11·2, the reaction will be seen to evolve heat to the amount of $11·2-3·5=+7·7$; an amount quite sufficient to account for the result, apart from any atom attraction, though it is probable that the latter may occur.

A study of the compounds of the haloid elements and their relations to each other and to other bodies is very interesting from a calorimetric point of view. I will first call your attention to the following table, which gives the heat of formation of several compounds of hydrogen in different states:—

			Result a gas.	Result a dilute solution.
	$H+Cl$	$=HCl$	: +22	: +39·3
	$H+Br$ (gas)	$=HBr$	: +13·5	: +33·5
	$H+Br$ (liquid)	$=HBr$	: + 9·5	: +29·5
	$H+I$ (gas)	$=HI$	: − ·8	: +18·6
	$H+I$ (solid)	$=HI$	− 6·2	: +13·2
½	H_2+S (gas)	$=H_2S$	: + 3·6	: + 5·9
	H_2+S (solid)	$=H_2S$	: + 2·3	: + 4·6
½	H_2+O	$=H_2O$	: +29·5	: +34·5

(*To be continued.*)

The Pharmaceutical Journal.

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SATURDAY, APRIL 23, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE DEATH OF MR. MACKAY.

The death of Mr. Mackay, following so unexpectedly the withdrawal of Mr. Sandford and Mr. Hills from the Council of the Pharmaceutical Society, makes a serious addition to the loss that the Society's Executive has to sustain, and when considered in connection with the small number of nominees for election who have consented to become candidates for a seat upon the Council, it affords no little reason for anxiety as to the future of the body by which the interests of the trade are to be provided for. The work to be done by members of Council is now so considerable that it requires a very large sacrifice of time and attention to perform the various duties appertaining to them. At the same time, the exigencies of business are such as to debar many men from undertaking those duties without neglect of their own affairs, and hence the number of possibly eligible pharmacists is limited within a very narrow compass.

This fact alone ought to be regarded as a reason for grateful estimation of the services rendered to the trade generally by those who have the opportunity to take part in the conduct of the Society's business, as well as the interest in its welfare to induce them to give their time to the work. Of the services rendered by the two members of Council who are about to retire it is not our intention to speak, since they are sufficiently familar to all readers of this Journal to render any such attempt unnecessary and since as a matter of complimentary recognition on their retirement from office they will be dealt with by the Council itself at its next meeting. But in the case of the member whom the Council has just lost by death, it may not be out of place to recall the fact that he had served upon the Council for no less than twenty years, a constant attendant at its meetings and at committees, notwithstanding the distance of his residence from London, and always an active as well as useful participator in the business to be done.

The services of Mr. Mackay in connection with the establishment of a Branch of the Society in Scotland and on the Board of Examiners there will be remembered as having been productive of great benefit. His loss at an age when there was still every probability of long continued activity will be felt especially by the Scotch Branch of the Society, and it will be no disrespect to those who have worked with him in carrying on its business to say that they will find a difficulty in filling his place.

During the last forty years Mr. Mackay has acted as Honorary Secretary of the North British Branch, after having been largely instrumental in securing the co-operation of Scotch pharmacists with Jacob Bell in the formation of the Society. Throughout that period he has been untiring in his exertions to promote the efficiency of the Museum and Library of the Branch and to keep up the interest of the Evening Meetings.

As regards the general affairs of the Pharmaceutical Society, also, there is reason to bear Mr. Mackay's services in grateful remembrance on account of the active part he took in connection with the Society's Journal and in the improved organization of its finances. So likewise in the alteration of the footing on which the School of Pharmacy stood to the Society, Mr. Mackay's activity was prominently exercised.

THE INTERNATIONAL PHARMACEUTICAL CONGRESS.

The Executive Committee entrusted with the duty of making suitable arrangements for the International Pharmaceutical Congress has good reason for anticipating that the action it has taken in inviting the co-operation of provincial associations will be attended with success, since, in response to its request, Mr. Richard Reynolds, the President of the Pharmaceutical Conference, and Mr. Thomas Barclay, the President of the Chemists and Druggists' Trade Association, have allowed their names to be added to the Committee and have signified their desire to assist in carrying out the work, as well as their willingness to take part in the proceedings of the Congress.

By the time this number of the Journal is circulated the Presidents of provincial associations throughout the country will have received a circular setting forth, as far as can be done at present, the contemplated programme and asking them to cooperate with the Executive Committee in such manner as they may consider most conducive to the interests of pharmacy. We venture to express the hope that this solicitation will be cordially responded to, and that contributions to the subjects of discussion will be furnished in time to admit of their being adequately dealt with when the reports are drawn up by which the several subjects are to be introduced for discussion.

It is scarcely necessary to point out that at a meeting like the International Congress, where pharmacists of several nations may be expected to be present, the difficulty of intercommunication of opinions, due to want of familiarity with the English language, must be provided for in a special manner, and it is only by previously collating the views of those who desire to take part in those discussions that the several subjects can be put before the Congress in a useful way. It is with this object that intending visitors to the Congress have been requested to send in to the Executive Committee a statement of the views they entertain on the subjects to be brought forward. In the discussion of those subjects at the Congress, opportunity will be given for speakers to address the Congress in their own language, and reporters will be provided who can at once translate the leading parts of their addresses for the general convenience of those to whom the language used by the speakers may not be intelligible.

We may mention that the Executive Committee has received a suggestion that "the relation of pharmacists to the public and to the medical profession" would form a suitable subject for discussion, and closely related to this is another recommendation, decided upon by the Pharmaceutical Society of Austria, of the question, "How far may the pharmacist go in supplying medicines to the public independently of professional direction without trenching upon the province of the physician?"

These two suggestions open up a wide field for comment from various points of view, and under existing conditions the discussion they may give rise to would not fail to be of interest and utility.

The subject of a Universal Pharmacopœia has been so much a standing topic of discussion by the International Congress at previous meetings that it cannot well be left out of the programme on the present occasion; but it is proposed to limit the discussion of that subject to the inquiry as to what means can be adopted for equalizing the strength of official preparations containing potent drugs and common to the Pharmacopœias of most countries. This is a strictly practical question, and one that is deserving of very careful consideration, as being for the present one of the most feasible steps towards the establishment of a Universal Pharmacopœia. If a sufficiently strong case can be made out, and there be a general agreement among pharmacists as to the desirability of making the preparations referred to of uniform strength, the conclusions arrived at by the International Congress may furnish a basis for representations from pharmaceutical societies in different countries to the authorities who have the power to make the required alterations in the respective Pharmacopœias, and in this way the desired object might probably be effectually achieved.

The other subjects mentioned in the circular issued by the Executive Committee, viz., Pharmaceutical Education and the Revision of Pharmacopœias, are both of especial interest just now to British pharmacists. There is but too much need for introducing improvement in the conditions under which youths are prepared for a pharmaceutical career and in this respect we may learn much from our foreign visitors. As regards the part to be taken by pharmacists in Pharmacopœia revision, again, there is every reason to expect that when this subject is discussed by the Congress, and the practice of other countries is made known, it will become apparent that our own procedure is no less anomalous than insufficient for securing the most satisfactory results.

In each of these bearings therefore we believe the meeting of the International Congress in London would be beneficial to British pharmacy, and though we are far from wishing to insist especially upon this mere utilitarian view in recommending it to the support of our readers, we may at least urge that as one reason for giving it their support.

THE CANADIAN PHARMACY ACTS.

A case recently decided in the Appeal Court of the Dominion of Canada appears to indicate that the multiplication of Pharmacy Acts in different parts of the world will tend to restrain any undue propensity for roaming that may manifest itself in pharmacists. According to the *Canadian Pharmaceutical Journal* a Mr. Bennett, of Brantford, was in 1879 registered under the Ontario Pharmacy Act. Shortly afterwards he shifted his quarters into the province of Quebec and commenced business as a chemist and druggist in Montreal. Thereupon he was summoned by the Quebec Pharmaceutical Society for illegally using the title of "chemist and druggist" and fined five dollars and costs. As he still continued in business he was again summoned and again fined. He then appealed to a superior Court, but failed to establish his point that the registration under the Ontario Act gave him any right to practise pharmacy in Quebec. Mr. Bennett next sought for an injunction to restrain the Pharmaceutical Society of Quebec from further prosecution, on the ground that the Quebec Pharmacy Act was unconstitutional and was *ultra vires* of the local legislature, it being an interference with trade and commerce which were regulated exclusively by the Dominion Legislature. The petition was dismissed; but with great pertinacity Mr. Bennett again appealed, only to be once more beaten. The attempt to upset the Quebec Act was therefore unsuccessful from first to last, and Mr. Bennett, if he still wishes to practise pharmacy in his new home, will have to satisfy the requirements of the local board of examiners.

The subject, however, has a wider interest, and now that pharmaceutical legislation is being sought and attained in so many of our colonies it is at least worthy of consideration under what conditions, if any, the certificates of the examining boards in the different colonies might become interchangeable.

THE EXHIBITION OF CHEMICAL AND PHARMACEUTICAL APPARATUS, ETC.

We think it desirable to remind persons intending to contribute to the exhibition in connection with the forthcoming Annual Meeting, but who have not yet intimated their desire to the Committee, that applications for space must be made before the 1st of May. Such applications must be accompanied by a detailed description of the articles it is proposed to exhibit, forms for which may be obtained upon application to the "Exhibition Committee," 17, Bloomsbury Square.

Transactions of the Pharmaceutical Society.

PRELIMINARY EXAMINATION.

At a meeting of the Board of Examiners for England and Wales, held on Thursday, April 21, 1881, the report of the College of Preceptors on the examinations held on April 5, was received.

Three hundred and thirty-four candidates had presented themselves for examination, of whom *one hundred and eighty-four* had failed. The following *one hundred and fifty* passed, and the Registrar was authorized to place their names upon the Register of Apprentices or Students:—

(Arranged alphabetically).

Armstrong, John Alfred	Lincoln.
Ashton, George	Buxton.
Austin, William Hoskin	Devonport.
Bainbridge, John	Kirkby Stephen.
Barker, Robert Henry	Ambleside.
Barnes, Albert George	Bath.
Barnes, William Robert	Plaistow.
Barrett, John Richard	Devonport.
Baxter, George Munnerby	Chester.
Beckwith, Arthur Fredrick	Colchester.
Bell, Richard Henry	Hanley.
Berry, James Henry	Bradford.
Bignall, Rowland	Dartford.
Bloomer, Joseph	Cradley Heath.
Bond, Arthur Stuart	Bristol.
Brinsford, James Arthur	Birmingham.
Bulmer, Bethel	Pickering.
Burgess, Arthur Henry	Alderley Edge.
Carhart, Harry Manaton	Portishead.
Clark, Henry	Barton-on-Humber.
Coates, Arthur	Belper.
Coleman, Charles Goodwin	Shipston-on-Stour.
Colman, Alfred Ernest	Newport, I. of Wight.
Corden, Louis Nicholas	Brentwood.
Cowper, Joseph	Penrith.
Cox, Henry Stancer	Bedford.
Cross, Arthur Richard	Shrewsbury.
Cumber, Charles Davis	Guernsey.
Curtis, Wallace Edward	Hatch Beauchamp.
Cussons, Martin Chapman	Appleby.
Davies, Frederic Andrew	March.
Davies, Gwilym Clement	Aberdare.
Davies, Llewelyn Henry	Llanidloes.
Day, Henry William	Margate.
Dewing, Charles	New Malton.
Dunn, Spencer S.	London.
Elsdon, Herbert William	Wells, Norfolk.
Evans, Daniel	Rhos.
Farren, William James	London.
Felthouse, Charles	Tamworth.
Fox, Arthur Edward	Falmouth.
Foxon, Alfred James	Boston Spa.
Frost, Wilfred Elliot	Derby.
Galashan, George Alexander	Belfast.
Garvie, William Alexander	Leith.
Girdlestone, Arthur Edward	Grantham.
Gowans, William	Brechin.
Gregory, Matthew Joseph	Worksop.
Grieve, William	Crieff.
Griffiths, Richard Lloyd	Llanidloes.
Hallilay, Frank	Leeds.
Hampshire, Frank Reginald	Wakefield.
Hamlin, Charles Booth	Crediton.
Hargreaves, Fredk. Bentley	Chorley.
Harris, Joseph Bastable	Totnes.
Harvey, Joseph Charles	Halesworth.
Hatfield, George William	London.
Hickmott, Albert Ernest	London.
Hill, Arthur Croft	London.
Hill, Frederick William	York.
Hindel, William Henry	Darwen.
Hine, Alfred Ernest	Beaminster.
Hine, Richard	Beaminster.
Hogg, John Alexander	Edinburgh.
Hollis, Henry	Birmingham.
Holmes, George Hirst	Sheffield.
Holmes, Thomas Mason	Bowness-on-Windermere.
Hood, Charles	Brechin.
Hordley, Henry Clement	Stoke-on-Trent.
Hughes, Thomas Griffith	London.
Johnson, William	Stoke-on-Trent.
Judd, Henry	London.
Lamacraft, Charles A.	Putney.
Lauder, George	Kelso.
Lesiter, Frederick William	Richmond, Surrey.
Linnell, Percy Allison	Manchester.
Lister, William Benjamin	London.
Lobban, Alexander	Keith.
Lockwood, Johnson	York.
Loveday, William Dunmore	Irthlingborough.
Lyle, William	Rothesay.
McArdle, Francis James	Liverpool.
McEwan, Donald	Dunfermline.
Mackfie, William Sharp	Rothesay.
Mackay, David James	Edinburgh.
Mackenzie, Robert Young	Nairn.
Macmillan, James	Thornhill.
McMurray, Peter Buchannan	Paisley.
MacNaughton, George Wm. F.	Edinburgh.
Maxwell, Thomas Wellwood	Montrose.
Mellin, Joseph Richard P.	Wimbledon.
Menzies, James	Crieff.
Milligan, George	Manchester.
Morgan, Charles	Bristol.
Morrell, Arthur William	Derby.
Morriss, Herbert	Lynn.
Munro, John	Paisley.
Nichols, William Hartley	Leeds.
Norris, William	Pembroke.
Parker, Edward	York.
Parry, William Harrop	Llanrwst.
Paterson, Alexander	Portsoy.
Pearson, Frederic John	Doncaster.
Perkins, Samuel Augustus	Plymouth.
Philp, Richard Arthur	St. Austell.
Pipe, William Philip	Lynn.
Pirie, James	Keith.
Pitt, William Carey	Gloucester.
Porter, Sidney	Nailsea.
Preston, Thomas Issott	Leeds.
Pullan, Walter H. L.	Wakefield.
Redgate, Frederick Tibbits	Lincoln.
Reece, Charles Clement	Llandilo.
Reynolds, William Marshall	Torquay.
Ross, Alexander	Inverness.
Rundell, Charles Walter	Cardiff.
Rundell, William Carvosso	Blackburn.
Russell, James Richard	Bedale.
Sands, Robert C.	Edinburgh.
Sara, Herbert	Falmouth.
Schofield, Samuel Reuben	Abingdon.
Siggers, George William	Colchester.
Smale, Frederick Thomas	Plymouth.
Southwell, Charles Arkinstall	Chapel Ash.
Stanwix, Henry	Darlington.
Strawson, Fred	Leyton.
Thatcher, Robert	Mottram.
Thomas, Arthur	Narberth.
Thomas, Ernest Lloydwick	St. Dogmells.
Thomas, James Watkin	New Quay.
Thomason, Allan Elkington	Birmingham.
Tireman, John Thomas	Darlington.
Vawser, Arthur	March.

Walker, Alfred Ernest	Mansfield.
Walker, John Brown	North Vennel.
Watson, Edwin Joseph	Birmingham.
Watt, John Charles	Darlington.
Wheatley, Charles Henry	Ryde.
Wheeler, Joseph Kingston	Bristol.
Williamson, Robert Charters	Dunfermline.
Williamson, Theophilus R. W.	Cardiff.
Willocks, Robert Stuart	Brechin.
Willows, Herbert George	Doncaster.
Wilson, George Waite	Boston.
Woffindin, Thomas	Market Rasen.
Wokes, Thomas Siminson	Hull.
Woodhouse, William Henry	Stourbridge.
Woodson, George Leopold	Sheffield.
Worrall, John Edward	Epworth.
Wright, Charles Edward	Burton-on-Trent.

The following is a list of the centres at which the examination was held, showing the number of candidates examined at each centre and the result:—

	Candidates.				Candidates.		
	Examined.	Passed.	Failed.		Examined.	Passed.	Failed.
Aberdeen	9	4	5	Lancaster	7	2	5
Birmingham	17	9	8	Leeds	15	7	8
Brighton	2	0	2	Lincoln	7	5	2
Bristol	8	6	2	Liverpool	13	5	8
Cambridge	1	0	1	London	46	19	27
Canterbury	7	1	6	Manchester	19	8	11
Cardiff	8	3	5	Newcastle-on-T,	6	0	6
Carlisle	10	3	7	Northampton	1	1	0
Carmarthen	6	5	1	Norwich	5	4	1
Carnarvon	3	0	3	Nottingham	16	5	11
Cheltenham	1	1	0	Oxford	3	3	0
Darlington	7	4	3	Peterborough	4	2	2
Dundee	11	4	7	Sheffield	6	4	2
Edinburgh	22	9	13	Shrewsbury	10	4	6
Exeter	10	8	2	Southampton	7	2	5
Glasgow	21	8	13	Truro	6	4	2
Guernsey	2	1	1	Worcester	1	0	1
Hull	4	2	2	York	11	6	5
Inverness	4	2	2				

The questions for examination were as follows:—

Time allowed: Three hours for the three subjects.

I. LATIN.

1. Translate into English:—

A. Prima luce, quum summus mons a T. Labieno teneretur, ipse ab hostium castris non longius mille et quingentis passibus abesset, neque, ut postea ex captivis comperit, aut ipsius adventus, aut Labieni, cognitus esset: Considius, equo admisso, ad eum accurrit; dicit montem, quem a Labieno occupari voluerit, ab hostibus teneri: id se a Gallicis armis atque insignibus cognovisse.

B. (i.) Divitiacus multis cum lacrimis Cæsarem complexus obsecrare cœpit, nequid gravius in fratrem statueret. (ii.) Eâ disjectâ, gladiis destrictis, in eos impetum fecerunt. (iii.) Si populus Romanus alicujus injuriæ sibi conscius fuisset, non fuisset difficile cavere. (iv.) Consuescunt dii immortales interdum hominibus secundas res concedere.

2. Decline *luce, castris, insignibus*, and give the gender of each.

3. Account for the moods of *abesset, voluerit, teneri*, in the passage above (A).

4. Decline in all their cases, singular and plural, *bonus vir, nova res*; and give the perfects and supines of *moneo, rego*, and *audio*.

5. Translate into Latin;—(i.) The army crossed the river by boats and rafts. (ii.) Cæsar called together the hostages, and inquired of them which way the enemy had gone. (iii). It is the master's business to teach, the pupil's to learn. (iv.) Life is short, death is certain; live well, and you will die happy.

II. ARITHMETIC.

[The working of these examples, as well as the answers, must be written out in full.]

6. If a person's estate be worth £1384 16*s.* per annum, and the land tax is 2*s.* 9½*d.* in the pound, what is his net income?

7. Divide 2 by the sum of 2¾, ⅓, and 4; add 1⅔—⅜ to the quotient; multiply the result by the difference of 5¼ and 4⅓.

8. Reduce $\cdot 004\dot{4}\dot{9}$ to a vulgar fraction; and find the value of 3·225 of 2½ guineas.

9. The boards for flooring a rectangular passage, whose length is 25·72 metres, and breadth 6·1 metres, cost 24·4 francs; it costs to floor a room 15·25 metres long, with the same quality of boards, 217·26 francs; find the width of the room.

III. ENGLISH.

10. Define *conjunctions*, and classify them, giving examples.

11. Write a simple sentence, and add to it *adjectival* and *adverbial* clauses.

12. Give the origin and meaning of the following prefixes:—*con, de, sub, un, in*. Illustrate your answer by examples.

13. Parse the words in italics:—

> "Virtue *may be assailed, but* never *hurt*,
> *Surprised by* unjust force, but not inthralled."

*14. Write a short composition on *one* of the following subjects:—

The conditions of Success in Life.

Are Drilling and Gymnastics desirable for young growing boys?

or,

Any town or country with which you are familiar.

NORTH BRITISH BRANCH.

ANNUAL MEETING.

The annual meeting of the North British Branch of the Society took place in the Society's rooms, 119A, George Street, Edinburgh, on Tuesday, April 19, Mr. J. B. Stephenson, President of the Branch, in the chair.

The President read the annual report which, on the motion of Mr. Kinninmont, supported by Mr. Kerr, was unanimously approved of.

ANNUAL REPORT, 1880–1.

The Council has again to lay before the North British Branch of the Pharmaceutical Society its report for the past year.

The operations of the Branch in furtherance of the objects for which it was established continue to be carried out steadily and successfully in all their departments.

The museum and library are constantly receiving accessions in the form of unique and valuable contributions from friends and well-wishers of the Society, and the Council has pleasure in announcing that its experience in this respect during the past year has not been less gratifying than in preceding years. These contributions are announced as they occur, at the monthly scientific meetings, and are recorded in the Journal.

The facilities afforded for study in this department, appear still to be duly appreciated by students, the number visiting the rooms having been 1011 during the day and 768 during the evening, being 11,930 in all since this system has been in operation. The Honorary Secretary has also issued special tickets as usual for the lasses of those Lecturers on chemistry and materia nedica who grant this advantage to students connected rith the Society, and your Council has the gratification f stating that the medals in both of these this session have een carried off by members of the Society.

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* This *must* be taken by all candidates.

There have been six scientific meetings during the eason. The attendance on all occasions has been quite atisfactory, and the communications interesting and nstructive. These are printed and appear in the Journal. 'he Council desires to record its acknowledgment of he kindness of all the gentlemen who favoured it with heir valuable contributions.

The Board of Examiners has met at the usual ntervals during the past year, in all upon ten days, and he numbers of candidates presenting themselves were leven for the Major, of whom seven were found duly ualified; one hundred and five for the Minor, of whom ixty-three passed; and four for the Modified, only one whom was successful. Putting aside the Major and Modified numbers as too small to afford a reliable basis f percentage, the rate of rejections has been 40 per cent., little lower than it was last year. The number of candidates is somewhat less this year, but it had been unusually high in the preceding year. For the Preliminary xamination in Edinburgh there have been seventy-nine andidates, of whom forty-seven were rejected. The umber is considerably greater than last year, and the ercentage of rejections is practically the same, being onsiderably over 50 per cent.

Since last report, a deputation from the London Board as visited Edinburgh for the purpose of being present luring one of the examinations here. The interchange f opinions and sentiment was, it is believed, as satisfactory to the members of both Boards on this, as on ormer occasions. The Council in London contemplates continuance of this interchange, and has invited a leputation from the Scotch Board to be present at the une examinations in Bloomsbury Square. It seems ıow to be admitted that this system is an efficient means f maintaining that similarity in the conduct of both the Major and Minor examinations by the two Boards, which s so desirable.

Within these few months a Pharmacy Law Amendnent Act has been drafted and approved by the Council n London. While it was before that body, the Council ıere deemed it its duty to meet for the purpose of considering it. After a prolonged discussion, it was agreed hat opposition should be taken against the first and ifth clauses of the Bill (as it then stood). The former f these clauses proposed to take powers to appoint xaminers other than "in Scotland" to the Scottish Board. A resolution against the clause was carried nanimously, and upon being represented to the London Council, both by minute and by Scottish members of Council, the clause was withdrawn. The opposition to the fifth clause, however, was not so successful, and it has been allowed to stand part of the Bill. The object of this clause is to restrict to three years the time during which the business of a deceased chemist can be carried on for behoof of a widow, which had been left indefinite in the Act of 1868. It is unnecessary to enter here on the considerations which led to the resolutions against both these clauses, especially as they have already been put on record. Suffice it to say that with regard to the first, the distinctively Scottish character of our examining Board had been embodied in the statute, thirty years ago, doubtless for sufficient reasons, and that there seemed no good reason for disturbing it now, and with regard to the other clause it was thought that the reason alleged for altering the provision of the Act of 1868 seemed equally valid against the term of three years; and that the provision itself would be endangered by aising the question at all. In its other enactments the Bill seems eminently desirable. It has not yet been resented to Parliament, and your Council cannot help earing that the present session of Parliament, judging from appearances hitherto, is too busy a one to afford much hope of it being passed. Your Council has also to remark that at a general meeting of the trade in Edinburgh, which was held to consider the Bill, and which was numerously attended, substantially the same attitude as your Council assumed was taken up with reference to it.

We have to lament the death during the year of two of the oldest members of the Society in Edinburgh—Mr. Aitken and Mr. Baildon, both of them ex-Presidents and former members of the Examining Board. In the last year's report the Council had to express its regret that Mr. Baildon had declined, on account of his advancing years, to allow himself to be nominated for the election as member of Council, and to express a hope that he might still be long spared to aid it with his counsel and sympathy. This hope has unhappily not been realized, and the notice of his death, which appeared at the time in the Journal, showed the estimation in which he was held, and the loss which the Society has sustained by his removal.

Postscript.—It is with feelings of the most profound distress that the Council has to record the death of its invaluable Honorary Secretary, Mr. Mackay, which took place this morning at 3 o'clock.

At this moment of overwhelming sorrow, it can do no more than express the deepest sympathy with his bereaved family, and the sense of its own irreparable loss.

The President then submitted the result of the voting for the Council for 1881-2, when it was found that the following gentlemen had been elected:—

Mr. William Ainslie	Edinburgh.
Mr. D. Frazer	Glasgow.
Mr. William Gilmour	Edinburgh.
Mr. D. Kemp	Portobello.
Mr. A. Kinninmont	Glasgow.
Mr. G. H. Laird	Edinburgh.
Mr. R. McAdam	Glasgow.
Mr. G. D. Mackay	Edinburgh.
Mr. J. Mackenzie	Edinburgh.
Mr. A. Napier	Edinburgh.
Mr. J. Nesbit	Portobello.
Mr. A. Seath	Dunfermline.
Mr. J. B. Stephenson	Edinburgh.
Mr. D. Storrar	Kirkcaldy.
Mr. J. R. Young	Edinburgh.

The President here remarked in connection with the election of the new Council that 210 billets had been sent out, and owing to Mr. Mackenzie's name having been omitted, in consequence of the miscarriage of his acceptance, other 210 billets were issued. The total number returned was 118, 10 of which were duplicates, and 4 informal, leaving 104 to be tabulated. All the documents in connection with the voting were submitted to the meeting.

Mr. Gilmour moved and Mr. Blanshard seconded a hearty vote of thanks to the President for his conduct in the chair, and the President acknowledged the compliment, expressing his thanks for the support and indulgence which he had received.

MEETING OF THE NEW COUNCIL.

The Council met immediately after the annual meeting, and on the motion of Mr. Young, who paid a hearty tribute to Mr. Stephenson's ability in the chair on previous occasions, and a similar compliment being accorded to him by Mr. Frazer, he took the chair.

Mr. Nesbit also thanked the meeting on being elected Vice-President.

The Committee for visiting purposes was the same except with the addition of Messrs. Laird and Nesbit.

The Auditors of last year were again appointed.

The appointment of Honorary Secretary was left over.

Provincial Transactions.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

The annual business meeting was held on Thursday, April 7, in the rooms of the North British Branch, Mr. J. D. Robertson, President, in the chair.

The minutes of last meeting having been read and confirmed, the financial statement was read by the Treasurer. It showed an income of £7 15*s.* and a balance from last session of £4 4*s.* 4*d.*, making in all £11 19*s.* 4*d.* The expenditure amounted to £3 9*s.* 4*d.*, leaving a balance in the hands of the Treasurer of £8 10*s.*

The Secretary then read the annual report:—

The Committee had much pleasure in congratulating the Association on the highly satisfactory balance-sheet which the Treasurer had been able to present. The membership was 48 this year as compared with 46 last session, but it was thought it might still be largely increased. The attendance at the meetings during the session had kept well up to the average, notwithstanding the fact that two of the meetings were held during two of the most severe snowstorms of last winter. The Committee had also been able to carry out the printed syllabus in its entirety and the papers had again been all contributed by members of the Association. It very much regretted to have to state that no apprentices had competed for the prize offered this session, but as this appeared to be due partly to some misunderstanding it was recommended that it be offered again next session, in the hope of seeing a more satisfactory response to the offer. It recommended the members generally to make a diligent effort to increase the membership and thus the usefulness of the Association.

The financial statement and annual report having been read and adopted, the Secretary stated that the regret which was felt in connection with the apprentices' prize was somewhat relieved by the fact that the silver medal in connection with Dr. Stevenson Macadam's chemistry classes had been won this year by Mr. George Coull, an apprentice-member of the Association.

The Association then proceeded to appoint office-bearers for next session, when the following were elected: President, Mr. William Aitken; Vice-President, Mr. P. Boa; Secretary, Mr. J. R. Hill; Treasurer, Mr. C. F. Henry; and as members of Committee, Messrs. Adamson, Coull, Forret, Fraser, Hutton, McDonald, McPherson, Simpson and Wood.

A hearty vote of thanks was passed to the Council of the North British Branch fo its kindness in granting the use of the rooms, and it was resolved, as formerly, to give a donation of £1 1*s.* to the Benevolent Fund in return for this privilege.

Some further business having been completed, the meeting was closed with a cordial vote of thanks to the office-bearers and Committee for the session just ended.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held in the Church Institute, on Monday evening, April 4, Mr. Bambridge, President, in the Chair.

After the minutes for the meetings during the preceding month had been read and accepted, the President called upon Mr. Blanche, dentist, to deliver his lecture on the "Teeth."

Mr. Blanche, in commencing, begged to apologize for introducing such a subject to a society composed almost exclusively of members of the pharmaceutical profession, as, in large towns and cities, the practice of extracting teeth and prescribing for the diseases to which these organs are liable had gone into its proper channel, that is to the dentist, although still in country districts it was necessary that the pharmacist should have some knowledge of the various branches of dental surgery, so that, in a case of emergency, he might be fully prepared to relieve the patient, or to recognize any disease of the teeth requiring the skill and knowledge of the dental surgeon. The lecturer first spoke of the genesis, development and eruption of the teeth, showing that they were not, as popularly supposed, bones, but dermal appendages, formed originally from the softest tissue in the body. He then pointed out that the teeth are divided into incisors, canines, bicuspids and molars; that the tooth itself is composed of enamel, dentine, pulp, cementum and periosteum; that the enamel is only acted upon by mechanical violence or chemical agency; that dentine is highly sensitive; that cementum is nearly true bone, containing approximately 32 per cent. of animal matter, and that the pulp is soft, vascular, nervous, and covered by cellular membrane. Mr. Blanche next enumerated the diseases to which the various parts of the tooth are subject; of the enamel, none, or very few after their development, and admitting of no treatment; of the dentine "caries," a softening of the bony substance caused by animalcules; of the cementum, many, the principal one being "exostosis" caused by over-nutrition of the part; and of the pulp there are many diseases, the most common being inflammation of the pulp, caused by caries eating away the dentine and thus exposing the nerve. There is another disease of the pulp termed "polypus," which, although it may be cut away over and over again, admits of no permanent cure. The lecturer said that a very large number of infants die annually during dentition through omitting to call in the dentist, who, by his skill and attention, might often alleviate the sufferings, if not preserve the lives, of the little ones. The different methods of teeth-extraction formed the concluding part of the lecture, Mr. Blanche comparing the old and new methods, pointing out the error under which many people labour that taking out a tooth is an operation requiring no skill, and showing the dangers arising from unskilful persons extracting teeth.

At the conclusion of the lecture Mr. Boyd moved a vote of thanks to Mr. Blanche for his very interesting address, observing that many of the statements of Mr. Blanche he had himself verified by actual experience. Mr. Harrison seconded the motion, which was unanimously accepted.

THE REGISTERED CHEMISTS' TRADE ASSOCIATION OF LIVERPOOL.

The sixth annual reunion of this Association was held on the 5th inst. To meet the convenience of members it was thought desirable this year to have a supper instead of the usual dinner, with the result that a larger attendance was secured. The President, Mr. A. Redford, occupied the chair, and Mr. Symes, Ph.D., Vice-President, was croupier.

After the loyal toasts had been disposed of, the President gave the toast of the evening, "The Registered Chemists' Trade Association of Liverpool." Commending those present for courage and social instinct, he said, such friendly gatherings as these were likely to draw them closer together and to result in substantial gain to their humanity. Glancing at the work of the Association, its continued usefulness, and the fact that it was always a rallying point when danger threatened, he dwelt particularly upon the "Price List," now in its fourth edition which the Committee had spared no pains in the endeavour to keep revised to date and which was a monument of union in Liverpool, and had a large sale. The tariff of prices he considered fair and equitable, while on the other hand he expressed strong disapproval of the dishonourable and delusive device of under-selling. He thought the calm area of a chemist's life should be free from such disturbing influences and that the pleas urged for cutting down prices would not justify such a course to the conscience, the descent being ever in a sliding-scale deepening in degradation as the grave was reached. As brethren their interests in the long run were one, and a course of selfishness and envy would inevitably bring about ruinous consequences. He deprecated any feeling like panic or apprehensions of the future being encouraged, for in such states of mind, too often the voices of reason and conscience were unheard. If possible they needed to keep clear of delusions, even about "patent medicines," and to try rather by a reform in economics, by improved methods, intelligent enterprise and similar unexceptional arts to make their business pay them honourably, and they might still hold their own amongst the institutions of the country. He rejoiced to see around him many who had often sacrificed self when the general good was at stake, and hoped Liverpool would never lack such men to carry on the work of the Association. Coupling the toast with the name of Mr. J. Hocken, Honorary Secretary, who briefly responded, he referred to the loss the Association had sustained during the year by the death of two of its founders, Mr. J. Abraham and Mr. J. Fletcher.

The toast "The Pharmaceutical Society" and "The Chemists and Druggists' Trade Association of Great Britain" was then given in favourable terms by Mr. B. Dickins. In responding Mr. Symes, Ph.D., said, he scarcely felt entitled to the eulogistic remarks which had fallen from the last speaker. For some years past his interests had been identified with those of both the profession and trade of pharmacy, and if whilst following his vocation, he had been able to do ever so little to serve his day and generation, that was something to be grateful for. Had time permitted, it would have given him pleasure to have said more about the two societies with which his name had been associated. It would not have been difficult to show that the Pharmaceutical Society was sometimes blamed for turning a deaf ear to their requests or for neglecting their interests where no such neglect had existed. Some of the proceedings of the Society must be done in committee, but he ventured to say that much more was so done than there was any necessity to keep secret. Some years ago referring to the old proverb "Unity is strength," he pointed out the desirability of there being a better understanding existing between the Pharmaceutical Society and the Trade Association, at the same time promising to exert himself to bring about such a result; this he had never failed to do when opportunity presented itself, and others had been equally or more active in the field, and to-day these two great societies were working more in harmony than at any previous time of their existence. Having to leave in order to go to London to attend the meeting of the Council of the Pharmaceutical Society he would ask Mr. Woodcock, a worthy member of the Trade Association, to say a few words in completion of this hurried and imperfect speech.

Mr. Woodcock said he was proud of the honour he held of being one of the Committee of the Chemists' and Druggists' Trade Association of Great Britain and congratulated the chemists of the country that there was such a society established, ready at all times to take up in a practical way matters affecting the interests of the trade generally; he referred to the support given by local associations, and thought, that if similar societies to this were formed in other large towns, they would materially assist the larger society, and tend by greater unanimity to remove the cloud which at present seemed to overshadow the trade, and this he hopefully believed would be accomplished before long.

Mr. J. A. Turner then gave in facetious terms the toast of the "Liverpool Chemists' Association, and the Birkenhead Chemists' Association, and kindred Societies." In the absence of Mr. Symes, the President, Mr. Conroy, Honorary Secretary, responded on behalf of the Liverpool Association, and Mr. A. Stewart and Mr. J. Ball for the Birkenhead Society.

Mr. R. Parkinson, in complimentary terms, proposed the health of the President, Mr. A. Redford, which was drunk with musical honours. Mr. Redford, after responding, gave the health of the Vice-President, Mr. Symes, which was most cordially received and responded to on his behalf by Mr. Woodcock.

The pleasure of the evening was considerably enhanced by excellent songs, kindly given by Mr. J. Frederick Smith and Mr. A. H. Mason, F.C.S., and recitations by Mr. H. Jackson (Messrs. W. and H. Jackson) and Mr. Peat, who fairly deserved the thanks heartily given by the whole of the company.

The annual meeting was held on Thursday the 7th inst., when Mr. A. Redford was unanimously re-elected President. The former members of the Committee, Messrs. Redford, Hocken, Parry, Parkinson, Turner, Warhurst and Wright, were re-elected, and Mr. H. Wyatt in place of Mr. A. H. Blain who retired. The Treasurer's statement showed an improvement in the state of the funds; there being cash in hand amounting to £5 16*s*. 10*d*., besides a number of the fourth edition of the "Price List" issued during the current year.

The annual report was read, adopted, and ordered to be printed.

Parliamentary and Law Proceedings.

PROCEEDINGS UNDER THE PHARMACY ACT.

The case of the Pharmaceutical Society of Great Britain *v.* Piper, instituted in the Bloomsbury County Court, in which the plaintiffs sued the defendant for a £5 penalty incurred by his having kept open shop for the sale of poison, viz., having taken an order for and sold and delivered an article containing poison, has been terminated by the defendant paying into court the amount of penalty and costs.

The case of the Pharmaceutical Society of Great Britain *v.* Harrod, instituted in the Bloomsbury County Court, in which the plaintiffs sued the defendant for a £5 penalty incurred by his having kept open shop for the sale of poison, viz., having taken an order for and sold and delivered an article containing poison, has been terminated by the defendant paying into court the amount of penalty and costs.

ALLEGED DEATH OF AN INFANT FROM THE APPLICATION OF IMPURE VIOLET POWDER.

On Friday, April 8, the Coroner (W. H. Garrington, Esq.), held an inquest at the Dial Tavern, Crasswell Street, Landport, on the body of the female child, aged sixteen days, of Henry Williams, the landlord of the above house.—From the evidence of Eliza Craven, who nursed Mrs. Williams, it appeared that the deceased was to all appearance quite healthy at the time of birth, but about six days afterwards betrayed uneasiness, and the skin dried and peeled off, leaving a raw dry surface. This spread by degrees to every part of the body except the top of the head. The third day after the birth the nurse had begun to use some powder which Mrs. Williams had told her to take from the mantelpiece. It was contained in an ordinary powder box, and she used it with a powder puff. Dr. Green's attention was called to the state of the deceased last Monday week and the use of the powder was discontinued. The child gradually got weaker, and became convulsed two days before her death, which took place on Sunday. Mrs. Williams said that she had often used the powder upon her other children, and noticed that they became sore where it was applied, but at the time she had no suspicion this arose from the use of the powder, thinking they were sprayed by the cold weather.—Dr. James Green, of the

Commercial Road, said that there was nothing unusual in the appearance of the powder, and it smelt like violet powder. It was contained in a square box made of pasteboard with the name of "Hovenden" on it. He attributed the death of the deceased to the extensive inflammation of the skin, which, he was of opinion, was produced by the application of impure violet powder.

The Coroner, in opening the proceedings, had announced that he had been informed by Dr. Sykes, the public analyst, that an examination of the powder had proved that it contained sulphate of lime, or what was commonly known as plaster of paris; and the inquiry was adjourned for the purpose of ascertaining by analysis the exact percentage of sulphate of lime in the powder.—*Portsmouth Times.*

Action against a Chemist.

In the Birmingham County Court, on Thursday, April 14, George Day Horton, a chemist, was sued by Thomas Proctor, a retired butcher, for £50 for personal injury resulting from the improper making up of a prescription. Plaintiff, while suffering from gout, copied a prescription, the ingredients of which were two parts rhubarb and one part calcined magnesia, and sent it to the defendant to be made up. The entry in the defendant's book was rhubarb, calomel and magnesia. The plaintiff took the powders, and was badly salivated. He incurred a surgeon's bill of twelve guineas.

The jury returned a verdict for £15.—*Western Morning News.*

Theft of Government Stores from the Marine Barracks.

At the Stonehouse Police Court on Thursday, April 14, before Mr. J. F. Fortescue (in the chair), Admiral Watson, Mr. W. Matthews, and Mr. H. Tremain, further inquiry was made into the thefts of medical stores from the infirmary of the Royal Marine Barracks, Stonehouse.

George Prout, a private of the Royal Marines, and Samuel Sprague, a marine-store dealer, of Stonehouse, were charged with stealing a quantity of Government stores from the infirmary of the Marine Barracks. Mr. Eastlake, Admiralty law agent, appeared to prosecute; Mr. F. R. Stanbury defended Sprague, and Mr. J. E. Curteis defended Prout.

Dr. Henry, fleet surgeon, attached to the Royal Marines, repeated the evidence given on the last occasion, and Mr. Curteis questioned the witness as to the identity of the articles. The value of the goods found at Mr. Maitland's was £6 15*s.*

To the Bench witness said he had no moral doubt they were Government stores; but there was no mark upon them by which he could identify them.

Corporal William Denly, who said he was the dispensary man of the division, gave corroborative evidence. He identified the jars by a mark on the bottom; but, in reply to the Magistrates' Clerk, he said he did not see the mark before the jars were missed. It was the contractor's mark.

Mr. Curteis said he wanted to bring out that it would be impossible for a man to take these things from the infirmary without being seen by the sentry.

Mr. Maitland, the chemist, also repeated the evidence with reference to the goods having been sold to him by Sprague. He dealt with Sprague, who said he got the articles from a large steamer. Sprague asked Prout to have a glass of beer, but he did not see them divide any money.

In reply to Mr. Curteis, witness said the mark on the jar had nothing distinctive in it. It was such as anyone would have who dealt with that house if wholesale chemists. He knew the house very well. They supplied thousands of chemists.

The prisoners were committed for trial at the assizes.

Sprague was admitted to bail in two sureties of £50 and himself in £100.

At the conclusion of the case, the Chairman said he was desired by the Bench to say a few words with respect to the manner in which Mr. Maitland, the chemist, had conducted himself. The Bench thought his practice in connection with these men was hazardous in the extreme. He was liable to place himself in the awkward position of a man charged with receiving stolen goods. He bought these goods clearly very much under their value from men who were strangers to him, and the Bench wished to caution him and to express a hope that he would be more careful in the future.

Mr. Maitland had previously explained to the Bench that he had questioned the men, and that he gave them as much for the goods as they were worth to him.

John Williams, a private in the Royal Marines, was then charged with a similar offence.

Mr. Eastlake said this case really arose out of the last. The police found that medical stores had come into the possession of another chemist, whose explanation of it was that he had them from Williams. Williams was at one time a gardener at the infirmary; he afterwards served afloat; and at the time of his arrest he was a lamplighter at the barracks and at the infirmary. He did not desire to connect this case with the one just heard, but when Williams was apprehended he said he had these stores from Prout.

Mr. Eastlake stated that the infirmary sergeant was under arrest for neglect of duty, in not having reported the loss of these things at the time.

Mr. Stanbury said in this case the prisoner, under his advice, would plead guilty, and ask the Bench to deal with the case in a summary manner. The prisoner had been in the service fourteen years, and had three good conduct stripes.

Mr. Eastlake said, as he had already intimated, he did not ask the Bench to commit in this case. He concurred in the main in what had been said on behalf of the prisoner, and he believed justice could be met by the Bench dealing with the case summarily.

The Chairman said as that was not a petty session day they could not deal with the case then, but they would remand the prisoner and then deal with him summarily.—*Western Morning News.*

Prosecution of a Medical Practitioner for Selling Defective Chemical Food.

On Tuesday last, at Glasgow, Dr. James Downie was charged, before Sheriff Balfour, at the instance of the Local Authority, with a contravention of the Food and Drugs Act, by selling a bottle of chemical food which did not contain the requisite percentage of ingredients. The bottle was purchased on the forenoon of March 3 last, at the drug shop at 4, Abercromby Street, by Mr. Robert Inglis, ordinary sanitary inspector, for purposes of analysis, and he paid 2*s.* for the bottle. It was supplied by a girl, who told Mr. Inglis that if he waited till six o'clock he might see Dr. Downie. On being analysed by the public analyst the drug was found to contain ·47 of a grain of phosphate of iron, and ·38 of a grain of phosphate of lime, whereas it should have contained 2½ grains of phosphate of iron and 1 grain of phosphate of lime. For the defence it was contended that Dr. Downie, who had been in partnership with a medical student, had had nothing to do with the shop for the past eighteen months, but only used a room off the shop for the purpose of consulting with patients, although the business was carried on in Dr. Downie's name, and with his consent. The Sheriff found the charge proven, and imposed a fine of £8.—*Glasgow News.*

Obituary.

JOHN MACKAY.

It is with the deepest sorrow, which we are sure will be shared by all the members of the pharmaceutical body, that we have to record the death of Mr. John Mackay, Honorary Secretary to the North British Branch of the Pharmaceutical Society, which took place in Edinburgh on the morning of Tuesday last, the 19th inst., after a very short and severe illness. Mr. Mackay attended the meeting of the Council in London on the 6th of this month and returned to Edinburgh on the 7th. He was then suffering from a bronchitic affection to which he was liable, but was able to be at business up till Tuesday the 12th. On that day he was seized while in his office with alarming symptoms which were, it was feared, premonitory of severe illness, and which developed within the next day or two into acute inflammation of the lungs, to which he succumbed on the morning of the 19th.

Mr. Mackay's life was so crowded with action, and his character was so many sided, that it would be impossible to do justice to his memory in a notice like this. Indeed, such a task may be looked on as superfluous, because his utterances and his acts have been all along so prominently before the public, and his name has become such a household word, that any record of him intended for pharmacists is apt to weaken the impression that the mere anouncement of his death is fitted to convey.

Born at Edinburgh in the year 1818, Mr. Mackay was apprenticed to Messrs. Pugh and Plews, of that city, when only twelve years of age. Six years afterwards he became assistant in the house of John Bell and Co. in London. Whilst there he became acquainted with Mr. Jacob Bell, an acquaintance which ripened into a close intimacy and was maintained until the death of the latter. In 1838 he opened shop in Edinburgh as a pharmacist, which profession he has successfully prosecuted ever since.

From Mr. Mackay's association with Mr. Jacob Bell his sympathies were early enlisted in the cause of pharmaceutical advancement and elevation, and throughout all the contendings from 1841, even until the other day, there was no one who displayed a warmer interest or made more unceasing efforts for those objects. But it was more especially to the interests of the North British Branch of the Society that his efforts were directed. Of this Branch since 1841 Mr. Mackay has been Honorary Secretary, declining again and again to be nominated for the chair, feeling, as he often said, that he was more useful as secretary. He was the animating and guiding spirit of its proceedings. During all that time (he has recently been heard to declare) he was never absent from the meetings, whether for business, examinations or scientific purposes, except on two or three occasions, and then only owing to illness, and it was mainly through his personal efforts (although he has always been ready to give his coadjutors the credit of it) that the North British Branch and the Scottish Board of Examiners occupy their present position. In 1861 he was elected member of the Council of the Society, and the recorded proceedings of that body show what an efficient member he has been.

In addition to labours of this kind Mr. Mackay has been the contributor of numerous papers read at Evening Meetings and printed in the Journal. These partake of various characters—scientific and commercial—and are uniformly practical and interesting. The most recent was a long paper on the Homburg Springs, where he had gone two years ago with Mrs. Mackay for their health, and this had constituted his holiday task.

In 1869 the services of Mr. Mackay to British pharmacy were acknowledged by a public dinner and the presentation of a magnificent service of plate, which was very generally subscribed for both in England and Scotland.

Outside the Pharmaceutical Society Mr. Mackay was known as a public spirited citizen, and has held various honorary positions in public bodies.

In estimating Mr. Mackay's character, one is at once confronted with the difficulty of the task. He was possessed of so many gifts and attainments, rare in themselves, and still rarer in combination with one another, that it was natural to admire, to respect, and even to love the man without well recognizing the particular qualities which called forth these sentiments. He was a man of strict business principles and habits, yet the most playful and delightful companion, and the most perfect type of a good host in his own house. He possessed a full share of the "*perfervidum ingenium*" of the true Scot, yet was always the refined and courteous gentleman. No-one had a greater contempt for the hollow and unreal than he; yet no one could be more conciliatory and tolerant with opponents. In short, he possessed a large share of the *fortiter in re*, as well as the *suaviter in modo*, a combination rare indeed, but of irresistible influence. Herein probably lay the secret of his success in all he undertook, and the explanation of the immense amount of work he was able to overtake with incredibly little friction. It is hardly right to intrude into his family relations. Yet no one had the honour of even a slight introduction to his domestic circle (and there are very many in our own body who were so honoured), but could easily perceive that there he was, in a very remarkable degree, the loving and beloved husband and father. It is in contemplating his ability,—his goodness,—his devotedness,—that the great loss the Pharmaceutical Society has sustained by his removal will be most realized; but the feeling of loss is somewhat mitigated by the consciousness of the heritage he has left in the memories of a career, the embodiment of high and noble resolve, and of strenuous and virtuous achievement.

Notice has also been received of the death of the following:—

On the 1st of February, 1881, Mr. William Douglas Meikle, Chemist and Druggist, High Street, Great Berkhampstead. Aged 38 years.

On the 8th of March, 1881, at Witham, Mr. Frederick Samuel Rumsey, Chemist and Druggist, Old Bethnal Green. Aged 35 years.

On the 2nd of April, 1881, Mr. Sam Field, Chemist and Druggist, Scholes, Wigan. Aged 38 years.

On the 5th of April, 1881, Mr. William Jennings Southee, Chemist and Druggist, Mare Street, Hackney. Aged 30 years.

On the 6th of April, 1881, Mr. Frederick Appleyard, Chemist and Druggist, Denholme, Yorkshire. Aged 73 years.

Erratum.—In the obituary notices on p. 831, Mr. Matthew Urwin should have been described as of South Shields instead of North Shields.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[527]. I presume the difficulty experienced with this prescription is the want of a formula for loch. pectorialis. This preparation is frequently prescribed on the continent, and is to be found in the French Codex as looch huileux. The form is:—

Ol. Amygd. Dulc.	15.
Pulv. Gum Arab.	15.
Syr. Gummi	30.
Aq. Flor. Aurant.	15.
Aquæ	100.

Make a mucilage with the gum and twice its weight of water; to this add the oil in small quantities, and, lastly, dilute with the remaining liquids.

Perhaps I had better mention that syr. gum. acaciæ is intended, seeing that one of your correspondents a few weeks since said he should use syr. gum. rub. as being more active.

EARDLEY.

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[528]. The dark colour referred to by "Anxious Inquirer" doubtless arises from the action of the ferric chloride on the white of the lemon peel, and as it would be impossible to peel the lemons so fine as to exclude all white, the mixture if dispensed correctly with B.P. syrup should have a dark appearance.

The London firm must have unjustifiably used a syrup prepared from a private formula.

Belgravia. FIREWORKS.

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[529]. TINCT. IODI C. AMMON.—By this is meant tinct. iodi, B.P., with sufficient liq. ammon. fort. to render it colourless.

Belgravia. FIREWORKS.

[529]. Tinct. iodi ammon. is prepared from several different formulas, and is liable to considerable variation, though it should always be dispensed colourless. Squire's 'Companion' contains a form taken from the German Pharmacopœia, which adds hyposulphite of soda as well as ammonia. I believe it is usually prepared by decolorizing B.P. tincture of iodine with strong solution of ammonia. It requires some weeks to complete the reaction unless an excess of ammonia is added. Dorvault's 'Pharmacie Pratique' says, to have an instantaneous decoloration add an excess of ammonia, then add hydrochloric acid until the liquid has a slight alkaline reaction; any chloride of ammonium which may be precipitated can be easily removed by filtration.

It would be a difficult matter to say which is the original formula, so each chemist is left to choose which he thinks best.

EARDLEY.

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[532]. There should certainly be no deposit in this mixture. The London firm must have, quite unnecessarily, used heat to dissolve ferri ammon. tart., and thrown down ferric oxide.

Belgravia. FIREWORKS.

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[533]. Would "Dispenser" be justified in sending out the following prescription with the quinine dissolved by the aid of a little acid, or rub the quinine in a mortar, and put a "shake the bottle" label on?—

℞	Quin. Sulph.	grs. iij.
	Vin. Ferri	℥ss.
	Syr.	ʒij.
	Inf. Quass.	℥ij.
	Aq. Menth. Pip.	ad ℥iv.

M. ℥ss. bis die.

A STUDENT.

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[534]. The following prescription was presented to me to be dispensed a short time ago:—

℞	Ferri Bromid.	ʒiss.
	Potass. Bromid.	℥ivss.
	Aquæ	ad ℥ix.

From three separate "ounce bottles" of ferri bromid. the result was as follows:—

No. 1 readily soluble, forming a clear colourless solution, but after a few minutes a slight precipitate was visible.

No. 2 a clear solution as before, but no precipitate during twenty-four hours, after which time I cannot state.

No. 3 immediately presented a very unsightly, muddy mixture, due of course to a dense brown precipitate.

Would any of your readers kindly give an explanation of the cause?

JACQUE.

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[535]. Will any reader kindly inform me of a good excipient for the following pills?—

℞	Hyd. Chlor.	grs. xij.
	Ext. Coloc. Co.	grs. xxiv.
	Pulv. Scammony	grs. xxiv.

M. et ft. pil. Mitte xij.

Also a good excipient for the following:—

℞	Ext. Aloes Aquos.	ʒj.

Ft. pil. Mitte xij.

W. E. E.

---

[536]. Could any of the readers give me any information as to the difference (if any) between ferri citras and ferri ammon. cit., B.P.? If there is any, could anyone give me the properties and appearance of the ferri citras, and if in a prescription ordering ferri citras should I have been justified in using ferri ammon. cit.?

ASSISTANT.

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[537].

℞	Potassæ Bicarbonatis	ʒj.
	Potassæ Salicylatis	ʒj.
	Sp. Chloroformi	ʒj.
	Aq. Menthæ Pip.	ad ℥viij.

M. Fiat mistura cujus capiat cochleare medium ex aquâ frigidâ omnibus horis tert.

The above mixture turns black after it has been kept some time. Will any reader kindly say what decomposition takes place?

H. G.

---

[538]. Are the following ingredients compatible with one another?—

℞	Ammon. Carb.	ʒij.
	Spt. Chloroformi.	ʒij.
	Acid. Hydrocyanic. Sch.	♏ xvj.
	Ferri et Ammon. Cit.	ʒiij.
	Infus. Gent. Co.	ad ℥viij.

I have been told by a friend that they are not, the acidum hydrocyanicum being incompatible with ferri et ammon. cit. Is it so?

HARRY VERITY.

---

[539]. I had the two following prescriptions to dispense two days ago. Would anyone kindly tell me whether I was right in adding "acid. sulph. dil." to dissolve the "quinine," and also in using a little "aqua" to dissolve the "potassii iodid.," neither being ordered?—

I.

℞	Quin. Disulph.	gr. xij.
	Pot. Bromid.	ʒj.
	Syr. Aurantii	ʒss.
	Aquæ	ad ℥vj.

M. Ft. mist.

II.

℞	Potassii Iodid.	ʒij.
	Lin. Camph. Co.	℥j.
	Lin. Belladon.	℥j.

Ft. liniment.

R. J. D.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE BENEVOLENT FUND.

Sir,—The Secretary hit the right nail on the head when he remarked at the last meeting of the Council that "the prosperity of this Fund depended in a great measure on the efforts of the Local Secretaries." Speaking from personal experience I can fully ratify and confirm that statement.

The Chemists' Trade Association here sets an example worth following, where the Local Secretary is looked upon as the actual representative of the Association in his town, to whom blank receipts are annually sent, together with a list of present subscribers in his town, and a request to extend the list if possible, thus taking it for granted that in accepting office he is willing to do something for the general good of the Association. Were this plan adopted by our Society, the Local Secretaries would understand that their existence was to be known not only by the annually printed ist, but by their work, and would probably begin to feel some sort of responsibility that the amount of subscriptions from their town should fairly represent the trade in the town.

I would suggest in addition to the blank receipts, a printed form should be sent, containing a brief *résumé* of the work of the Fund during the past year, together with a request that in the event of not being already a subscriber the receiver should become such, and if employing assistants that he should endeavour to enlist their support to the Fund, and further stating that the Local Secretary would hope to call shortly for subscriptions. This should be printed note size, so as to be forwarded by the Local Secretary, per halfpenny post, to each chemist or subscriber in the town.

A WORKER.

THE EXAMINATIONS.

Sir,—I have read with much interest the report of Dr. reenhow and your valuable leading article upon the subect of the examinations. Will you allow me to offer a few emarks which suggest themselves to my mind?

The amount of disappointment occasioned by so many reections at the examinations, and the consequent loss of valuble time and money to the youths and their friends, gives ise to serious reflections upon the existing state of things, nd the question will evidently crop up how far the master of youth is liable and to what extent does his obligation exend in teaching him his business. Let it be fairly asked hat are the conditions under which a boy is placed to ccessfully learn his business in a country town. How any pharmacists are there in England, even in towns of venty or thirty thousand inhabitants, who are doing a purely ispensing trade? I speak from long and extensive expeence when I say not many, and I am sure there are ousands of so-called chemists doing a large mixed trade and t perhaps do not average half-a-dozen prescriptions a week. Is it not a fact that the greater portion of the country sinesses are so mixed that it would be difficult to tell hich was the most represented, the oilman, tobacconist, anure dealer or wine and spirit merchant?

And these are the sources from which the greatest number candidates are sent to the Minor examination. The hole thing requires revision, three years spent in a shop ould be all that is required to give a youth the ordinary utine knowledge of his business; the remaining time should spent in a school of pharmacy, so as to give a youth a fair ance of getting past his examination.

I trust before a new Pharmacy Bill is passed persons mpetent to form an opinion will be sent down into various rts of England to gain valuable information as to the rking of a country business, and that we may not be gislated for by men who know really nothing of the chater of a country business. I trust this subject will be ll ventilated; I am sure its importance demands it.

NE WHO HAS BEEN IN THE TRADE FOR THIRTY YEARS.

THE POSITION OF PHARMACY, ESPECIALLY IN ITS RELATION TO MEDICINE.

ir,—Although the above has already formed the subject some able letters, I venture to send you a few lines as an ression of my opinion in the matter. In doing this, I would first remark that to my mind it is of the utmost importance at the present time that chemists should combine together to resist all attempts, made either directly or indirectly, to drive them back upon the merely commercial portion of their business. In a crisis like the present, when the existence of pharmacy as a distinct calling is seriously threatened, surely it is of the highest import that we should be united, and that dissensions should not exist among us. The choice lies between two lines of policy, the one of aggression, the other of retrogression. The question really at stake is, shall pharmacy advance or shall she decline? And the present is the time for those at the head of pharmaceutical affairs to take a fresh departure in that line of policy which has up to now marked the action of the leaders of pharmacy and which aims at its continual advancement.

"The Pharmacy Acts Amendment Bill," as approved by the Council of the Society, is an indication of the fact that the members of the Council are fully alive to the danger threatening pharmacy, and of an earnest endeavour to grapple with it.

Now what is the proper office and function of the pharmacist? He is, in the first place, a retailer of drugs and chemicals, and in this respect differs nothing from the ordinary tradesman. And yet pharmacy cannot, by any means, be considered as a trade, nor the pharmacist as a tradesman, in the ordinary acceptation of the term. The definition of pharmacy as a trade does not cover the whole of the ground, so to speak, for closely associated with it is an innumerable number of transactions involving much care and skill, and which combine to give to pharmacy its peculiarly unique and distinctive character as a calling. It is, in point of fact, partly a trade, and partly a profession, the latter element predominating. To give a homely and simple illustration. A customer visits the chemist and purchases, say, an ounce of flowers of sulphur. He pays for it and so far the transaction is one simply of trade. But suppose he asks "How much of this may I take for a dose?" we trench at once upon the professional side of pharmacy. Pharmacy has, in fact, the duties and responsibilities both of a trade and of a profession, and it is no exaggeration at the present time to say that it takes the pay neither of one nor the other.

Then again, it is no doubt part and parcel of the duty of pharmacists to investigate the nature and composition of all drugs introduced into use as medicines, and also to discover how the various substances thus introduced shall best be treated, in order to yield their active principles, or preparations so representing, in a more convenient form, the active properties of the drugs, as shall better fit them for use as remedial agents, both by the medical practitioner and by the general public. Not only so, but it has happened in the course of events (probably owing mainly to the action of the Legislature in the institution of examinations), that the chemist is required to go through such a course of training and experience as necessarily makes him familiar with the properties of drugs, and their use as medicines. This is recognized by the public, who, moreover, expect the chemist to possess this amount of knowledge, and who in many instances have more faith in the skill of the chemist than in that of the medical man, and certainly, in simple cases, will far more readily consult the chemist than the doctor. And what reasonable objection can exist against the chemist prescribing in cases of simple ailments? A person is troubled with an attack of diarrhœa; is he therefore to walk up the street to the nearest doctor, when the chemist next door can give him relief just as readily? Or mayhap he has a slight attack of headache; is he therefore to consult a medical man, when perhaps all he needs is a dose of sal volatile? In such cases as these (and few chemists go further than this), it is absurd and ridiculous that medical men should talk of the chemist giving up counter prescribing.

But in speaking upon this subject, one's mind reverts to another branch, closely connected with it, viz., the dispensing of prescriptions, which naturally falls within the province of pharmacy.

Now as to any arrangement being arrived at under which the chemist shall concede to the medical man the sole right to prescribe, whilst, on the other hand, the latter shall hand over his dispensing to the former, I am of opinion, that although some general agreement of the kind is both desirable and possible, yet that any exclusive and complete arrangement would not be possible, and even if possible, might not be altogether desirable. For example, in some districts, as in country villages, and also in the densely populated and poorer quarters of large towns, the acquisition of the dispensing would be of small pecuniary value to the chemist; and it would be found better to continue what I believe to be the general, if not universal, practice at present, viz., for the doctor to do his own dispensing; the cost of medicine supplied being included in the fee charged. Then again, it would most likely be found that a few chemists would refuse to give up counter-prescribing; whilst some doctors would just as rigidly adhere to the old practice of dispensing their own medicines. But I think it would be found that chemists are just as willing (in fact more so) to give up counter-prescribing as the medical man to close his dispensary. For the remark oftimes made by chemists is no new one, "The doctors dispense their own medicines, and therefore I shall continue to prescribe."

In this matter, I think medical practitioners ought to take the initiative, for it is no concession to chemists that they should cease dispensing; whilst the chemist can certainly claim that in cutting himself free from counter prescribing, he is giving up that which he may lawfully claim as lying within his province. Moreover, I think it eminently necessary, both for the sake of the pharmacist and the safety of the general public, that the retailing and dispensing of drugs should fall entirely into the hands of the chemist; or at any rate, that he should have granted to him a far more extended monopoly in this respect than he at present possesses. Is not this his rightful claim? The Legislature of this land, by Act of Parliament, has acknowledged the existence of pharmacy as a distinct calling requiring a special training; and has furthermore demanded special qualifications in the matter of examinations. But to what purpose is all this? Truly it puts the pharmacist into possession of a rich inheritance! A sorry result indeed it is, that he finds at the end of all,—one half his living parted from the other, and appropriated by the dispensing doctor; whilst on the other side he finds himself engaged in a competition for his daily bread with the cheap grocer and the petty shopkeeper. No wonder, I say, that he is tempted to retaliate upon somebody or other, and do a little prescribing on his own account.

Before bringing this letter to a close I cannot refrain from uttering a word or two of protest against those misrepresentations of the position of the chemist in respect of charges, which are made too often. It needs but a few moments' consideration to see the falsity of the position in which we are being placed in the eyes of the public at large, and this too by those of whom better things might be expected.

The pharmacist serves an apprenticeship, paying as a rule a heavy premium, with the object of acquiring a practical knowledge of his business. Then in nine cases out of ten he must go through a curriculum at a school of pharmacy in order to acquaint himself fully with the theoretical portion of his business. Engaged in business, he has a considerable sum of money invested in stock, fixtures, etc.; his expenses are great in the matters of rental of premises, payment of assistants, rates and taxes; and again his risks are great by losses by breakage, etc. Add to this that the business is an exceedingly trying one, requiring the expenditure of a great amount of care and skill (for the chemist must be a man who never makes a mistake), requiring unfailing and constant attention on his part, and necessitating long hours of business, hours too, fraught with many anxieties which are peculiar to pharmacy. This thing being considered, is it to be expected that in dispensing a prescription, for example, the bare current price of the drug should be charged? Undoubtedly in the case of a poor person, where this is indicated upon the prescription by the medical man, by means of some word or letter, a reduction in the dispensing fee would be made; but any proposition embodying the principle that in dispensing a prescription the nominal value of the drugs used should be taken as the regulator of the charge for dispensing is absurd and devoid alike of reason and common sense. If the pharmacist is to continue to exist (and looking upon him in the light of a public servant I think he can ill be spared), it will not be at co-operative store prices, for his returns are small and hence the profits must bear a considerable ratio to the returns. It appears to me that the best plan open to the pharmacist is to adhere strictly to the usual prices for drugs, and to encourage, so far as possible, the development of the professional side of pharmacy.

In conclusion, I would express my conviction that of all public servants, boarded and lodged upon the industry of the people of this land, none is more worthy of his hire than the pharmacist.

Great Yarmouth. R. WRIGHT.

THE PHARMACY ACT, 1868.

Sir,—Attention has frequently been drawn to the fact that since chlorodynes and soothing syrups are sold by drapers and stores, the means of suicide and infanticide are within the reach of every one; but I fail to see what benefit would accrue to the community at large if the sale of these proprietary articles was restricted to chemists and druggists.

A recent endeavour to trace the sale of strychnine to some person or persons in this neighbourhood raised the question as to who has the right to inspect a chemist and druggist's poison register, and elicited the fact that Battle's vermin killer, which contains strychnine, is sold by unregistered persons. I have reasons to suspect that many dealers in photographic chemicals do not comply with the provisions of the Pharmacy Act, and venture the opinion that the poison clauses of this Act should be more strictly enforced.

Bromley Common, Kent. THOMAS JOBSON.

CITRINE OINTMENT.

Sir,—I noticed in the Journal dated February 10, that a writer on vaseline had failed to make the "citrine ointment with vaseline" by the instructions given in my 'Companion.' I may say that I first made it myself four or five years ago, and it has been prepared ever since without a failure. The mercury and acid are put into a wide-mouth bottle or flask and whilst the action is going on the vaseline is heated in a water-bath to 180° F. If the mercury is not completely dissolved, the flask is held in the water-bath till it is; it is then poured into the vaseline and the whole stirred till cold. One part of this ointment with three of vaseline has been used by the oculists and highly approved by them.

277, Oxford Street. PETER SQUIRE.

Messrs. Kirby and Co.—We fail to see that the circumstances as stated by you are such as to require notice in this Journal.

W. Banbury.—You are recommended to communicate the details as fully as possible to the Registrar and consult him upon the question.

T. T.—We do not know what, if any, societies are represented by the letters referred to.

"*Percontator.*"—The preparation you refer to is a proprietary one, and we have no special means of ascertaining its composition.

H. L.—The solution of hydrobromic acid recommended by Dr. Fothergill is made by dissolving ℥x, ʒvj, gr. xxviii, of bromide of potassium in four pints of water and then adding ℥xiij, ʒj. gr.xxxvij of tartaric acid. But see a paper by Mr. Palmer in the *Pharmaceutical Journal* for March 1, 1879, p. 721.

A. Reynor.—We are unable to comply with your request. For terms for advertisements, apply to Messrs. Churchill, 11, New Burlington Street, W.

Santonin.—As far as is known the physical change which takes place in santonin upon exposure to light is not accompanied by any chemical decomposition.

Hoiner.—In order to ascertain the composition of the preparation in question, you are recommended to submit it to chemical analysis. As to its properties you are referred to the statements published by the vendors.

H. C. H.—Probably *Sedum reflexum.* Send another specimen in July, when in flower.

C. J.—We are not aware of the existence of any authentic information on the subject.

J. G.—Oleate of zinc may be prepared by mixing together hot solutions of soft soap and sulphate of zinc, washing the precipitate and drying. Mr. Gerrard (*Pharm. Journ.*, [3], vol. iii., p. 141), prepares an oleate of zinc by heating together one part of oxide of zinc with four parts of oleic acid until dissolved. He also gives a formula for an ointment containing two parts of the oleate so prepared, one part of oil of almonds and one of prepared lard, mixed while hot.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Drummond, Gibbs, Wild, Campbell, Kinninmont, Kermath, Dispenser, Boo.

"THE MONTH."

Although the cold north-east winds have somewhat retarded the progress of vegetation, and the character of the month has been that of March rather than April, yet the warm sun has brought forth many of our spring flowers. Bluebells, primroses, cowslips and wood anemones are now carpeting the woods and pastures with their bright blossoms, and the light green of the larch refreshes the eye of the rambler in the country. The trees in the market gardens near London, too, are covered with blossom as though a snowstorm had passed over them, the profusion of dazzling white blossom covering the plum and pear trees like snowflakes.

Botanical gardens are now preparing, as it were, for their examination and for the demand that will be made upon them by botanical lecturers and students next month. Already several natural orders are well represented. The Amentiferæ, Amaryllidaceæ, Liliaceæ, Melanthaceæ, Labiatæ, Ranunculaceæ, Atropaceæ, Saxifragaceæ, Aristolochiaceæ, Papaveraceæ, Berberidaceæ and Apocynaceæ, have all some flowers in blossom. Among medicinal plants may be seen in blossom *Sanguinaria canadensis*, *Asarum canadense*, and *Adonis vernalis*, with its large yellow crocus-like flowers and finely cut foliage. Among rare British plants, *Anemone apennina*, *Epimedium alpinum*, *Lamium maculatum*, *Doronicum Pardalianches*, *Leucojum æstivum*, *Muscari racemosum*, *Fritillaria meleagris*, *Euphorbia Cyparissias* and *Scrophularia vernalis* may all be seen in blossom at Kew.

Few who have looked over botanical gardens but must have been struck with the fact that the gain to the student arising from the grouping of a number of different species and genera of one natural order together in one flower bed is more than counterbalanced by the loss of the natural habit and vigour of the plants, and by the absence of facts concerning their habits and places of growth, which might under other circumstances have been inferred from their surroundings. The fact that certain plants are known to belong to certain orders because they have been seen in certain flower beds may assist the memory, but can scarcely be calculated to stimulate examination of the flowers themselves.

The handsome collection of hellebores, at Kew, has been in full beauty during the past month, a result probably due in their case to the fact that the plants occupy not a systematic position but a shady place near trees, and thus approach more nearly to their natural habitat.

The elegant drooping pencilled flowers of the wood sorrel, and its graceful leaves, so sensitive to light and apparently to moisture also, are now to be found in moist shady woods. Although the style varies in length in different specimens, yet it is not constant, and the position of the stigma beyond the stamens seems intended for the pollen to fall more readily upon it. Some of the Equisetaceæ are now pushing their spikes of fructification above the ground in fields and damp sandy banks, notably *Equisetum arvense* and *E. maximum*, and their spores are in a good condition for examination. If examined in water, the student will find the elaters rolled around the spore; but if in the dry state, they will be seen spread out as usually represented in botanical works. The elastic force exerted when dry would seem to have some part in causing the bursting of the spore cases and the dispersion of the spores.

Those who are fortunate enough to live where such rarities grow will now find the pretty little grass, *Knappia agrostidea*, in blossom. The true oxlip, *Primula elatior*, Jacq., is also now in full flower. Although readily recognized again when once seen, it is not easy to point out its distinctive characters. The calyx is of a greener colour, much narrower, not at all inflated, and the peduncle and pedicel are more slender and the flowers more drooping—almost in a secund manner—than in the cowslip. A Barnet correspondent writes that the *Lathræa squamaria*, *Petasites fragrans*, and *Ranunculus auricomus* are now in bloom.

In the Isle of Wight the flowers seem to be considerably in advance of those in the neighbourhood of London. The common broom, *Arum maculatum*, *Euphorbia amygdaloides*, *Asperula odorata*, *Sanicula europæa*, *Matthiola sinuata*, *Symphytum officinale*, *Armeria maritima*, and even the hawthorn, have already been seen in blossom there.

A Warwickshire correspondent sends a large specimen of *Lycoperdon giganteum*, which appears to be known in that county under the name of "buckfois," and to be highly esteemed by the country people as a remedy for restraining hæmorrhage. At this time of the year it is found as a dusty, spongy mass of spores and minute threads, botanically called the capillitium.

One of the botanical names for the bluebell, *Hyacinthus non-scriptus*, has probably puzzled many a young botanist. Its origin, according to a writer in the *Gardeners' Chronicle*, April 2, is due to the fact that it is not the hyacinth of the Greeks, and has not the letters Ai, Ai (alas) on its petals, as the Greek plant fabled to have sprung from the blood of the boy, Hyacinth, is said to have had.

According to Professor Pringsheim's recent researches on chlorophyll, its presence in the corpuscles coloured by it favours the assimilatory powers of the corpuscles, in consequence of the absorption of light by the chlorophyll. The first visible product of the assimilatory power of the corpuscles is hypochlorin, from which, according to Pringsheim, the starch, glucose, oil and tannin found in the corpuscles are derived by oxidation. This conclusion is based upon the fact that the quantity of hypochlorin in a corpuscle varies inversely as the quantity of starch which is present, and that hypochlorin cannot be detected in seedlings until they have been exposed to light of such intensity as to enable them to assimilate. It has long been known that the seedlings of various species of *Pinus* become green in the dark, and it is found that hypochlorin makes its appearance in these in the later stages of germination.

Sir John Lubbock's paper on "Fruits and Seeds," in the *Fortnightly Review* for April 1, may be read with interest and profit by students of nature, for it is full of suggestive inquiry. The methods which plants possess of protecting their seeds during the ripening process and of dispersing them when ripe are as varied as the modes of fertilization of the flowers, and no less worthy of investigation. The differences occurring in different species of the same genus are very instructive. Thus in the *Viola hirta* and *V. odorata*, in which the abundance of radical leaves would prevent the dispersion of the seeds to any distance, the fruit stalk bends downward and tries to bury itself, while in *V. canina*, in which the leaves are small, the fruit stalks are erect, and the carpels, by contracting, eject the seeds sometimes to a distance of 10 feet. The occurrence of hooked seeds and fruits on such plants as come into contact with animals, and of those with wings and comal hairs or pappus in places where such accessory apparatus is best fitted for distributing the seeds, and the stickiness of the mistletoe berry which leads to its being planted on trees by birds rather than falling to the ground, are among some of the remarkable instances of adaptation to circumstances described in the paper. The object of the great similarity of the castor oil seed to the tick insect does not seem quite clear, whether to protect them from graminivorous birds or to induce insectivorous ones to swallow them. The different modes of ejecting seeds, whether by a watch-spring contraction of the carpel as in *Cardamine hirsuta*, by a longitudinally spiral twist as in the broom, or by endosmotic force as in the squirting cucumber, show that nature is by no means limited in its resources.

During the past month the new Natural History Museum at South Kensington has been opened to the public, and the large botanical collections formerly contained in the British Museum are now accessible to the public and to botanical students. The inconvenience which those in the centre and east of London will naturally feel at having to go so far west, and at the collections being separated from the library, will, to some extent, be counterbalanced by the benefit accruing to those who live in the west, and perhaps made up for by the magnificent botanical library which is now being formed in the botanical department at the Natural History Museum. The increase of room and of light will be found by visitors to be no inconsiderable advantage. Considerable improvements also are being made in the arrangement of that portion of the botanical department which is open to the general public

On Easter Monday the Economic Museum at Kew, after having been closed for the winter, was opened to the public. A new wing has been added to the museum for the reception of the large collection of Indian drugs and other economical and botanical products formerly in the India Museum. The whole of the museum has been rearranged by the able and indefatigable curator, Mr. J. R. Jackson, A.L.S.

Several cases of poisoning by belladonna liniment have recently occurred. In one of these, in which a wine glassful (℥ij. ʒij.) had been swallowed, recovery took place on the administration of the physiological antidotes, pilocarpine and tincture of opium. Of the former ⅕ of a grain was subcutaneously injected every fifteen minutes until ⅘ of a grain had been used. It did not cause the least perspiration. These accidents seem to point to the necessity of adding, in a future edition of the Pharmacopœia, some well-known, powerfully odorous substance to the liniment, or of adopting some other means of readily distinguishing it from other medicines.

Two cases have recently been recorded in the United States, in which respectively the infusion and oil of tansy have proved poisonous. In the one case, in which an infusion of ½ ounce of the dry herb was taken, the patient died in twenty-six hours. In the other, in which ⅓ drachm of the volatile oil had been taken, an emetic was sufficient to cause recovery.

From a note communicated to the *Lancet*, March 26, p. 524, it seems evident that chrysophanic acid acts constitutionally in psoriasis, and presumably also in other skin diseases. According to the writer of the note alluded to, Professor Charteris, of Glasgow found that in a case of psoriasis, in which chrysophanic acid (1 drachm to 1 ounce of excipient) was applied to the limbs on one side of the body and cotton wool only to the limbs on the other side, the cure of both sides was complete in ten days. It is obvious, therefore, if the above conclusion is correct, that in experiments in which two medicaments are applied simultaneously on opposite sides of the body for comparison of effects it will be necessary to ascertain whether one or both are absorbed before attributing an equal action to both. The supposition that chrysophanic acid is absorbed and acts physiologically is, however, questioned by other competent authorities.

Hydrofluoric acid seems to be attracting attention in medical circles as a remedy for goitre. Dr. E. Woakes describes in the *Lancet* (pp. 459, 497, 537), a number of cases in which this treatment has been successful. The dose prescribed at first is usually 15 minims twice a day, but this is increased in some cases to 30, 40, or even 50 minims, two drachms being the limit of toleration. In Dr. Woakes's hands the remedy has proved effectual in about 87 per cent. of the cases, although the treatment has taken a lengthened period, varying from six weeks to several months. The acid used in the treatment was prepared by Mr. Bullock. It contained 30 per cent. of gaseous acid and for internal administration was diluted by 200 per cent. of water, in which state Dr. Woakes says it can be kept in glass bottles for dispensing and is tolerated by the stomach. The stronger 30 per cent. solution must be kept in a gutta percha bottle fitted with a cork, not with a gutta percha stopper, as the latter admits air and the acid is thereby deteriorated.

Dr. Woakes was led to try the acid from the consideration that fluorine belonged to the same group as iodine, which has already been found of use in that disease, and that there appears to be a physiological relationship between drugs belonging to natural groups, whether in the domain of botany or chemistry. It is not a little singular, however, that a remedy which must be abundant in Derbyshire, where the disease is so common as to have received the popular name of the "Derbyshire neck," should be found to act almost as a specific for the disease, and seems to point out that fluorine has an opposite action in large and minute doses.

As long ago as 1866,* M. Maumené, as the result of experiments, attributed the cause of goitre to the presence of fluorides in drinking water, and indeed produced goitre in a dog by a course of five months' treatment with fluoride of potassium. A suggestion of the possible usefulness of hydrofluoric acid as a homœopathic remedy for goitre occurs in Hughes's 'Pharmacology' (part i., p. 26), published in 1875.

Professor Binz (*Lancet*, April 16, p. 638) has recently shown that chlorine, bromine and iodine, when inhaled, paralyse the nerve centres, and cause death by cessation of the respiration, not of the heart. This fact becomes of some importance when it is considered that chloride of lime or liquids giving off chlorine are sometimes placed in the rooms where patients are sleeping, and seems to indicate that disinfectants which give off oxygen or ozone are to be preferred for such purposes to those which are liable to give off chlorine gas.

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* *Medical Times and Gazette*, May 5, 1866.

M. Armaingaud, of Bordeaux, in a communication to the *Académie de Médecine*, states that repeated hypodermic injections of pilocarpin will cure the troublesome fetid perspiration of the feet without any injurious effect upon the system. This it appears to do by setting up a hypersecretion in the salivary glands. Jaborandi, which produces a general sudorific action, does not give the same beneficial results (*Lancet*, April 16, p. 638).

According to M. Auger (*Union Médicale*, April 14) a lotion containing 1 part in 1000 of sulphate of atropine, applied by means of a compress wetted with the solution and covered with oiled silk or gutta percha, gives considerable relief to the pain of cancer without causing symptoms of absorption, such as dilatation of the pupils or dryness of the throat.

The oil of ergot, obtained by exhausting the drug with benzene and allowing the benzene to evaporate, has been turned to account in the United States as an external application in erysipelas, eczema, and various skin diseases, in which it is said to have been used with excellent results.

Not long ago dugong oil was introduced into this country as a rival to cod liver oil, and now a new claimant has appeared under the name of "oolachan oil." At ordinary temperatures it appears to have a consistence between that of dugong and cod liver oils and a taste that is perhaps slightly more agreeable than either. The oolachan fish is about the size of a herring, and is met with on the coast of British Columbia and Vancouver's Island. It is so full of oil as to be known as the candle fish, for when dried it can be used as a torch.

Dr. Petersen (*Petersb. Med. Woch.*, March 28) finds that the odour of iodoform can be completely masked by the addition of tincture of musk in the proportion of one drop to the ounce of iodoform, whether this be in the solid or fluid form.

Some experiments with the bark of the *Erythrina corallodendron*, a large leguminous tree growing in the north of Brazil, where it bears the name of "mulungu," have been reported by M. Bochefontaine (*Comptes Rendus*, xcii., 733). In its native country the bark is popularly used as a sedative and hypnotic, under the form of a decoction, tincture and extract. M. Bochefontaine found that a decoction and a filtered aqueous solution of an extract gave precipitates characteristic of an alkaloid, which he has provisionally named "erythrine," but does not appear to have further examined chemically. Physiological experiments made by subcutaneous injections of the aqueous liquid showed that this acted upon the central nervous system by diminishing or abolishing its normal function. M. Bochefontaine concludes, therefore, that the bark possesses the sedative properties attributed to it in Brazil, and that these are due to the alkaloid it contains. Should any further contribution be made to the history of this alkaloid, it will be as well to remember that the name "erythrin" is already used as a synonym for erythric acid, occurring in *Roccella tinctoria* and other lichens, whilst "erythrine" is a synonym for cobalt bloom ($Co_3AsO_4+H_2O$).

A short time since (see before, p. 511), M. Tanret separated a crystalline neutral principle from the fruit of *Simaba Waldivia*, which is frequently confounded with that of *S. Cedron*. Some physiological experiments carried out by M. Dujardin-Beaumetz (*Comptes Rendus*, xcii., 731) show that this principle, waldivin, is a powerful poison, but slow in its action, death in the case of dogs not occurring until from five to ten hours after injection, even when the dose is many times that necessary to produce death. In the human subject and in dogs it provokes vomiting when administered by the stomach, but rabbits fall into a profound stupor which continues until death. In cases of snake-bite and hydrophobia it has failed to prevent a fatal termination, though when administered to mad dogs in doses of 0·004 gram daily it is said to cause an entire suppression of the exacerbations, the animals remaining insensible and dying without convulsions. Waldivin does not appear to exercise any influence in cases of intermittent fever. On the other hand, cedrin, the corresponding principle of *S. Cedron*, is less toxic, but possesses decided febrifuge properties, though the action is slower and less sure than that of quinine. Like waldivin, cedrin exercises no influence in cases of snake-bite, so that if there be any foundation in the popular reputation in South America of the seeds of *Simaba Cedron* as a specific against the bites of venomous serpents (see vol. iii., p. 801) it is not due to this principle. Neither substance produces toxic symptoms in frogs, even in large doses.

Although the profit on cinchona plantations is said to be from 70 to 80 per cent., cinchona growers in Ceylon and the East Indies will need to look closely into the cost and possible profit of their plantations, since they may soon have to compete, not only with the Government plantations, but with enterprise in Bolivia. In 1878, a few private individuals tried the experiment in that country of cultivating the cinchona tree, and now, according to the report of the Dutch Consul, there are on the banks of the Mapiri, at La Paz, four or five hundred thousand young trees of two years' growth. In other places also new plantations are springing up, chiefly on the mountain slopes, which are cultivated for three-fourths of their height. The cultivation of the cinchona in its original home is, of course, easy, the chief danger being from drought or ants during the first two years, and the only labour necessary is to keep the young plants free from weeds during the same time. To give shade to the seedling plants bananas are planted between them. Already excellent yellow bark from Bolivia has been sold in this country, and cultivated South American red bark, yielding 3 per cent. of sulphate of quinine, has lately appeared in the London market.

At the drug sales this month large quantities of the bark known as "china cuprea" have again been offered, and with it some bark closely resembling it in external appearance, but not containing quinine. Several other parcels of bark have also been offered which do not appear to contain quinine, and probably do not belong to the cinchona genus at all. The variety of gum which gives a ropy mucilage, in appearance like white of egg, is still to be met with in commerce. It may interest those who have it in stock to know that it may be restored from its allotropic to its natural condition by dissolving it in hot water, and allowing it to stand for twelve hours or so in a warm place. In appearance the gum is hardly to be distinguished from the best "Turkey" sort, but is of a greyish, rather than a yellowish-white tint.

The new *Handels-Bericht* of Messrs. Gehe and Co., of Dresden, contains, as usual, interesting information as to the German drug and chemical market. The demand for quebracho blanco bark has been met by several large importations from the Argentine republic, much in excess of present requirements, and there has been consequently a considerable fall in the price. For the same reason the alkaloid aspidospermine and its citrate have become much cheaper. The preparation of the pure alkaloid is said to be difficult, as it is accompanied in the bark by a number of other more or less distinctly characterized bodies. It is expected that the bark from young trees will be more profitable to work than the bark and rhytidoma of old stems which have hitherto been sent over. Meanwhile the demand for aspidospermine is said to have almost fallen into oblivion. Should, however, the more reasonable price revive the desire for experiment, the intensely bitter-tasting citrate and sulphate are suggested as more suitable than the pure alkaloid, which on account of its difficult solubility in water scarcely tastes bitter. The demand for hydrobromate of homatropine, which was at first so large as temporarily to exhaust Messrs. Gehe's stock of belladonnine in its preparation, has also nearly ceased. It appears to be established that the action of homatropine varies in different individuals, and for this reason oculists are generally returning to the use of the more constant, if more powerful, atropine. Jaborandi leaves are becoming an important article of commerce, 11,500 kilos having been imported into Hamburgh during the past year and quickly sold at good prices. The imports into London and Paris are described as having consisted of thin greenish leaves from the Argentine Republic and South Brazil, containing little pilocarpine, and in fact, not true *Pilocarpus pennatifolius* leaves. A sample of jaborandi bark from Buenos Ayres possessed a very powerful odour, but proved unsuitable for the preparation of pilocarpine. This alkaloid has become considerably lower in price, and is proportionally in larger demand; it is to be included in the new edition of the German Pharmacopœia. Jaborine, which is described as a decomposition product due to the faulty preparation of pilocarpine, is said to have an analogous but weaker action. Pure jaborine is a bronishw liquid, having a peculiar odour somewhat resembling jaborandi and tobacco. Boldo leaves are also in request, although the importation is limited. The use of tannate of pelletierine as an anthelmintic is said to be increasing considerably.

One subject mentioned by Messrs. Gehe has been more than once referred to in these columns, namely, the confusion existing in respect to the aconitines, which is not only a reproach to pharmacy, but a source of danger to the public, since the widely varying activity of different preparations sold under this name has already led to serious accidents. According to some experiments made by M. Hottot, 5 milligrams of English aconitine (Morson's) killed frogs in thirty minutes; 3 milligrams of Hottot's aconitine killed them in three minutes; and one-twentieth of a milligram of Duquesnel's crystallized aconitine killed them in three minutes. Dr. Langgaard, too, writes from Tokio that he has obtained from a Japanese species of *Aconitum* an alkaloid far exceeding in activity Duquesnel's preparation. For several years Messrs. Gehe prepared an aconitine from the roots of *Aconitum ferox*, adopting the method used in the preparation of veratrine, and stating the fact in their lists. But they have received so many communications as to the violent action of this preparation that they have now abandoned it. Seeing, therefore, that the use of different roots and different methods of preparation must necessarily result in widely differing products, which when sent into the market under the same name must constitute a source of danger, it is only reasonable to expect that an attempt should be made to define authoritatively in the different pharmacopœias the source and character of the substance to be henceforth supplied when aconitine is ordered. In attaining this end some valuable assistance should be derivable from the labours of Dr. C. R. A. Wright and his colleagues.

A new process for the industrial manufacture of carbonate of potash is being experimented upon in Montpellier (*Comptes Rendus*, xcii., 725). Magnesia or carbonate of magnesia is added to an aqueous solution of chloride of potassium and the mixture is stirred in the presence of carbonic acid gas. Bicarbonate of magnesia is first formed, which passing into solution reacts upon the chloride of potassium and precipitates the potassium in the form of a double carbonate of magnesia and potash ($MgCO_3.HKCO_3$). This precipitate, which is crystalline, when heated, either dry or in the presence of water, gives off carbonic acid gas and splits up into carbonate of magnesia and carbonate of potash, which are separated by water. The carbonate of magnesia is available for a second operation, as also is the carbonic acid gas evolved during the last reaction.

Until recently it was supposed that chlorine combined with ammonia only in the proportions found in sal ammoniac. M. Troost, however, succeeded in obtaining what he calls a tetra-ammoniacal hydrochlorate and a hepta-ammoniacal hydrochlorate (*Comptes Rendus*, lxxxviii., 715). He now reports still greater success (*Comptes Rendus*, xcii. 715), in obtaining new analogous crystalline compounds of ammonia with hydrobromic acid and hydriodic acid. The formulæ of the compounds are thus represented by M. Troost:—

ClH,NH_3	BrH,NH_3	IH,NH_3
—	BrH,NH_3+NH_3	IH,NH_3+NH_3
ClH,NH_3+3NH_3	BrH,NH_3+3NH_3	IH,NH_3+3NH_3
$ClH,NH_3+2(3NH_3)$	$BrH,NH_3+2(3NH_3)$	$IH,NH_3+2(3NH_3)$

The nearly allied position usually assigned to caffeine and theobromine in respect to uric acid, is, apart from a certain family likeness in the empirical formulæ, based upon only a few observations, and with a view to throwing further light upon the subject Messrs. Maly and Hinteregger (*Monatshefte für Chemie*, ii., 87 and 126) have been turning their attention to the decomposition products of those substances. By the oxidation of caffeine by means of chromic acid they obtained dimethylparabanic acid (the "nitrotheine" of Stenhouse and the cholestrophan of Rochleder). Theobromine, when treated similarly, yielded methylparabanic acid, a compound also obtained by Dessaignes by heating a base produced by the action of nitrous acid on creatinine with hydrochloric acid and probably formed also by the action of baryta on creatine. The homologous relation existing between these two vegetable bases is therefore characteristic also of their oxidation products: caffeine ($C_8H_{10}N_4O_2$) yielding dimethylparabanic acid ($C_5H_6N_2O_3$), while theobromine ($C_7H_8N_4O_2$) yields methylparabanic acid ($C_4H_4N_2O_3$). According to Herr Schmidt (*Berichte*, xiv., 812) some attempts to convert caffeine into theobromine by withdrawing the methyl group by means of hydrochloric acid have been unsuccessful. In the same communication Herr Schmidt describes the hydrochlorate, hydrobromate, two hydriodates, nitrate, sulphate, acetate, normal butyrate and isovalerate of caffeine. He states that caffeine only yields uniform well-characterized salts when it is directly acted upon by the respective acids in a concentrated condition. The "so-called citrate of caffeine" is referred to as a body proved to be non-existent; but the author is probably unacquainted with the work of Mr. Parsons (see before, p. 760), who found that when solutions of caffeine and of citric acid in a liquid having an equal solvent action on each body (such as chloroform, 2 parts; alcohol, sp. gr. ·835, 1 part) are mixed together, a definite citrate of caffeine is formed, which, however, is decomposed by water or any other solvent that dissolves citric acid readily and caffeine sparingly.

The composition of commercial picrotoxin appears to be still the subject of research. Messrs. Schmidt and Löwenhardt (*Berichte*, xiv., 817) agree with Messrs. Barth and Kretschy that upon boiling picrotoxin with benzol two substances, picrotoxinin and picrotin, may be separated, the former being much more soluble in benzol than the latter; but they do not agree that these bodies occur in commercial picrotoxin as a mixture. They hold rather that picrotoxin is a definite compound, which splits up under the treatment, the decomposition products being picrotoxinin and picrotin. This they represent by the following equation:—

$$\underset{\text{Picrotoxin.}}{C_{36}H_{40}O_{16}} = \underset{\text{Picrotoxinin.}}{C_{15}H_{16}O_{6}} + \underset{\text{Picrotin.}}{C_{21}H_{24}O_{10}}$$

They report also that they have isolated from the cocculus grains, besides picrotoxin, a body which is not bitter, crystallizing in fine white needles, difficultly soluble in hot water, nearly insoluble in cold water, alcohol and ether, and represented by the formula $C_{19}H_{26}O_{10}$. Whether this body is identical with the anamirtin of Messrs. Barth and Kretschy, which, however, was described as the most soluble in water (see before, p. 352), remains to be determined; meanwhile it is called "coculin."

In the *Pharmaceutische Zeitung fur Russland* (March 29, p. 229) there is a preliminary notice by Magister Theegarten upon a new variety of European opium from Bulgaria, a sample of which has been submitted to him by the medical authorities of the principality. The opium, which was in cakes covered with unidentified leaves, was brown on the outside, lighter brown internally, and contained a few seeds. The smell was strong and resembled that of good opium; the taste was bitter and acrid. When powdered the opium yielded a powder lighter in colour than the cake. Water dissolved 69·65 per cent. of the original weight of the opium, and in the filtrate was found 8 per cent. of pure morphia. The aqueous solution, which had an acid reaction, formed a brown liquid, which when dilute became red upon the addition of a drop of perchloride of iron. Probably owing to the opium being in small pieces and having been kept in a warm place it contained only 4·22 per cent of moisture.

In the supplement to the Hungarian Pharmacopœia about to be issued the following new remedies will be included:—Nitrite of amyl, hydrochlorate of apomorphia, citrate of caffeine, the leaves, tincture, and volatile oil of eucalyptus, salicylate of sodium, thymol, physostigmine, hydrochlorate of pilocarpine and vaseline.

It is difficult with such a preparation as phosphide of zinc to determine the change likely to take place when it is mixed with extracts, as in No. 523, in order to form a pill. Changes are known to have occurred with oxide of silver, which in some instances have been followed by an explosion. The circumstances under which these occurred will be found in the earlier volumes of the *Pharmaceutical Journal*. But phosphide of zinc has never been so extensively employed, and from some observations by M. A. Viger, a French pharmacien (*Pharmaceutical Journal*, [3], vi., p. 982), it appears that he found several samples manufactured in Paris defective, one containing a small quantity of oxide of zinc.

If No. 524 be treated as a prescription, the spirit of ammonia of the Pharmacopœia Londinensis, 1836, should be used, and that being a rectified spirit preparation there would necessarily be complete solution of the camphor, which is soluble in equal parts by weight of spirit; but if it be one of those numerous recipes which admit of some latitude as regards these preparations, spirit of ammonia would be taken to mean an aqueous solution of ammonia, instead of a spirituous one, and consequently the camphor previously dissolved in the spirit of wine would be thrown out of solution by the ammonia. The answer to this question, therefore, must be, that if made with a spirituous solution of ammonia it will be a clear mixture; but if made with merely an aqueous solution, which is often used in domestic recipes for spirit of ammonia, the mixture instead of being clear will have most of the camphor thrown out of solution, and only diffused through it. This seems to be Mr. Culph's view, p. 830.

It is not unusual to find a prescription for pills containing essential oil much in excess of that the other ingredients are capable of taking up, and sometimes this is the case when the oil does not form an essential part of the remedy. In the case, however, of No. 525, the oil of savin is prescribed as a therapeutic agent with a specific object in view. It must, therefore, in this instance be dispensed, and if the dried sulphate of iron be used in the proportion of two-thirds the quantity of the sulphate ordered, and as an excipient a very small quantity of glycerine of tragacanth, there will be little difficulty. Care should be taken that the extract of henbane be evaporated to a stiff consistence previously to its addition to the other ingredients. Reference is suggested to some previous remarks on a similar prescription in "The Month."

The writer of prescription No. 526 having ordered a certain quantity of acid. sulph. dil., though insufficient for the solution of the quinine, it would be very generally assumed by dispensers that he intended complete solution; if some quinine were allowed to float in a solution of it, this undissolved quinine would be very likely to determine the crystallization from the solution on the side or bottom of the bottle, the small particles acting as nuclei for that purpose.

The first ingredient in prescription No. 527 is kermes mineral,—synonym, antimon. sulphuratum—B.P., and the second is looch pectoralis; looch is equivalent to linctus, and the formula is given by a correspondent. There would be little difficulty in preparing the linctus extemporaneously, bearing in mind the proper method of emulsifying the oil by rubbing it with the powdered gum arabic, and then adding the water. Having made the linctus, the further manipulation with the kermes mineral must be obvious; care should be taken that it be triturated with a little of the fluid, and afterwards thoroughly diffused through the mixture.

It has been on a former occasion observed that it is difficult to determine what is meant when a mixture made up in one place is said to be darker, and the same made up at another place to be lighter; these minor differences cannot always be explained or accounted for, and probably in many instances may not be material. With reference to the one now in question, that of No. 528, the first colour of the mixture will depend on the tinct. ferri perchlor., which sometimes becomes much darker in keeping; but on its addition to the syrup of lemon it becomes several shades deeper, from its contact with that syrup, and this is mainly dependent on the care which has been employed in preparing the lemon peel for the syrup. The galenical preparations of the B.P. should be intelligently prepared, and then in dispensing prescriptions, the result, a correctly and faithfully prepared prescription, can be confidently relied on. It must not be hastily assumed that a private formula was used for the preparation of the syrup by the last dispenser because the resulting mixture differed a little in colour; that may have been due to a variety of minor causes.

There is a formula for tinct. iodi decolorat. in the German Pharmacopœia; it will be found in Squire's 'Companion,' as follows:—Tinct. iodi decolorat. Ger.: Iodine 10, hyposulphite of soda 10, distilled water 10; dissolve and add alcohol ammon. sp. gr. 0·808 (10 per cent.) 16, agitate and then add alcohol 75; set aside three days and filter. This is most probably intended when tinct. iod. c. ammon. is ordered, and it would be safe to use it unless it be known that a preparation from a private formula was intended. The preparation from the above formula should be a clear and colourless neutral or faintly alkaline fluid. The decolorization of ordinary tincture of iodine, unless excess of ammonia be employed, requires time. This subject has been referred to on a former occasion in these pages.

The acid. salicylic. of No. 530 should be rubbed to a fine powder and then triturated with sufficient mucilage to fairly suspend it when mixed with the water; about half an ounce will be sufficient for this purpose, and the mixture should be accompanied by a "shake" label. It has been observed on several occasions previously that when a crystallized substance is in excess of that the fluid will retain in solution, it must be rubbed down and suspended by means of mucilage; no attempt should be made to dissolve more by the aid of heat, or the result will be the crystallization of all that is contained in the bottle.

The proper method of dispensing the mixture, No. 531, is by first dissolving the salicin by the aid of heat in a small quantity of the water, and when cold adding the solution to the other ingredients, with the exception of the quinine, previously dissolved in water; the quinine should then be rubbed in a mortar with a little mucilage and added last. A very satisfactory mixture may in this manner be made with the suspension of the quinine. The method adopted by J. H. was not a good one, and resulted in the suspension of the salicin, which, as suggested, may be dissolved. This mixture contains salicin and not sodæ salicylas, as the one referred to quite recently by W. G. T.

The mixture, No. 532, should be quite clear and about the colour of tincture of calumba; it is difficult to understand how it could have possessed any other appearance. Under the head "Characters and Tests" in the B.P. it is stated that the ferri am. tart. is in "thin, transparent scales of a deep garnet colour, and soluble in water," and there is nothing in this mixture that should materially interfere with the colour and solubility.

If the vin. ferri of prescription No. 533 be in a proper condition it will not contain sufficient free acid to dissolve the quinine, and the introduction of sulphuric acid into the mixture would not be admissible; but if the quinine be mixed with the vin. ferri and the mixture be placed for a few minutes in a water-bath complete solution will be effected, and mixed afterwards with the other ingredients will form a clear mixture, and one not liable to any change.

To make an elegant mixture of No. 534 a solution of the bromide of iron should be first prepared, and may contain from 5 to 20 grains to the fluid drm.; the solution is clear and of an olive green colour. This, when added to a solution of bromide of potassium, is decomposed with change of colour to a rusty brown, and finally deposits a red sediment of iron. This decomposition with deposit of iron is due to the presence of a little hydrate of potash in the bromide of potassium, and it may be obviated by the addition of a little citric acid to the solution previous to the addition of the bromide of iron.

In each of the two prescriptions under No. 535 there is an obvious error; the directions should probably run thus:—"Misce et divide in pil. xij." In each case a very good and possibly the best excipient will be the decoction of aloes, a few drops of which will serve to combine the pills of each of these prescriptions.

This inquiry indicates that feature which has on several occasions previously been commented on in these columns, the want of self-reliance, and apparently an entire absence of the effort or disposition to investigate personally any one of the many simple problems with which the daily practice of the dispenser brings him into contact. It is difficult to name an excipient that would have failed to combine the ingredients of these two sets of pills. The cry is raised to Jupiter, but the shoulder is not at the wheel.

In reply to "Assistant," No. 536, ferri citras is understood to mean ferri ammon. citras, B.P., when met with in a prescription. In the Pharmacopœia of the United States there is a ferri citras and a ferri ammon. citras, but this fact does not affect the principle to be adopted with regard to English prescriptions.

It is difficult to account for the mixture, No. 537, turning black after being kept some time; the change must be looked for in some impurity in one of the ingredients or the contact of one of them with some foreign substance. There seems no reason why such a change should occur.

With reference to prescription, No. 538, acid. hydrocyanic. is incompatible with the salts of iron; but in a mixture such as the one in question, it can scarcely be said to be incompatible with the ammonio-citrate of iron contained in it. The odour of hydrocyanic acid will continue perceptible after such a mixture has been prepared and kept for a reasonable length of time.

In the first prescription of No. 539, R. J. D. was not right in adding any dilute sulphuric acid to dissolve the quinine; it should have been powdered and suspended by means of mucilage. With regard to the second under the same number, in this also there was no necessity for the addition of water, as the potass. iodid. being rubbed in a mortar with lin. camph. co. and lin. bellad. will readily dissolve.

R. J. D. should always try a prescription just as written, and if in this mixture of the two liniments he had failed to dissolve the iodide of potassium, then as a solution of this sort was essential to the liniment he might have ventured to add a few drops of water in order to facilitate the solution.

ROSE OIL, OR OTTO OF ROSES.*

BY CHARLES G. WARNFORD LOCK.

This celebrated perfume is the volatile essential oil distilled from the flowers of some varieties of rose. The botany of roses appears to be in a transition and somewhat unsatisfactory state. Thus the otto-yielding rose is variously styled *Rosa damascena*, *R. sempervirens*, *R. moschata*, *R. gallica*, *R. centifolia*, *R. provincialis*. It is pretty generally agreed that the kind grown for its otto in Bulgaria is the damask rose (*R. damascena*), a variety induced by long cultivation, as it is not to be found wild. It forms a bush, usually 3 to 4 feet, but sometimes 6 feet high; its flowers are of moderate size, semi-double, and arranged several on a branch, though not in clusters or bunches. In colour, they are mostly light red; some few are white, and said to be less productive of otto.

The utilization of the delicious perfume of the rose was attempted with more or less success, long prior to the comparatively modern process of distilling its essential oil. The early methods chiefly in vogue were the distillation of rose water, and the infusion of roses in olive oil, the latter flourishing in Europe generally down to the last century, and surviving at the present day in the south of France. The butyraceous oil produced by the distillation of roses for making rose water in this country is valueless as a perfume: and the real otto was scarcely known in British commerce before the present century.

The profitable cultivation of roses for the preparation of otto is limited chiefly by climatic conditions. The odoriferous constituent of the otto is a liquid containing oxygen, the solid hydrocarbon or stearoptene, with which it is combined, being absolutely devoid of perfume. The proportion which this inodorous solid constituent bears to the liquid perfume increases with the unsuitability of the climate, varying from about 18 per cent. in Bulgarian oil, to 35 and even 68 per cent. in rose oils distilled in France and England. This increase in the proportion of stearoptene is also shown by the progressively heightened fusing point of rose oils from different sources; thus while Bulgarian oil fuses at about 61° to 64° Fahr.; an Indian sample required 68° Fahr.; one from the south of France, 70° to 73° Fahr.; one from Paris, 84° Fahr.; and one obtained in making rose water in London, 86° to 89½° Fahr. Even in the Bulgarian oil, a notable difference is observed between that produced on the hills, and that on the lowlands.

It is, therefore, not surprising that the culture of roses, and extraction of their perfume, should have originated in the East. Persia produced rose water at an early date, and the town of Nisibin, north-west of Mosul, was famous for it in the 14th century. Shiraz, in the 17th century, prepared both rose water and otto, for export to other parts of Persia, as well as all over India. The Perso-Indian trade in rose oil, which continued to possess considerable importance in the third quarter of the 18th century, is declining, and has nearly disappeared; but the shipments of rose water still maintain a respectable figure. The value, in rupees, of the exports of rose water from Bushire in 1879, were—4000 to India; 1500 to Java; 200 to Aden and the Red sea; 1000 to Muscat and dependencies; 200 to Arab coast of Persian Gulf and Bahrein; 200 to Persian coast and Mekran, and 1000 to Zanzibar. Similar statistics relating to Lingah, in the same year, show—Otto: 400 to Arab coast of Persian Gulf and Bahrein; and 250 to Persian coast and Mekran. And Bahrein, Persian otto: 2200 to Koweit, Busrah and Bagdad; rose-water: 200 to Arab coast of Persian Gulf, and 1000 to Koweit, Busrah and Bagdad.

India itself has a considerable area devoted to rose gardens, as at Ghazipur, Lahore, Amritsur, and other places, the kind of rose being *R. damascena*, according to Brandis. Both rose water and otto are produced. The flowers are distilled with double their weight of water in clay stills; the rose water (*goolabi pani*) thus obtained is placed in shallow vessels, covered with moist muslin to keep out dust and flies, and exposed all night to the cool air, or fanned. In the morning, the film of oil, which has collected on the top, is skimmed off by a feather, and transferred to a small phial. This is repeated for several nights, till almost the whole of the oil has separated. The quantity of the product varies much, and three different authorities give the following figures:—(*a*) 20,000 roses to make 1 rupee's weight (176 grains) of otto; (*b*) 200,000 to make the same weight; (*c*) 1000 roses afford less than 2 grains of otto. The colour ranges from green to bright amber, and reddish. The oil (otto) is most carefully bottled; the receptacles are hermetically sealed with wax, and exposed to the full glare of the sun for several days. Rose water deprived of otto is esteemed much inferior to that which has not been so treated. When bottled, it is also exposed to the sun for a fortnight at least.

The Mediterranean countries of Africa enter but feebly into this industry, and it is a little remarkable that the French have not cultivated it in Algeria. Egypt's demand for rose water and rose vinegar is supplied from Medinet Fayum, south-west of Cairo. Tunis has also some local reputation for similar products. Von Maltzan says that the rose there grown for otto is the dog-rose (*R. canina*), and that it is extremely fragrant, 20 lbs. of the flowers yielding about 1 dr. of otto. Genoa occasionally imports a little of this product, which is of excellent quality. In the south of France, rose gardens occupy a large share of attention, about Grasse, Cannes and Nice; they chiefly produce rose water, much of which is exported to England. The essence (otto) obtained by the distillation of the Provence rose (*R. provincialis*) has a characteristic perfume, arising, it is believed, from the bees transporting the pollen of the orange flowers into the petals of the roses. The French otto is richer in stearoptene than the Turkish, 9 grams crystallizing in a litre (1¾ pint) of alcohol at the same temperature as 18 grams of the Turkish. The best preparations are made at Cannes and Grasse. The flowers are not there treated for the otto, but are submitted to a process of maceration in fat or oil, 10 kilograms of roses being required to impregnate 1 kilogram of fat. The price of the roses varies from 50 cents to 1 franc 25 cents per kilogram.

But the one commercially important source of otto of roses is a circumscribed patch of ancient Thrace or modern Bulgaria, stretching along the southern slopes of the central Balkans, and approximately included between the 25th and 26th degrees of east longitude, and the 42nd and 43rd degrees of north latitude. The chief rose growing districts are Philippopolis, Chirpan, Giopcu, Karadshah-Dagh, Kojun-Tepe, Eski-Sara, Jeni-Sara, Bazardshik, and the centre and headquarters of the industry, Kazanlik (Kisanlik), situated in a beautiful undulating plain, in the valley of the Tunja. The productiveness of the last-mentioned district may be judged from the fact that, of the one hundred and twenty-three Thracian localities carrying on the preparation of otto in 1877—they numbered one hundred and forty in 1859—forty-two belong to it. The only place affording otto on the northern side of the Balkans is Travina. The geological formation throughout is syenite, the decomposition of which has provided a soil so fertile as to need but little manuring. The vegetation, according to Baur, indicates a climate differing but slightly from that of the Black Forest, the average summer temperatures being stated at 82° Fahr. at noon, and 68° Fahr. in the evening. The rose bushes flourish best and live longest on sandy, sun-exposed (south and south-east aspect) slopes. The flowers produced by those growing on inclined ground are dearer and more esteemed than any raised on level land, being 50 per cent. richer in oil, and that of a stronger quality. This proves the advantage of thorough drainage. On the other hand, plantations at high altitudes yield less oil, which is of a character that readily congeals, from an insufficiency of summer heat. The districts lying adjacent to and in the mountains are sometimes visited by hard frosts, which destroy or greatly reduce the crop. Floods also occasionally do considerable damage. The bushes are attacked at intervals and in patches by a blight similar to that which injures the vines of the country.

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* From the *Journal of the Society of Arts*, February 11, 881.

The bushes are planted in hedge-like rows in gardens and fields, at convenient distances apart, for the gathering of the crop. They are seldom manured. The planting takes place in spring and autumn; the flowers attain perfection in April and May, and the harvest lasts from May till the beginning of June. The expanded flowers are gathered before sunrise, often with the calyx attached; such as are not required for immediate distillation are spread out in cellars, but all are treated within the day on which they are plucked. Baur states that, if the buds develop slowly, by reason of cool damp weather, and are not much exposed to sun heat, when about to be collected, a rich yield of otto, having a low solidifying point, is the result, whereas, should the sky be clear and the temperature high at or shortly before the time of gathering, the product is diminished and is more easily congealable. Hanbury, on the contrary, when distilling roses in London, noticed that when they had been collected on fine dry days the rose water had most volatile oil floating upon it, and that, when gathered in cool rainy weather, little or no volatile oil separated.

The flowers are not salted, nor subjected to any other treatment, before being conveyed in baskets, on the heads of men and women, and backs of animals, to the distilling apparatus. This consists of a tinned-copper still, erected on a semicircle of bricks, and heated by a wood fire; from the top passes a straight tin pipe, which obliquely traverses a tub kept constantly filled with cold water, by a spout, from some convenient rivulet, and constitutes the condenser. Several such stills are usually placed together, often beneath the shade of a large tree. The still is charged with 25 to 50 lbs. of roses, not previously deprived of their calyces, and double the volume of spring water. The distillation is carried on for about one hour and a half, the result being simply a very oily rose water (*ghyul-suyu*). The exhausted flowers are removed from the still, and the decoction is used for the next distillation, instead of fresh water. The first distillates from each apparatus are mixed and distilled by themselves, one-sixth being drawn off; the residue replaces spring water for subsequent operations. The distillate is received in long-necked bottles, holding about 1¼ gallon. It is kept in them for a day or two, at a temperature exceeding 59° Fahr., by which time, most of the oil, fluid and bright, will have reached the surface. It is skimmed off by a small, long-handled, fine-orificed tin funnel, and is then ready for sale. The last-run rose water is extremely fragrant, and is much prized locally for culinary and medicinal purposes. The quantity and quality of the otto are much influenced by the character of the water used in distilling. When hard spring water is employed, the otto is rich in stearoptene, but less transparent and fragrant. The average quantity of the product is estimated by Baur at 0·037 to 0·040 per cent.; another authority says that 3200 kilograms of roses give 1 kilogram of oil.

Pure otto, carefully distilled, is at first colourless, but speedily becomes yellowish; its specific gravity is 0·87 at 72·5° Fahr.; its boiling point is 444° Fahr.; it solidifies at 51·8° to 60·8° Fahr., or still higher: it is soluble in absolute alcohol, and in acetic acid. The most usual and reliable tests of the quality of an otto are (1) its odour; (2) its congealing point; (3) its crystallization. The odour can be judged only after long experience. A good oil should congeal well in five minutes at a temperature of 54·5° Fahr.; fraudulent additions lower the congealing point. The crystals of rose-stearoptene are light, feathery, shining plates, filling the whole liquid. Almost the only material used for artificially heightening the apparent proportion of stearoptene is said to be spermaceti, which is easily recognizable from its liability to settle down in a solid cake, and from its melting at 122° Fahr., whereas stearoptene fuses at 91·4° Fahr. Possibly paraffin wax would more easily escape detection.

The adulterations by means of other essential oils are much more difficult of discovery, and much more general; in fact, it is said that none of the Bulgarian otto is completely free from this kind of sophistication. The oils employed for the purpose are certain of the grass oils (*Andropogon* and *Cymbopogon spp.*), notably that afforded by *Andropogon Schœnanthus*, called *idris-yaghi* by the Turks, and commonly known to Europeans as "geranium oil," though quite distinct from true geranium oil. The addition is generally made by sprinkling it upon the rose leaves before distilling. It is largely produced in the neighbourhood of Delhi, and exported to Turkey by way of Arabia; it is sold by Arabs in Constantinople in large bladder-shaped tinned-copper vessels, holding about 120 lbs. As it is usually itself adulterated with some fatty oil, it needs to undergo purification before use. This is effected in the following manner:—The crude oil is repeatedly shaken up with water acidulated with lemon juice, from which it is poured off after standing for a day. The washed oil is placed in shallow saucers, well exposed to sun and air, by which it gradually loses its objectionable odour. Spring and early summer are the best seasons for the operation, which occupies two to four weeks, according to the state of the weather and the quality of the oil. The general characters of this oil are so similar to those of otto of roses—even the odour bearing a distant resemblance—that their discrimination when mixed is a matter of practical impossibility. The ratio of the adulteration varies from a small figure up to 80 or 90 per cent. The only safeguard against deception is to pay a fair price, and to deal with firms of good repute, such as Messrs. Papasoglu, Manoglu and Son, Ihmsen and Co., and Holstein and Co., in Constantinople.

The otto is put up in squat-shaped flasks of tinned copper, called *kunkumas*, holding from 1 to 10 lbs., and sewn up in white woollen cloths. Usually their contents are transferred at Constantinople into small gilded bottles of German manufacture for export. The Bulgarian otto harvest, during the five years 1867–71, was reckoned to average somewhat below 400,000 *meticals*, *miskals*, or *midkals* (of about 3 dwt. troy), or 4226 lbs. avoirdupois; that of 1873, which was good, was estimated at 500,000, value about £700,000. The harvest of 1880 realized more than £1,000,000, though the roses themselves were not so valuable as in 1876. About 300,000 *meticals* of otto, valued at £932,077, were exported in 1876 from Philippopolis, chiefly to France, Australia, America and Germany.

THE ROOT OF HYDRANGEA ARBORESCENS.*

BY JACOB BAUR, PH.G.

In looking over the pharmaceutical and chemical literature with reference to hydrangea, the only analysis found was that by Mr. Jos. Laidley, of Richmond, Virginia, in the year 1851, since which time no one seems to have published anything with regard to the principles to which the drug might owe its activity. Laidley found but gum, starch, resin, etc. In writing of the drug and its uses in gravel and urinary diseases, he notes some marked cures effected by its administration, which are no less remarkable than some which have been communicated to me by Dr. Jno. H. Parrish, of Saundersville, Tenn., who has used with good results an extract of the root prepared by the late Prof. Edward Parrish, and recently by Mr. Clemmons Parrish. He says, "My case-books show thirty-one cases of gravelly deposits in the bladder, which I believe to have been cured by hydrangea; I remember no case in which it has failed under fair circumstances. I regard hydrangea as a valuable remedial agent not only in sabulous troubles, but in any case where the functions of the kidneys are impaired." Other physicians have recommended it in the same complaints. That it is used by many physicians may be known from the words of Prof. J. U. Lloyd, of Cincinnati, who writes: "The section of country about Cincinnati annually supplies large amounts of hydrangea root for other markets."

A quantity of the root of good quality was obtained, its identity established and carefully inspected as to the absence of all foreign admixtures. This was ground suitably for percolation; some difficulty was here encountered owing to the peculiar ligneous character of the root, the greater portion of which is an insipid hard wood, with but a thin much fissured bark, which, as found in the market, is quite frequently detached in thin concentric layers, due to the unequal shrinkage of the wood and bark in drying. The peculiar sweetish but acrid taste of the root seems to reside in the bark.

Three grams of the root were ignited, yielding ·13 grams of ash, the greater portion of which was soluble in water. The appropriate tests being made, carbonates, sulphates and phosphates of potassium, sodium, calcium, magnesium and iron were found in the ash.

In a preliminary investigation, which was undertaken to ascertain the best solvents for its important constituents, a decided indication of an alkaloid was obtained by the application of the various alkaloidal tests; the following experiments were made in order to isolate the alkaloid, if possible.

One thousand grams of the drug being exhausted with alcohol of ·828 sp. gr. by percolation, yielded 38·209 grams of extract, which was redissolved in a small quantity of warm alcohol, and poured into one quart of water previously acidulated with acetic acid; the resin separated weighed 6·43 grams.

The filtrate (*a*) was set aside for further investigation. The resin obtained had a sweet, mild, but afterwards lastingly acrid taste. It was insoluble in ammonic hydrate, almost entirely soluble in potassic hydrate, which solution was precipitated by hydric chloride. Approximately one-half the resin was soluble in ether. The insoluble portion was almost insoluble in amylic alcohol. The alcoholic solution of the resin was precipitated by solutions of neutral and basic plumbic acetate.

The filtrate (*a*), obtained on separating the resin, was evaporated to an extract which had a saccharine odour and a bitterish taste, and weighed 31·566 grams. This extract was dissolved in a small quantity of warm water and filtered; the next morning the solution contained a few crystals which it was found impossible to separate. Solutions of neutral and basic plumbic acetate were added to thoroughly precipitate tannin, yielding a bluish-black precipitate with iron salts; the excess of lead was removed by sulphuretted hydrogen, the filtrate evaporated to small bulk, acidulated with hydric chloride and shaken with ether; the ethereal layer evaporated spontaneously left but a slight residue, in which no alkaloid was present.

The aqueous portion was then shaken with pure amylic alcohol, the latter separated and evaporated to dryness, the slight residue remaining gave in solution the following reactions: with Mayer's solution, a light, whitish, flocculent precipitate; with iodine in potassium iodide, a brown precipitate. Phosphomolybdic acid and tannin both gave precipitates. Platinic chloride gave a yellowish precipitate having a crystalline appearance on standing a short time. Picric acid gave no precipitate.

One hundred and twenty-five grams of the drug were exhausted by maceration and percolation with pure coal tar benzol. The greater portion of the benzol was recovered and an extract weighing 1·43 gram was obtained. Warm acidulated water (with HCl) was shaken with the extract and yielded then, with the alkaloidal reagents, light precipitates. Tests for glucosides were also applied with no indication of their presence. The extract was almost entirely dissolved by alcohol.

The drug exhausted by benzol was dried and exhausted by 80 per cent. alcohol. On evaporation to a small bulk a few crystals separated; the solution was acidulated, diluted and precipitated with plumbic acetate. After removing excess of lead by sulpuretted hydrogen, the filtrate gave again indications of the presence of an alkaloid by the above tests. The drug treated with benzol and alcohol was exhausted with water; the extract obtained contained sugar and gum.

Five hundred grams of the powdered root were boiled repeatedly with acidulated water, the mixed decoctions evaporated to a small volume, the gum removed by an equal volume of alcohol, and, after recovering the alcohol, the tannin precipitated by subacetate of lead, which precipitates also colouring matter. After removing excess of lead reactions were again obtained pointing to the presence of an alkaloid; however, judging by the quantity of drug operated upon, this alkaloid, if such it is, must be present in minute quantities. The presence of an alkaloid would, indeed, be interesting as being the first one discovered in any plant of the natural order Saxifragaceæ.

The constituents of hydrangea root, determined by these experiments, are resin soluble in ether, resin insoluble in ether, probably an alkaloid and a crystalline compound, the nature of which was not determined; also tannin, gum, sugar, colouring matter, and 4·33 per cent. of ash.

FERROUS SUCROCARBONATE.*

BY C. TANRET.

By substituting cane-sugar for milk-sugar in the preparation of "*masse de vallet*," a syrupy mass interspersed with crystals is obtained. The crystals are of a brown colour and opaque; the angle between the lateral faces is 79·40°. Sp. gr. = 1·85. They are decomposed by the neutral solvents of sugar, the sugar going into solution and ferrous carbonate being precipitated. The sugar acts but faintly on Fehling's solution until heated with acid, when it readily reduces it.

The analysis of the crystals corresponds with the formula $(C_{12}H_{22}O_{11})_3(Fe_2CO_3)_2$.

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* From the *American Journal of Pharmacy*, April, 1881.

* From *Journ. Pharm.* [5], 2, 469—471. Reprinted from the *Journal of the Chemical Society*, April, 1881.

THE SOLUBILITIES OF ALKALOIDS IN ALCOHOL.*

BY ALBERT HENRY LAFEAN, PH.G.

On several occasions having been called upon to make alcoholic solutions of the alkaloids, and, upon consulting the different text-books, finding the statements differing very much, it was thought a useful subject of investigation to determine the solubilities from actual experiments. In most cases alcohols of different strengths and various temperatures were employed for the solubilities as given in text-books. Besides this the article is frequently merely stated to be "very" or "slightly" soluble.

The authorities which were consulted were the United States Dispensatory, the National Dispensatory and Storer's 'Dictionary of Chemical Solubilities,' and below is given a list of the alkaloids selected for the experiments, with a table showing their solubility in alcohol of usual strength, as determined by the writer, and as given by text-books.

The method of ascertaining the solubility of the alkaloid was to place a given quantity in a somewhat less quantity of alcohol than that recommended by the text-books or authorities, contained in an accurately graduated tube, and at ten degrees higher temperature than the standard temperature selected (60° F.). The alkaloid was digested for several hours, with occasional agitation, and if the quantity of alcohol was insufficient an addition was carefully made until solution was effected at this slightly higher temperature. If an excess of alcohol happened to be added the tube was left unstopped, to permit evaporation, for a few hours, until a slight deposition took place. If this failed to be dissolved at a slightly elevated temperature, a very small quantity of alcohol was added, sufficient to take up the slight excess, and the solution was then brought to the proper temperature, 60° F.

This plan was adopted because it was believed to present advantage over the usual methods of digestion, or by cooling, as less troublesome, less liable to error, which in the case of ordinary digestion is apt to occur, with an excess of the salt [? Editor], through moisture adhering to the excess of salt [?] that is filtered out, and also less danger through supersaturation, which is likely to happen by the hot process. Moreover, it was believed that it would be better to give solubilities that represent the actual amount dissolved under such conditions as are likely to exist in actual dispensing practice.

	United States Dispensatory.	National Dispensatory.	Storer's Dictionary of Chemical Solubilities.	Lafean.
Atropia. .	Soluble in 8 parts of alcohol.	Soluble in a little alcohol.	8 to 8 parts cold alcohol. Easily soluble in alcohol. Soluble in 1·5 part cold alcohol.	Soluble in 2 of alcohol.
Cinchonia.	Soluble in boiling alcohol, which deposits a portion on cooling.	Soluble in 140 parts 80 per cent. alcohol.	Soluble in 400 parts alcohol, 80 per cent. at 17°. 110 parts, at temperature of boiling. 83·8 parts strong alcohol. 115·78 parts alcohol, ·90 per cent., 15°. 126·5 parts absolute alcohol, at about 15°.	Soluble in 145 of alcohol.
Cinchonidia	None given.	Soluble in 20 parts ·80 per cent. alcohol.	88 parts cold alcohol. ·833 and 19 of the same alcohol, at boiling. In 12 alcohol, ·835.	Soluble in 30 of alcohol.
Caffeia . .	Soluble in alcohol.	Not freely soluble in water, more so in alcohol, and chloroform. but less in absolute alcohol and ether.	20 parts alcohol, 21°. 25 parts 85 per cent. alcohol, 20°. Quickly soluble in boiling alcohol.	Soluble in 150 of alcohol.
Colchicia .	Very soluble in alcohol.	Freely soluble in alcohol.	Soluble in alcohol.	Soluble in 3 of alcohol.
Daturia .	Is very soluble in alcohol.	Identical with atropia in solubility.	Vid. Atropia.	Soluble in 2 of alcohol.
Morphia .	Slightly soluble in cold alcohol, and freely so in boiling alcohol, which deposits it on cooling.	Soluble in 30 boiling and 50 cold alcohol.	20 parts cold and 13 of boiling alcohol, sp. gr. ·822.	Soluble in 215 of alcohol.
Narcotina .	Soluble in 100 parts cold and 24 parts boiling alcohol, which deposits it on cooling.	None given.	Soluble in 100 parts cold and 24 of boiling alcohol	Soluble in 265 of alcohol.
Quinia . .	Is very soluble in alcohol.	Soluble in 80 parts 80 per cent. alcohol.	Soluble in all proportions of cold absolute alcohol, and in almost all proportions of alcohol 90 per cent.	Soluble in ·8 of alcohol.
Quinidia .	None given.	Soluble in 45 parts absolute alcohol.	Soluble in 45 parts cold absolute alcohol. 3·7 parts of warm ordinary alcohol.	Soluble in 115 of alcohol.
Strychnia .	Boiling officinal alcohol dissolves it without difficulty, and deposits it on cooling. Very sparingly soluble in absolute alcohol.	120 parts cold and 10 parts boiling 80 per cent. alcohol. Sparingly soluble in absolute and dilute alcohol.	1200 parts alcohol, 89 per cent., ordinary temperature. 10 parts boiling 80 per cent. alcohol.	Soluble in 175 of alcohol.
Veratria .	Soluble in 11 parts of alcohol, ·847.	Soluble in 3 parts of alcohol.	Soluble in 3 parts of cold and 2 of boiling alcohol.	Soluble in ·8 of alcohol.

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The Pharmaceutical Journal.

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CINCHONA BARK AS AN ARTICLE OF THE OFFICIAL MATERIA MEDICA.

IN a recent number of the *Pharmaceutische Zeitung* Professor FLUCKIGER has drawn attention to the uncertainty now prevailing as to the kind of cinchona bark that would be best to use for pharmaceutical purposes. He considers that from the importance of that drug as a medicine this circumstance alone is sufficient to justify the existing desire for a revision of the German Pharmacopœia, and the same view may be applied to the Pharmacopœias of most other countries.

One of Professor FLUCKIGER's objections to the three kinds of cinchona bark now officially prescribed is that they are referred to only as of South American origin, and he points to the development of the supply of bark from British India since 1867 as having now reached a stage when Indian grown bark requires to be considered in a very different manner from what was possible when the last German Pharmacopœia was published in 1871.

The question to be considered is how the cultivated cinchona bark imported from India should be dealt with in a new Pharmacopœia, and Professor FLUCKIGER is of opinion that its consideration must not be confined merely within the limits of a pharmacopœia commission, or undertaken exclusively from a medical or pharmaceutical point of view, but that it must be conducted also with suitable regard to the present position of cinchona bark as an article of commerce as well as the probable form that it may take in the future.

From an examination of the various circumstances obtaining in regard to those varieties of South American cinchona bark which are now official Professor FLUCKIGER arrives at the following conclusions, which, we think, will be of interest to our readers.

The flat calisaya or yellow bark of the Pharmacopœia, he finds to be more scantily and less regularly exported than formerly and at the same time it has become inferior in quality, the amount of alkaloid in the Peruvian and Bolivian calisaya bark being very much less than we were formerly accustomed to. Whatever may be the cause of this deterioration it is unquestionable that the official calisaya bark does not meet the requirements which the Pharmacopœia should demand of cinchona bark to which preference is to be given. Such bark ought to be obtainable abundantly and uniformly at a comparatively moderate price, and it should contain an adequate as well as a constant amount of alkaloid. In addition to these points it is to be remembered that the therapeutic action of cinchona bark must be in part ascribed to other constituents besides the alkaloids. The quinotannic acid, quinovin and quinovic acid, as well perhaps as quinic acid, are present in smaller proportion in the stem bark of calisaya than in most kinds of branch bark. All these facts are regarded by Professor FLUCKIGER as being so unfavourable to calisaya bark that he would recommend its being abandoned as an article of the official materia medica. As a further reason for taking such a step, he refers to the geographical as well as the political situation of the frontier lands of Bolivia and Peru where the cinchona calisaya is indigenous. The high table-land surrounding the Titicaca Lake is very difficult of access, very insufficiently connected with the rather defective ports of the Pacific Coast, Islay, Arica, or, if the territory in question be somewhat further extended, even Iquique and Cobija. Occasional violent floods and earthquakes also combine to render the development of these localities very questionable, and the present unsettled state of the country is a further reason why the pharmacist should not rely upon such an uncertain source for the supply of such an important drug as cinchona bark.

The same remarks are applied to the bark known as Loxa or Huanuco bark, and even somewhat more forcibly. Though perhaps it may be hoped that at some future time the Chilians may improve the condition of the southernmost cinchona district adjoining the ports of Cobija and Iquique there is now little prospect of rapid economical advance in the central district of Peru surrounding Huanuco. If the Peruvians have not hitherto seen the desirability of making a sensible use of their cinchona wealth it is not likely they will now be able to undertake the cultivation and planting of trees as a business, and it may be feared that impending revolutions will scarcely leave the Government of that unfortunate country time or means of opening up the interior for trade.

As to red bark, it is urged that the district where the *Cinchona succirubra* is indigenous in South America is so limited as to account for the very scanty supply of this bark and also for the high price it commands. Whether bark of the same character may not eventually be obtained at a cheaper rate from India is a question that must be left for the future to solve, but for the present there can be no hope of obtaining thick stem bark, such as is ordered by the German Pharmacopœia. Such bark is not often to be had at all, and its intrinsic value seldom corresponds to its price.

In Bolivia and that part of Peru within the valley of the Amazon cinchonas are probably abundant, as indicated by Ledger's discovery of the very valuable tree named after him; but those sources of supply will become accessible only when the numerous rivers of that immense region shall have been opened up for regular traffic. The possibility of exporting cinchona bark of excellent quality from that locality has already been practically demonstrated, but it will probably be a long time before there be any trustworthy means of communication.

Beyond these sources of South American cinchona bark there is the northern part of the cinchona region in Columbia and Venezuela, to which belong the *C. lancifolia* and *C. pitayensis*. The south western section of this district is partially connected with the Atlantic Ocean by the rivers Cauca and Magdalena and this part of South America undoubtedly still yields the greater portion of the cinchona bark of commerce. At the ports of Carthagena and Sabanilla especially, as well as those of Maracaibo, Puerto Cabello and La Guaira, are very considerable harbours, which are connected with the Atlantic Ocean by the Carribean Sea, and for the shipment of bark they have an obvious advantage over those situated on the Pacific. The objection raised by Professor Fluckiger to taking the bark supplied from this district for pharmacopœia purposes is based upon the difficulty he thinks there would be in making a selection from among the various kinds differing very considerably in their appearance and in the amounts of alkaloids, etc. For the preparation of quinine, mere differences of character are of less importance, provided that the amount of alkaloid be sufficient; but in selecting a variety of cinchona bark for the Pharmacopœia it is, in Professor Fluckiger's opinion, at least necessary to put prominently forward a specific kind of bark, even if it be not exclusively ordered. If the bark thus adopted is to be moderately uniform in outward appearance he thinks it is scarcely possible to look for it from Columbia or Venezuela, while at the same time he thinks there is much reason for giving preference to a branch bark rather than a stem bark. The latter is always proportionally more costly, since it is better to work in the quinine factory.

After thus surveying the native habitat of the cinchonas from the Central Cordilleras to the northernmost extremities of the mountain range without finding any part of it whence cinchona bark is to be obtained to suit the requirements of the Pharmacopœia, Professor Fluckiger points to the cinchonas cultivated in India as presenting the most advantageous opportunity for the selection of an official bark for the Pharmacopœia.

As regards the amount of alkaloid in Indian grown bark, experience has shown that it is increased by cultivation and though all Indian grown cinchona bark may not be equally rich, that is also the case with the bark growing wild in South America. As time progresses it may be expected that the systematic culture of cinchona trees in India and Java will have led to a knowledge of the most favourable conditions for securing the largest and most uniform produce. It is now beyond question that India furnishes excellent cinchona bark and it only remains to inquire whether that country can be relied upon for yielding enough of it. At present the supply from India may be taken as amounting to about one-tenth part of the entire production from all countries, although it was only in 1867 that the first Indian cinchona bark made its appearance in the London market. Professor Fluckiger thinks, therefore, that it is only a question of time when South America shall be equalled in this respect by India and other colonies and that the latter may even become the chief source of supply.

Following up the question as to the kind of bark to be selected from among those grown in India, Professor Fluckiger does not approve of deciding altogether from the amount of alkaloid. He holds that if the physician desires to have recourse to the curative action of the alkaloids it is best to employ them in a pure state, and to employ cinchona bark or some one of its pharmaceutical preparations, chiefly in cases where the accessory influence of other of its constituents is desired. From this point of view it is admissible to dispense altogether with bark, which like good flat calisaya, is of value chiefly on account of the quinine it contains.

In selecting from among the branch bark of various kinds of cinchona there is some difficulty, but taking all things into account Professor Fluckiger inclines to that of *C. succirubra* as being most suitable to adopt as official for pharmaceutical purposes; but in order to provide against any possible future experience contrary to that we now possess, he would not entirely exclude other kinds of bark provided they contain a sufficient amount of alkaloid.

SYSTEMATIC AND PRACTICAL BOTANY AT THE GARDENS OF THE ROYAL BOTANIC SOCIETY.

It will be seen by reference to the advertisement of the School of Pharmacy of the Pharmaceutical Society of Great Britain, that Professor Bentley will commence his Course of Lectures and Demonstrations on Systematic and Practical Botany at the Gardens of the Royal Botanic Society, Regent's Park, on Saturday morning, May 7, at 8 o'clock. The Lectures will be continued on the succeeding Friday and Saturday mornings till the end of July.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association will be held on Thursday, May 5, at 8.30 p.m., when a paper on "Ozone" will be read by Mr. T. Lewis. A Report on Botany will be made by Mr. D. Hooper on "The Coffee Leaf Disease."

Transactions of the Pharmaceutical Society.

BOTANICAL PRIZE FOR 1882.

A Silver Council Medal is offered for the best Herbarium, collected in any part of the United Kingdom, between the first day of May, 1881, and the first day of June, 1882; and should there be more than one collection possessing such an amount of merit as to entitle the collector to reward, a second prize, consisting of a Bronze Medal, and also Certificates of Merit, will be given at the discretion of the Council. In the event of none of the collections possessing sufficient merit to justify the Council in awarding medals or certificates, none will be given.

Competitors must be Associates or Apprentices or Students of the Society, and under twenty-one years of age.

The collection must consist of phanerogamous plants and ferns, arranged according to the natural system of De Candolle, or any other natural method in common use, and be accompanied by lists, arranged according to the same method, with the species numbered.

The collector must follow some work on British botany (such as that of Babington or Hooker), and state the work he adopts. The name of each plant, its habitat, and the date of collection, must be stated on the paper on which it is preserved.

Each collection must be accompanied by a note, containing a declaration signed by the collector, and certified by his employer, or a pharmaceutical chemist to whom the collector is known, to the following effect:—The plants which accompany this note were collected by myself, between the first day of May, 1881, and the first day of June, 1882, and were named and arranged without any other assistance than that derived from books.

In estimating the merits of the collections, not only will the number of specimens be taken into account, but also their rarity or otherwise, and the manner in which they are preserved, and should a specimen be wrongly named, this will be erased from the list.

The collection must be forwarded to the Secretary of the Society, 17, Bloomsbury Square, on or before the first day of July, 1882, indorsed "Herbarium for Competition for the Botanical Prize." After the Prize Distribution in October, collections will be retained one month, under the care of the Curator of the Museum, for the inspection of persons connected with the Society, and then returned to the collector, if required.

Erratum.—On p. 884, in the list showing the number of candidates who were examined at the various centres in the last Preliminary examination, opposite Aberdeen, *for* 9 examined, 4 passed, 5 failed, *read* 7 examined, 3 passed, 4 failed.

Provincial Transactions.

PRESTON PHARMACEUTICAL STUDENTS' SOCIETY.

A meeting of the above Society was held at the rooms, Church Street, on Friday evening, April 22. Mr. T. H. Greenall, President, in the chair. A paper was read by Mr. S. J. Elliott on "Some of the Arrangements which ensure the Cross Fertilization of Plants by the Visits of Insects." Mr. Elliott first touched on the well established fact that cross fertilization was an advantage, if not an absolute necessity, to the propagation of the species, and then reviewed those natural orders in which occur some of the most interesting arrangements for securing the transference of the pollen by bees. After the paper a discussion took place on the question of the gradual disappearance of plants bearing insignificant and unattractive flowers.

It was announced that the following donation had been received:—'Materia Medica Cabinet,' and Southall's 'Organic Materia Medica,' from Messrs. Southall, Brothers and Barclay.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The second general meeting of the session was held in the Society's rooms, on Wednesday evening, April 13, Mr. Ellinor, the President, in the chair.

The minutes of the previous meeting having been read, Mr. Ellinor proposed, and it was unanimously resolved, that a letter of sympathy be sent to Mrs. Hudson on the death of her husband.

Mr. Andrew Graham was elected a member of the Society.

Mr. Learoyd then took the chair and Mr. Ellinor read a paper entitled "A Few Notes on Prescribing," which was listened to with great interest and called forth some discussion.

A hearty vote of thanks to Mr. Ellinor for his paper concluded the business of the meeting.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

(Assistants' Section).

The sixth and final meeting of the session was held in Anderson's College, on Wednesday, April 20, at 9 p.m., Mr. Paris, President, in the chair.

The minutes of previous meetings having been read and adopted, the Secretary read the annual report, which records the session now closed as one of comparatively fair success; although the average attendance had slightly decreased, the library had been more fully used than in some sessions. The election of office bearers and Committee was postponed owing to frequent changes occurring among the assistants during the recess.

A few valedictory remarks from the President ended the session.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, April 21, Dr. Debus in the chair.

The following certificates were read for the first time: A. B. Avarne, A. W. Duncan, T. King Rogers, J. Schwartz, P. Trigger, G. Tate.

It was announced that a ballot for the election of Fellows would take place at the next meeting, May 5.

The following papers were read—

On the Distillation of Mixtures of Carbon Disulphide and Carbon Tetrachloride. By F. D. Brown.—These experiments were carried out by the same method as that employed by the author in some similar experiments, made about eighteen months ago, with carbon disulphide and benzene. An improvement has been made in the still, which in the present research was of copper, shaped like an ordinary tin can; the upper portion is covered with a copper jacket closed at the top; it has a sloping bottom, at the lowest portion of which is inserted a tube leading to the condenser. The vapour which rises from the boiling liquid is thus not subjected to the cooling action of the air in the neck of a flask, but, after rising from the inner vessel, descends though the copper jacket, and thence through the tube to the condenser; any liquid which may condense, therefore, runs into the condenser and not back to the still. The liquids were purified with the utmost care. The composition of the distillates was found by a careful determination of specific gravities. The objects of the research were (1) to find the boiling point of every possible mixture of the two liquids, and (2) the composition of the vapour evolved by any mixture when boiling. Tables and curves accompany the paper. The first set of experiments was made at the ordinary atmospheric pressure. Another set was carried out at a pressure of 434·8 mm. The author was rather astonished to find that the curves at the two pressures coincided, and that, therefore, when a mixture of two liquids is boiled, the composition of the vapour evolved is independent of the pressure under which ebullition takes place. This important conclusion, the author hopes to confirm by experiments with other liquids. In conclusion, the author discusses the various theories of fractional distillation, proposed by Wanklyn, Berthelot and T. E. Thorpe, shows that none of the formulæ proposed by these investigators agrees with the results contained in the present paper, and it appears that the general expression for the ratio of the weights, X^1, X^2, of the two vapours given off is $\frac{X^1}{X^2}=\frac{W^1}{W^2}$ C where W^1 and W^2 are the relative weights in the mixture, and C is a constant (3·5) which replaces the varying ratio of the vapour tensions. The author suggests that the ordinary vapour tensions which hold good when a vapour is diffused in a vacuum do not hold good when that vapour is diffused in a space containing another gas. He promises further research on this point. He shows that the results obtained by Thorpe, Berthelot, etc., agree with those obtained in the distillation of two substances which do not mix, and suggests that this non-mixing might be determined by the presence of traces of water.

Professor Hartley then read a paper—

On the Estimation of Hydric Peroxide by means of Potassic Permanganate. By W. E. ADENEY.—The author undertook the investigation in consequence of some statements published by C. T. Kingzett as to the error which might be caused by using an acid solution of permanganate, which threw some doubt on some results obtained by Professor Hartley by the above method. As a result of the investigation, it appears that although the numbers previously obtained by Professor Hartley have to be modified, the conclusions which he drew from those numbers are not affected.

On the Oxidation of Sulphurous Acid. By H. B. DIXON.—When sulphur dioxide mixed with a large excess of air is passed over a moist surface, especially if an alkali be present, much sulphate is produced. There is no doubt, moreover, that dry SO_2 and dry O at ordinary temperatures have no action on each other, but the question still remains open as to whether sulphur dioxide, oxygen and steam at 100° combine to form hydrogen sulphate. This question, which the author states is of interest in relation to the formation or non-formation of sulphuric acid in the combustion of ordinary coal gas, he has endeavoured to answer in the present paper. He has observed very carefully whether any diminution of volume takes place when SO_2, O and steam at 100° are left in contact in McLeod's gas analysis apparatus. No contraction was observed as long as the temperature remained at 100°. On cooling the mixture so as to allow water to condense, a distinct contraction took place; thus a mixture of 38·98 c.c. after standing for two hours at 5° measured 38·91, and after standing for two hours at 8° measured 38·86 c.c. The author concludes that sulphurous acid is unoxidized in a damp atmosphere, as long as the temperature is above the dew point, and that the sulphuric acid in a gas-lighted room is formed by the oxidation of hydrogen sulphite, which is first produced by the solution of sulphurous acid in water condensed on cold and hygroscopic surfaces.

Dr. Armstrong thought that the experiments showed that H_2SO_3 could not exist in a gaseous state, as it was already known that SO_2 could not be oxidized by O under these conditions.

Mr. Kingzett asked if the conditions of the above experiments fully reproduced the conditions existing in a gas jet. There was an enormous difference in the temperatures employed in the two cases, and probably at the high temperature of a gas jet H_2SO_4 might be formed.

Mr. Page said that temperature had a great deal to do with the oxidation, and instanced the old Letheby sulphur apparatus, in which the quantity of sulphate produced was very much increased when the cylinder was kept hot by some non-conducting covering.

Mr. Dixon said that no H_2SO_4 was produced in an ordinary gas flame, but if the products of combustion were rapidly sucked into cold water, all the sulphur was obtained as H_2SO_3.

On the Reduction of Cinnamic Alcohol. By F. HATTON and W. R. HODGKINSON.—When cinnamic alcohol is acted on by sodium amalgam in the presence of a large quantity of water almost the sole product is β phenylpropylic alcohol. If, however, an amalgam containing about 15 per cent. of sodium be employed with but a small quantity of water, the reaction proceeds much further. Cinnamic alcohol from storax, boiling between 248° and 252°, was digested in a steam-bath with sodium amalgam for three or four days. Water was then added and the whole distilled in steam. A quantity of an oily body distilled over, which on distillation boiled at 140°–147°, and by its odour and analysis was identified as cinnamene. The aqueous portion of the distillate was neutral, but rapidly decolorized a solution of potassic permanganate. It was treated with permanganate until a pink colour remained; on evaporation a potassic salt was obtained, which was converted into a lead salt, and analysed. It proved to be a formate. The ultimate reaction is therefore $C_6H_5.CH : CH.CH_2OH + H_2 = C_6H_5.CH.CH_2 + CH_3OH$. Neither α nor β phenylpropylene appear to be formed when the cinnamic alcohol is nearly anhydrous.

The Society then adjourned to May 5, when a ballot for the election of Fellows will be held, and the following papers read:—"On the Action of Humic Acid on Atmospheric Nitrogen," by E. W. Prevost; "On the Active and Inactive Amylamines," by R. T. Plimpton; "On the Products of the Action of Alkalies on Ethyl β Ethylacetosuccinate," by L. D. Thorne; "On the Action of Sodium Alcoholates on Fumaric Ether," by T. Purdie.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

HEAT IN RELATION TO CHEMICAL ACTION.*

BY HENRY ALLEN.

(*Concluded from page* 880.)

It will be seen at once that heat is developed by the substitution of chlorine for Br, I, and S in these hydracids and therefore that the latter should be decomposed by chlorine; which is the case. Bromine too displaces sulphur and iodine easily. The mutual relations of sulphur and iodine offer some complication.

In dilute solution iodine should decompose H_2S with the decomposition of sulphur and formation of hydriodic acid. On the contrary sulphur ought to decompose anhydrous hydriodic acid with liberation of iodine. This has been found to be so; and it is further indicated by the fact that it is impossible to produce a solution of hydriodic acid above a certain strength by the action of iodine upon sulphuretted hydrogen. The limit observed corresponds to the commencement of the production of anhydrous hydriodic acid which can exist in a concentrated solution, the action continuing as long as there is only a stable hydrate of the acid present.

According to the numbers given, oxygen should displace sulphur in sulphuretted hydrogen, as it does.

For chlorine and oxygen theory indicates a thermic equilibrium in solution, chlorine should decompose water thus:

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* Read at a meeting of the School of Pharmacy Students' Association, March 24, 1881.

$Cl_2 + H_2O + \text{water} = 2HCl + O + \text{water}$: +4·8

On the other hand anhydrous HCl should be decomposed by oxygen:

$O + 2HCl = Cl_2 + H_2O$: +7·5

The former reaction is well known; the latter has been accomplished by electricity and by heat; a mixture of oxygen and hydrochloric acid gas passed through a red-hot porcelain tube is partially decomposed with production of water and free chlorine. The incompleteness of the action is due partly to the dissociation of the water-vapour and partly to the inverse action that occurs on cooling.

Finally, oxygen decomposes hydrobromic acid slowly and hydriodic readily, whether gaseous or in solution; a result agreeing with theory.

I will now notice some distinctive features of hydriodic acid. This body, under certain circumstances, is capable of acting as a powerful reducing agent, thus differing greatly from the corresponding compounds of chlorine and bromine. Thus a strong solution of hydriodic acid is decomposed by sulphurous or sulphuric acid, the latter acids being reduced to H_2S and iodine being deposited:—

$SO_2 + 6HI = H_2S + 2H_2O + 3I_2$: +55·4

$H_2SO_4 + 8HI = H_2S + 4H_2O + 4I_2$: +68·9

On the contrary, in dilute solutions, iodine oxidizes sulphurous acid:

SO_2 sol. $+ 2H_2O + I_2 = H_2SO_4 + 2HI$: +10·5

This positive quantity is produced by the solution or rather combination of anhydrous hydriodic acid with water which disengages +19·4. A dilute solution of sulphurous acid is oxidized by bromine or chlorine; hydrochloric acid has no reducing action on sulphuric acid; hydrobromic acid acts thus:—

$H_2SO_4 + 2HBr$ (gas) $= SO_2 + 2H_2O + Br_2$ (liquid) = −3·8: the sign being minus: the reaction is explained by the fact that some of the anhydrous acid combines with the water produced, developing heat which more than compensates for that absorbed by the reduction.

The reduction of organic bodies by hydriodic acid affords still more definite confirmation of the principle we are considering. The concentrated acid decomposes alcohol thus:—

$$\left.\begin{array}{l} C_2H_6O + HI = C_2H_5I + H_2O \\ C_2H_5I + HI = C_2H_6 + I_2 \end{array}\right\}$$

There are here two actions, each evolving heat:—

$2HI = H_2 + I_2$: 2 × ·8 = + 1·6

$C_2H_6O + H_2 = C_2H_6 + H_2O$: + 23·

24·6

If the dilute acid were used $2HI$ dil. $= H_2 + I_2 +$ water: —37·2 $\left\{ 18{\cdot}6 \times 2 \right\}$ *i.e.*, more heat would be absorbed than is evolved by the reduction, in fact the dilute acid has no action upon alcohol. By referring to the table it will be seen that no such reduction can occur if hydrobromic acid or hydrochloric acid be substituted for hydriodic: the heats absorbed being −27 (2 × −13·5) and −44 (2 × −22) respectively. I will next direct your attention to the second table in order to point out some relations between the haloids salts of the metals and the corresponding oxides and sulphides that possess thermic interest.

	Metal combined with					Oxide combined with		
	O.	Cl.	Br.	I.	S.	H_2S.	HCl.	HCl dil.
Na . . .	50·1	97·3	90·7	74·2	51·6	3·85		13·7
Ca . . .	66	85·1	75·8	59·3	46	Ba 3·9		13·85
Mn . . .	47	56	50	34				
Zn . . .	43·2	48·6	43·1	30	21·5	9·6		9·8
Fe″ . . .	34·5	41	35	19	11·9	7·3		10·7
Fe‴ . .	31·9							
Al . . .	65·3	53·6	44·2	28·8				
Pb . . .	25·6	42·6	38·5	26·6	8·9	13·3	25	7·7
Hg″ . .	15·5	31·4	30·4	22·4	9·9	24·35	26·75	9·45
Ag . . .	3·5	29·2	27·7	19·7	1·5	27·9	37·9	20·6
Au‴ . .	1·9	7·6						
As^{ous} . .	77·3	69·4	59·1	28·8				
P^{ic} . . .	181·9	107·8						
P^{ous} . . .	?	75·8	54·6	26·7				

From these data some obvious consequences may be deduced.

Each chloride will be seen to have a higher number than the corresponding bromide, and each bromide than the corresponding iodide; bromine will therefore replace iodine, and chlorine will replace both iodine and bromine in every case.

Chlorine should displace oxygen from all the metallic oxides with one exception. Such displacement actually occurs, though generally requiring the assistance of heat. In the case of the alkalies and alkaline earths the excess of energy is sufficient to form hypochlorites and such-like bodies, which, however, are decomposed at a higher temperature.

Chloride of aluminium, on the contrary, is decomposed, though incompletely, by oxygen at a red heat.

It is, however, possible to prepare the chloride from the oxide, using the energy of the combustion of charcoal, viz., 14·4, which surpasses the heat (11·7) absorbed:—

$Al_2O_3 + 3Cl_2 + C_3 = Al_2Cl_6 + 3CO$.

Chloride of manganese, too, is decomposed by oxygen, contrary to the numbers here given, but the result is due to the formation of a higher oxide, which has a heat of 58 cir.

The relations of bromine and oxygen need not be discussed; bromine displaces oxygen in most cases. Bromide of aluminium, on the contrary, when red hot takes fire in dry oxygen with the formation of the oxide and free bromine.

The mutual relations of iodine and oxygen require a more detailed notice. According to the table, iodide should displace oxygen from combination with sodium and potassium, a result first observed by Gay-Lussac, the action occurring at a low red heat. On the contrary, at about 400° iodide of potassium absorbs oxygen, with formation of basic iodate and an iodized iodide. The formation of the iodate, liberating about 44 units, compensates for the oxide formed at the expense of the iodide. This action, I may say in passing, explains the difficulty of preparing an iodide entirely free from iodate and alkali.

The iodides of calcium, zinc and iron, are easily decomposed by oxygen, the case of iodide of iron being very familiar. Manganous iodide takes fire in oxygen.

The vapour of aluminium iodide becomes explosive when mixed with the same gas. All these actions are seen to agree perfectly with theory. It will be noticed that the difference of heat units between the oxide and iodide of Al is much greater than that for any other metal given.

The numbers, in the case of lead, are nearly equal. Accordingly, iodide of lead is decomposed when heated in a current of oxygen, and oxide of lead is similarly decomposed by iodine.

Lastly, there are two metals, Hg″ and Ag, whose iodides are not attacked by oxygen, while their oxides are readily decomposed by iodine. In this case also, the law of maximum work holds good.

We have seen that generally chlorine has greater affinity for the metals than oxygen; in the group of metalloids, however, to which phosphorus and arsenic belong, oxygen readily displaces all the haloid elements from their combinations. The compounds of boron and silicon give similar results.

Decomposition of Water by Metals.—The combining energy of water being about 34, all the metals in the list down to aluminium should be able to affect its decomposition. Na and Ca do so in the cold, the rest when heated. Between iron and hydrogen there is equilibrium; this is indicated by the fact that the iron can be reduced by hydrogen, and oxidized by steam. The insolubility of alumina, which covers the metal in a thin film, prevents the decomposition in this case. Lead, though falling below 30, at a high temperature decomposes water, but the action is here complicated by dissociation. At a lower temperature, hydrogen reduces oxide of lead and oxide of silver.

Action of Hydrochloric Acid.—The limit of the action of the dilute acid (heat = 39) is at lead. The concentrated acid, on the other hand, should be decomposed by all the metals here, except gold. In the case of mercury and silver, a heat of 500–600° C. is required to effect the decomposition.

Hydrobromic and hydriodic acids are completely decomposed, even in the cold, by all the metals as far as silver, with evolution of H. A word as to the mutual displacements of these hydracids and their salts. We have seen that chlorine displaces bromine and iodine from combination; this occurs in the case, *e.g.* of silver:—

$$AgI + Cl = AgCl + I, \text{ etc.}: +9{\cdot}5.$$

On the contrary, hydriodic acid attacks chloride of silver, forming iodide and free hydrochloric acid. This reverse action can be very easily explained; thus:—

$$AgCl + HI = HCl + AgI.$$

$$+29{\cdot}2 \quad -{\cdot}8 \quad +22 \quad +19{\cdot}7 :—28{\cdot}4 + 41{\cdot}7 = +13{\cdot}3.$$

the difference between HCl and HI being greater than that between AgCl and AgI heat is evolved by this reaction. A similar reaction occurs with other metals.

Sulphides.—The attraction of sulphur for the metals decreases from sodium to silver. On the contrary, hydrogen sulphide attacks the oxides increasingly in the same order. The heat evolved in the case of Hg and Ag is at once seen to be due, not to the combination of the metal with the sulphur, but to the attraction of the hydrogen of the acid for the oxygen of the oxide. All the sulphides down to iron are decomposed by dilute HCl; those below only by the concentrated acid. These facts agree with the thermic equivalents.

The action upon metals of acids containing oxygen presents some peculiar features.

(1). Sulphuric acid, when dilute acts as HCl, liberating H, and forming a sulphate. When concentrated, it is often without action in the cold; but when heated it is reduced by the metal (or by the hydrogen liberated) to sulphurous acid; the reaction in the case of copper being:—

$$Cu + 2H_2SO_4 = SO_2 + 2H_2O + CuSO_4.$$

The heats of formation being:—

$$+2 \times 96{\cdot}7 : +34{\cdot}5 : +2 \times 29{\cdot}5 : +91{\cdot}8.$$

$$= 193{\cdot}4 : = 185{\cdot}3.$$

The results (= − 8·1) would seem to indicate the impossibility of such a reaction; while it is evident that still less can any simple substitution of Cu for H take place (91·8 − 96·7 = − 4·9). If, however, it be remembered that sulphuric acid undergoes dissociation upon heating ($H_2SO_4 = H_2O + SO_3$), all difficulty is removed. The actual equation will be:—

$$\left.\begin{array}{l} Cu \;\; + SO_3 = CuO + SO_2 \\ CuO + SO_3 = CuSO_4 \end{array}\right\}$$

$$\text{or } Cu + 2SO_3 = CuSO_4 + SO_2$$

$$2 \times 51{\cdot}5 : +91{\cdot}8 : +34{\cdot}5$$

$$= 103 : = 126{\cdot}3 \text{ and } 126{\cdot}3 - 103 = +23{\cdot}3.$$

In this case a further action occurs, some sulphide being formed:—

$$Cu + 2SO_2 = CuS + CuSO_4$$

$$+69 : +5{\cdot}1 : +91{\cdot}8 \text{ and } 96{\cdot}9—69 = +27{\cdot}9.$$

(2). *Nitric Acid.*—This acid never forms nitrates by simple substitution of metal for hydrogen, but decomposes, giving oxygen, which combines with the metal, the resulting oxides being attacked by more acid. Two molecules of the acid ($2HNO_3$ or HO_2, N_2O_5) furnish, according to circumstances, 1 to 5 atoms of oxygen, nitrogen or one of its lower oxides, or a mixture of these being simultaneously formed.

The heat of formation of nitric acid is (liquid) 19·9.
" " " " " (solid) 20·5.
" " " " " (solution) 27·1.

The heat of solid nitrate of silver is only + 7; that of ferric nitrate + 33·4; the former could not therefore be produced directly; the latter might theoretically with evolution of heat 33·4 − 20·5 = + 12·9 or (dilute) 30·4 − 27·1 = + 3·3; the actual reaction, however, is—

$$\left.\begin{array}{l} Fe_2 + H_2O.N_2O_5 = Fe_2O_3 + H_2O + 2NO \\ Fe_2O_3 + 6HNO_3 = Fe_26NO_3 + 3H_2O \end{array}\right\}$$

The heat is $H_2O.N_2O_5 = H_2O + N_2O_2 + O_3$.

$$27{\cdot}1 : +34{\cdot}5 : -43{\cdot}3 : +34{\cdot}5 - 70{\cdot}4 = -35{\cdot}9,$$

i.e., − 12 for each equivalent of oxygen. The oxidation of iron evolves + 31·9, the combination of more acid with the oxide formed:—

$$\begin{array}{rl} \left.\begin{array}{r} H_2O = 34{\cdot}5 \\ Fe_2\,6No_3 = 30{\cdot}4 \end{array}\right\} & = 64{\cdot}9 \\ Fe_2O_3 = 31{\cdot}9, & 64{\cdot}9 - 59 \\ HNO_3 = 27{\cdot}1, & \;\; = 5{\cdot}9 \\ \hline 59 & \end{array}$$

+ 5·9; the total heat, therefore, will be—

$$5{\cdot}9 + 31{\cdot}9 - 12 = +25{\cdot}8.$$

I have no time to enter into an examination of the reciprocal displacements of acids and of bases, though the subject is most interesting. I may just briefly allude to the double decomposition of neutral salts. The terms strong and weak, applied to acids and bases, are familiar, but vague. M. Berthelot has given a precise definition. The term "weak" he applies to an acid or base the salts of which are more or less decomposed by solution in water into free acid and base. Salts not so decomposable are formed by a union of a "strong" acid with a "strong" base. Adopting this definition, the general rule of decomposition is that the strong acid combines with the strong base, and the weak acid with the weak base; in other words, the most stable and the least stable are the salts formed.

For instance, when a solution of ammonium nitrate is mixed with a solution of potassium carbonate, a double decomposition occurs; ammonium carbonate and potassium nitrate are formed. This is indicated by the following numbers:—

$K_2CO_3 + 2AmNO_3 = Am_2CO_3 + 2KNO_3$; − 3·1 (absorbed). On the contrary, $Am_2CO_3 + 2KNO_3$ mixed in solution neither absorb nor evolve heat. The heat of each of the four salts in solution is:—

$$\left.\begin{array}{l} \tfrac{1}{2}K_2CO_3,\ 12{\cdot}9 : AmNO_3,\ 12{\cdot}5 = 25{\cdot}4 \\ \tfrac{1}{2}Am_2CO_3,\ 8{\cdot}5 : KNO_3,\ \ 13{\cdot}8 = 22{\cdot}3 \end{array}\right\} \text{difference} = -3{\cdot}1.$$

It will be said that this absorption of heat is in direct contradiction of the principle of maximum work. It must be remembered, however, that the salts are here in solution; if their heats of formation in the solid state be used in the calculation, it will be found that heat is evolved, as it should be.

In this case, the ammonia is a weak base, and its nitrate accordingly suffers in solution a partial decomposition, giving a little free ammonia and a little free nitric acid. This nitric acid attacks the carbonate of potash, and disturbs the equilibrium; more nitrate of ammonia decomposes, and the reaction continues till complete.

Take another example:—

Na_2SO_4 (solution) + ZnA'_2 (solution): + ·45 (evolved).
2 NaA' (solution) + $ZnSO_4$ (solution): − ·34 (absorbed).

It might be thought that acetate of zinc decomposed sulphate of soda; but, in fact, the opposite reaction takes place:—

$$Na_2SO_4 + ZnA'_2 = 2\,NaA' + ZnSO_4,$$

the heat evolved in the first case being due to the dilution of the acetate of zinc solution, which evolves more heat than the dilution of three other solutions together. The heat of the anhydrous salts prove the reality of the decomposition:—

$$\begin{array}{rcl} ZnA'_2 : 3{\cdot}3 & : & \tfrac{1}{2}ZnSO_4, 11{\cdot}9. \\ \tfrac{1}{2}Na_2SO_4 : 34{\cdot}7 & : & Na_2A', 18{\cdot}3. \\ \hline 38{\cdot} & & 30{\cdot}2. \end{array}$$

$$38 - 30{\cdot}2 = +7{\cdot}8 \text{ (evolved).}$$

Let me here give an instance of the use of heat measurements to measure slow decomposition of weak salts by water, *e.g.*, ferric acetate. This body gradually decomposes in solution into basic acetate, which remains in a pseudo-solution, and free acetic acid.

The fresh solution treated with solution of potash evolves	+ 8·87.
The same solution kept two months	+ 10·39.
After eighteen months	+ 12·8.
A solution, six times as dilute, kept only three weeks	+ 12·82.
The fresh solution heated to 100° C., and then cooled	+ 12·72.
The last three numbers indicate the liberation of nearly all the acetic acid, the heat of acetate of potash being	+ 13·3.

In the examples just given the salts formed remain in solution; the reactions in which precipitation occurs are better known, *e.g.*,

$$Na_2SO_4 + SrCl_2 = 2NaCl + SrSO_4 \text{ (precip.).}$$

There is no doubt here but that decomposition takes place; the heat is at 5° : + ·41; at 16° : O; at 25° : − ·33; these results indicate clearly that the heat of the solutions does not determine the reaction. On the contrary, if all the bodies be anhydrous, heat is evolved (+ 7), a quantity which scarcely varies between 0° and 100° C.

There is no time to go further this evening; otherwise we might find ourselves entering on the application of heat measurements to the wide field of chemical equilibrium or to the study of organic chemistry. I have thought it best to confine myself to familiar reactions, but enough has been said, I think, to show the value of thermo-chemistry, not only in giving a satisfactory explanation of apparently abnormal reactions, but especially in indicating the points of connection and mutual relations between chemistry and the physical sciences.

Parliamentary and Law Proceedings.

SERIOUS CHARGE AGAINST A CHEMIST UNDER THE SALE OF FOOD AND DRUGS ACT.

At Bridgwater, on Monday, the 25th inst., Mr. William Henry Griffith, chemist and druggist, carrying on business on the Cornhill, was charged with that, on March 16, the guardians of the Bridgwater Union demanded of him a certain drug—to wit, a solution of sulphate of quinine, and that he unlawfully sold to the said guardians and to their prejudice, a certain drug which was not of the nature, substance and quality of the drug demanded. Mr. Cook, Town Clerk, prosecuted, and Mr. E. Barham appeared for the defendant.

Mr. Cook, in opening the case, after explaining the provisions of the Sale of Food and Drugs Act, said that Mr. Griffith, the defendant, who was a highly respectable chemist in Bridgwater, had entered into a contract with the Board of Guardians for the supply of drugs, one of the articles to be so supplied being quinine. On March 16 last, in consequence of a previous communication between Mr. Weller, one of the district medical officers of the Union, residing at Westonzoyland, and Mr. Parsons, medical officer of health, Mr. Weller sent to Mr. Parsons a prescription as follows:—"Sulphate of quinine, 20 grains; diluted sulphuric acid, 25 drops; water up to 10 ounces." After the receipt of that, Mr. Parsons placed himself in communication with Mr. Parker, the borough inspector of nuisances, and the prescription was afterwards taken to Mr. Griffith, the defendant, by a girl named Keirle, a daughter of the woman for whose use it was intended, and who was then, and had been for some time before, suffering from intermittent fever, being under the care of Mr. Weller. The Bench would see at once how important it was in this case, as the woman was suffering from fever, and in other cases where fever existed, that there should be a faithful compliance, on the part of Mr. Griffith, as holding the post of the Union contractor, with the prescriptions furnished to him. The girl, as the bearer of the prescription, was afterwards followed into the shop by Mr. Parker, who entered it just as the prescription had been made up, and the bottle was being handed to the girl by Mr. Griffith. Mr. Parker took the bottle, notifying that he was going to send a sample of it for analysis to the public analyst. He divided it into three parts, one part being left with Mr. Griffith, a second part being retained by Mr. Parker, and the third part, consisting of 3 ounces, being sent to Mr. Stoddart for analysis. Mr. Stoddart's certificate, dated March 24, and addressed to Parker, was as follows:—"I, the undersigned public analyst, do hereby certify that I received on March 17, 1881, a sample of solution of sulphate of quinine for analysis, which then weighed 3 ounces, and having analysed the same, I declare the result of my analysis to be as follows:—I am of opinion that it contains only ·64 grains of sulphate of quinine instead of 2 grains in each fluid ounce." Mr. Cook added that one scarcely liked to trust himself to describe the flagrant character of the offence of Mr. Griffith in so dealing with Mr. Weller's prescription. Here was a woman suffering from intermittent fever. Whether life or death was dependent on a literal compliance was not for him to say; but at all events it involved most probably the speedy recovery of this woman and the consequent happiness and prosperity of the family. These were the facts of the case so far as he was instructed, and he apprehended that if he succeeded in proving them the Bench would come to the conclusion that both from a public point of view, a contract point of view, and in other ways, a very serious offence indeed had been committed by Mr. Griffith. The only way for them to mark their sense of it would be by determining what proportion of the £20, if they thought the whole fine need not be inflicted, should be imposed for the offence so committed. Mr. Cook then called

Mr. John Weller, practising at Westonzoyland, and one of the medical officers under the Bridgwater Board of Guardians, who said that on March 16 last he had a Mrs. Keirle under his care as a pauper patient. On that day he gave a girl named Charlotte Keirle, daughter of the woman referred to, a prescription, as follows:—"For Izet Keirle. Sulphate of quinine, 20 grains; diluted sulphuric acid, 25 drops, and water to 10 ounces." The woman Keirle was suffering from intermittent fever. The quinine never reached her.

By Mr. Barham: The drugs were charged to the Board of Guardians.

Mr. J. F. C. Parsons, medical officer of health, said on March 16, the girl Keirle brought the prescription referred to by the last witness to him. He had previously had communication with Mr. Weller. After receiving the prescription he (witness) communicated with Mr. Parker, the borough inspector, who left his house about the time with the girl.

By Mr. Barham: He had been in communication with Mr. Parker on the subject before—a fortnight before. Mr. Parker's action was at his (witness's) request, acting as the medical officer for the Rural Sanitary Authority.

Mr. J. Parker, inspector of nuisances for the borough, said on March 16, he went to the house of the last witness at his request, and there met the girl Keirle. He saw the prescription produced, and afterwards accompanied the girl to the shop of Mr. Griffith, chemist. Whilst she was in the shop he (witness) stood immediately opposite, and had a view of the girl in the shop all the time. In about two minutes he went into the shop, and saw there Mr. Griffith and the girl. Mr. Griffith was then in the act of handing a bottle to the girl. Witness asked "Is this the quinine referred to in the prescription of Dr. Weller?" Mr. Griffith replied, "Yes, it is." Witness then said, "I have been directed to take it for the purpose of analysis by the public analyst, Mr. Stoddart. I shall divide it into three equal parts, one of which I shall retain myself, another you may have, and the third I shall take to Mr. Stoddart." He then divided it as nearly as he could in his presence, and handed one of the parts to Mr. Griffith, retaining two parts himself. He afterwards communicated with Mr. Parsons. On the 17th he took one of the two parts to Bristol, and delivered it to Mr. Stoddart personally. On the 24th or 25th he received the certificate produced from Mr. Stoddart.

Mr. Barham: I object to its being produced as evidence.

The Clerk: What is the objection?

Mr. Barham: That it was not obtained in pursuance of the directions of the Act of Parliament. (To the witness): You took the sample under the directions of Mr. Parsons.

Mr. Parker: Yes.

Mr. Barham: In the information you say the guardians demanded this drug, and that it was sold to the guardians, and you say the same now?

Mr. Parker: Yes.

Mr. Barham: Then this was a purchase by the Board of Guardians, was it not?

Mr. Cook: That is a question of fact for the Bench to determine.

Charlotte Keirle, aged 14, living at Othery, said on March 16 she received a paper from Mr. Weller, which she took to Mr. Parsons in the Square. She also saw Mr. Parker there, and afterwards went to Mr. Griffith's shop. She received a bottle containing something from Mr. Griffith, and gave it to Mr. Parker whilst in the shop. Her mother was ill on that day.

This was all the evidence.

Mr. Barham, for the defence, contended that the purchase was made by the Board of Guardians, and not by Mr. Parker, and that as the Act contemplated that the proceedings should be taken by the person who made the purchase the Act had not been complied with. There had been no proof that Mr. Parsons, upon whose instructions Mr. Parker had acted, had any authority from the Board of Guardians to institute these proceedings.

This led to a lengthy legal argument, Mr. Cook contending that Mr. Parker acted throughout as the agent of the Board of Guardians, and that there had been a strict and literal compliance with the provisions of the Act as regarded the mode of procedure, the notification of Mr. Griffith, the causing of the analysis to be made and in instituting these proceedings.

At the close of the legal argument, in the course of which some cases were referred to on either side bearing on the points raised,

Mr. Brice, the magistrates' clerk, addressing Mr. Barham, said "Do you go into the merits at all?"

Mr. Barham replied in the negative, adding, however, that he would merely point out that whatever might be the explanation of the matter it did not necessarily follow that there had been any of the flagrant conduct on the part of Mr. Griffith that had been spoken of by Mr. Cook. This Act of Parliament allowed some excuses, but it made no allowance for any mistake or error that might have been committed, and which would possibly relieve Mr. Griffith from any moral blame.

The magistrates retired for deliberation, and on their return into court,

The Mayor said: The magistrates have gone into this matter thoroughly, and it is very painful to them to find a tradesman in the position of Mr. Griffith summoned here for such an offence. The penalty will be £10 and costs.

Mr. Barham applied for a case to the Court above, and the application was acceded to.

Mr. Cook applied for allowance of the usual fee in the event of the conviction being upheld, and this was also granted.—*Bridgwater Mercury.*

Obituary.

Notice has been received of the death of the following:—

On the 19th of March, 1881, very suddenly, Mr. William Gowen Cross, Pharmaceutical Chemist, Mardol, Shrewsbury. Aged 61 years. Mr. Cross was registered as a Member of the Pharmaceutical Society in 1847, but had been connected with it some time before that date. He was the Society's first Local Secretary for Shrewsbury, and continued in that office till his death. Mr. Cross was the representative of one of the oldest families of burgesses at Shrewsbury, and has been connected with the municipal government of the town since 1856. He was a justice of the peace for the borough, and twice filled the civic chair. At the time of his death he was presiding alderman of the police committee. His funeral took place at the Shrewsbury General Cemetery on March 23, and was attended by nearly all the public office holders in the town, as well as by a large number of county magistrates and friends.

On the 12th of April, 1881, Mr. Edmund Henry Laffere, Chemist and Druggist, Market Place, Hadleigh. Aged 45 years.

On the 17th of April, 1881, Mr. John Creed Henly, Pharmaceutical Chemist, Penge Road, South Norwood. Aged 82 years. Mr. Henly had been a Member of the Pharmaceutical Society since 1842.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[588]. If "Dispenser" were a practised dispenser, he would certainly know how to dispense this prescription. The quinine will dissolve without difficulty in vin. ferri.

371

[534]. Squire makes a sol. ferri brom. which might be used here, the strength of which is 4½ grs. to ʒj.

374.

[536]. Ferri ammon. cit. is also called ferri cit.

374.

[536]. Ferri citras is prepared by the evaporation at 140° F. of a solution of ferric hydrate and citric acid. It occurs as a dark amber coloured scale compound, slightly soluble in cold water, easily so in warm water. It is ordered in the U. S. Pharmacopœia and a process given for its manufacture. Ferri ammon. cit. is generally intended and dispensed in England when ferri cit. is ordered. The dispenser should, however, be guided as to what the prescriber intended by surrounding circumstances. If occurring in an American prescription, ferri ammon. cit. is not intended.

FRANCIS CARTER.

[538]. Ferri ammon. cit. and acid. hydrocyan. sch. are incompatible.

374.

[539]. I.—I think that the quinine would be very nearly, if not quite, dissolved by the syr. aurantii.

374.

[539]. I.—R. J. D. is not justified in dissolving the quinine. It should be powdered and a "shake the bottle" label attached to the bottle.

FRANCIS CARTER.

[539]. II.—The liniment will dissolve the pot. iodid.

374.

[539]. II.—If R. J. D. triturates the potass. iodid. with the lin. belladonnæ, and then adds the lin. camph. co., he will obtain a perfect solution without the addition of water.

FRANCIS CARTER.

[540]. I had the following prescription given me to dispense a few days ago:—

℞ Emulsionis Ol. Morrhuæ Co. . . . ℥vj.

For the above I gave a simple emulsion of cod liver oil made with yolk of egg, sugar and flavoured with a little rose water and tincture of oranges.

Could you oblige me by saying whether I was right or not in doing so?

I thought at the time it might be some private or hospital formula.

COUNTRY CHEMIST.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

ELECTION OF COUNCIL.

Sir,—Among the names of those gentlemen who have declared their readiness to serve on the new Council, if elected, I notice that of Mr. G. S. V. Wills. Last year Mr. Wills manifested similar eagerness in the same direction, and several letters concerning his candidature appeared in the correspondence columns of the Journal.*

One of these, from Mr. Richard Reynolds, very completely stated the objections to the occupation of a seat on the Council by one whose business consists in preparing candidates for the pharmaceutical examinations.

I cannot add anything to the remarks of Mr. Reynolds, but I wish to reaffirm that it is not seemly that a gentleman actively engaged in preparing candidates for examinations should aspire to be a member of the body which appoints the Examiners, and in certain ways controls the examinations.

It is a pity Mr. Wills has not learnt this. "*De gustibus non est disputandum.*"

I have not this year received a circular from Mr. Wills. As far, however, as my memory serves me, I believe one of his claims for support, as stated in a former circular, was made upon the ground that he was strongly interested in educational matters. May this interest continue! It is quite proper for the chief of a firm of teachers advertising "home work given to do" to be *personally* interested in the advancement of education. I think, however, it is distinctly improper that such an one should become an elector of the Board which tests the value and extent of that education, and, as Mr. Reynolds suggests, the Privy Council will be very likely to think the same thing.

April 26, 1881. A YOUNG MEMBER.

Sir,—What *are* we coming to? There are fourteen vacancies in the Council and only sixteen gentlemen are found willing to accept the office, if elected; and even one of those, in the face of the correspondence which appeared in your columns last year (see Mr. Reynolds's letter, *Ph. Journ.*, [3], x., p. 908), would have shown good taste by declining to accept nomination for the office.

Are there no more amongst us able and willing to act as councillors? or is the Society, by adversely criticising its executive without offering the help and advice it alone can give, rendering the position of its leaders too invidious and thankless to be worth the trouble and anxiety accompanying what should be a coveted position of dignity and honour?

Besides indications of short-sighted apathy amongst the members, personal observation has led me to conclude that a great many of them are culpably careless in reference to the manner in which they tender their votes for the election of the Council. In the cases alluded to, the list of candidates is hurriedly scanned and the less familiar names erased without a thought as to the views the candidates hold, or the extent to which they are likely to be able to carry out the arduous and responsible duties they offer to undertake. The names may be familiar of those whose vocation entirely unfits them for the position they crave; while there are gentlemen whose names are, from various causes, less familiar to members in general, but who are able, in virtue of the positions they hold, the abilities they possess, and the time they are prepared to devote to the welfare of the Society, to command the respect and confidence of its members to the utmost extent.

The present is an important crisis; pharmacists are being sorely tried by unfair competition on the one hand and excessive legislation on the other; the Society has lost by resignation two of its most valued and most respected advisers. It, therefore, behoves every member thoughtfully to realize the position of our calling and to do his share towards the advancement of pharmacy by voting at the coming election for not less than fourteen gentlemen, who, as councillors, will most effectively uphold the dignity of the Society and most zealously defend and advance its interests.

ENITAR.

Sir,—In the list of nominations for Council I notice the name of a gentleman who advertizes his willingness to prepare for a pharmaceutical career individuals who have no knowledge either of the Latin language or essay writing. Such assistance, if given gratuitously, would doubtless have been praiseworthy during a past transitional period, but at the present time pharmacy needs fewer but better educated candidates, therefore such a course of action is prejudicial to progress and in my opinion should certainly not be encouraged and rewarded with a seat at the Council Board.

Mr. Wills, being directly interested in the success or non-success of candidates for the various examinations of the Society, can scarcely be expected to perform, without bias, such duties as the selection of Examiners or the consideration of the important subject of pharmaceutical education.

A JUNIOR M.P.S.

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* *Pharm. Journ.*, May 8, 1880.

Pharmaceutical Titles.

Sir,—The Privy Council examiner having officially introduced the above subject, I beg to add a few remarks to those of Mr. G. L. Huet. I do not think that the majority of pharmaceutical chemists pass the "Major" examination for the sake of the greater repute which the higher title has in the view of the public, because the public scarcely knows the relative value of the numerous titles by which the pharmacist seeks to individualize himself; but the "Minor" man usually proceeds to the "Major" because he has sufficient ambition or desire for knowledge not to rest content with a minimum qualification for the practice of his profession.

I do believe that a well-defined title would stimulate a larger number of men to pass the "Major" examination than do so at present. Those who shirk this question seem to me to put the question in the form of this dilemma: "If a student is fond of learning he needs no stimulus, and if he dislikes learning no stimulus will be of any avail; but as he is either fond of learning or dislikes it, a stimulus is either needless or of no avail." But fondness and dislike are not the only two possible alternatives, for there may be some who are neither fond of learning nor dislike it, and to these a stimulus in the shape of rewards is desirable, and if the reward be sufficiently valuable, it may even allure those who dislike study.

The title F.P.S. (Great Britain), as suggested by Dr. Greenhow, is one that would be analogous to those of F.R.C.P. and F.R.C.S., both honourable diplomas; but there are other "Fellows" whose titles a pharmaceutical chemist would scarcely care to add to his name. A more alluring and distinctive one would be that of doctor of pharmacy, and would be quite in harmony with the titles accorded to the highest ranks in the other branches of the medical profession, viz., the degree of M.D. and the diplomas of doctor of dental surgery (D.D.S) and dental medicine (D.M.D.); whilst our Portuguese brethren have set us the example by granting the title of "licentiate in pharmacy" to those who pass the lower examination (their Minor), and that of "doctor in pharmacy" to those who pass the higher examination (their Major).

We have only to look at the varieties of doctors who exist to see at once that the use of this title by pharmaceutical chemists would not interfere with the privileges of physicians, surgeons and apothecaries, the greater number of whom are dubbed with the title of "doctor" without possessing it; whereas there are a large number of men possessing and using the title who do not practise medicine, viz., D.Sc., D.C.L., LL.D., D.D., Lit. Doct., Mus. Doc., etc., and no ill result has flowed from this custom.

If the Major examination be either not comprehensive enough, or not stringent enough, by all means make it so; but let there be such a title (pharm. doct.) gainable by a knowledge of the subjects embraced by our own profession as will raise our status in the eyes of the public, be an ample guarantee to the Government for the correct discharge of our functions, and be of such distinction and value as to induce able men to enter the ranks of our profession.

Manchester. A. H. Jackson.

Preparing for Examination.

Sir,—A recent Journal contains two letters, one complaining about the number of failures in the examinations, and the other is a long wail about everything in general and nothing in particular. In the advertising columns there is also a verse of four lines of the most wretched doggerel ever penned:—

"Six ingredients you must know," etc., etc.

Is it any wonder that the list of unsuccessful candidates should be so long when young men are educated (crammed, rather, to cheat the examiners), in this way.

Is this the way to educate men who are expected to be intelligently acquainted with such a profession as ours in all its details?

I have refrained hitherto from drawing the attention of your readers to this matter in the hope that some one better qualified would have done so.

"Thomas Carlyle."

Vaseline, and its use for making Citrine Ointment.

Sir,—A nice lemon-coloured ointment may be made with white vaseline, *vice* the lard and olive oil ordered in the Pharmacopœia for making unguentum hydrargyri nitratis, and a dull orange-coloured ointment may be prepared from yellow vaseline, if, in either case, the solution be mixed with the vaseline, as Mr. Squire says, at 180° F. The action is very similar to that which takes place in making the Pharmacopœia ointment; the mixture froths up, and the mercurial solution if well stirred does not separate on cooling, it is all absorbed in the ointment or evaporated. Still, I think the preparation is a different one therapeutically to that of the Pharmacopœia, which contains a complex mixture of basic nitrate of mercury, elaïdin, fatty acids in combination with mercury, etc. On heating white vaseline with pure nitric acid a frothy evolution of nitrous fumes takes place, and a lemon-coloured mixture is formed; on heating yellow vaseline with nitric acid a dark orange one is produced. On testing white vaseline by boiling and agitating with liquor potassæ for some time a frothy and somewhat milky emulsion is formed; in fact, it appears partially to saponify, but on cooling a complete preparation takes place. Taking the clear liquor potassæ from the mixture and adding diluted hydrochloric acid in excess no fatty acids are set free, dispelling the suspicion that white vaseline might contain some organic fat. It is curious how at times white vaseline acquires a disagreeable rancid odour; so does the yellow, but it is not so prone to do so. Yellow vaseline does not make as perfect an emulsion as the white when boiled with liquor potassæ, still it does froth and emulsify to some extent, as will heavy paraffin oil when so treated.

Wm. Martindale.

Sir,—I think perhaps I ought to apologize to Mr. Squire for having mentioned his name in connection with citrine ointment and vaseline, but when I read the paper he refers to before the Students' Association, I had no idea it would be published *in extenso* (although I subsequently saw a printed proof). But I still think that when used alone "vaseline is not suitable for making citrine ointment" and that very little else "but a mechanical mixture" is obtained, from which an acid solution of nitrate of mercury will separate on pressure or fusion. Of course in the official ointment a large proportion of the nitric acid expends itself in producing elaïdine; likewise when a mixture of wax and vaseline is used very little free nitric acid is left, and I cannot but think that the therapeutical action of "ung. hyd. nit. c. vaselin." must be very much greater than that of "ung. hyd. nit. B.P."; the former may perhaps be elegant in appearance and highly approved by oculists, but does not by any means represent the official preparation.

St. John's Wood. Wm. Hy. Symons.

The Alleged Robbery of Government Stores.—We have received from Mr. S. Maitland, Treville Street, Plymouth, a communication stating that he is not the Mr. Maitland referred to in the report of the hearing of this case. A reference to p. 870 will show that there is no ground for misconception on this point.

Stamp (who failed to enclose his card).—We do not think that the subject is suitable for discussion in this Journal.

Export.—(1). Seemann's 'Flora Vitiensis,' Reeve and Co., would probably answer the purpose. (2). Procter's 'Practical Pharmacy' (Churchill).

J. Hurst.—Cooley gives the following recipe for an amber liquid: Dragon's blood (in coarse powder), 1 part; oil of vitriol, 4 parts; digest, and when the solution is complete dilute with q.s. of soft or distilled water.

W. J. Campbell.—According to the Explosives Act, 1875, coloured fires are included in the term "explosives" and are subject to the same regulations as gunpowder. An epitome of the Act will be found in the 'Calendar of the Pharmaceutical Society.'

P. E. C.—The letters can only be imperfectly removed by rubbing with a bit of soft wood.

Communications, Letters, etc. have been received from Dr. Hesse, Dr. Parchkis, Dr. Reichardt, Messrs. Bate, Southall, Colebrook, Madsen, Wright, Nichol, Evans, Tillet, Lux, Inquirer, W. F. G., E. A. H., M. P. S., T. H.

CONTRIBUTIONS TO A CLOSER KNOWLEDGE OF SOME LITTLE KNOWN LEAVES.*

BY DR. HEINRICH PASCHKIS.

III. LEAVES OF ANGRÆCUM FRAGRANS, *P. Th.*

Folia Faham; *Bourbon Tea*† (Orchidaceæ).

The specimens examined were in the possession of the Vienna Pharmaceutical Institute and came partly from the Vienna Exhibition of 1873, partly from the Paris Exhibition, and part was received direct from Paris.

This drug, which occurs in French commerce, consists of well preserved entire leaves and leafy stalks. The leaves are yellow to yellowish brown, softening like leather in water and very tough. When freshly obtained they have an agreeable, but not very strong smell, remotely resembling that of coumarin. They reach a length of over 7 centimetres and a breadth of more than 1. In form they are linear, rounded at the apex, and split up by a shallow indentation into two unequal roundish points; at the base they attenuate only slightly and surround the petiole like a sheath. The parallel veins are somewhat more prominent on the under side than on the upper.

When examined microscopically the epidermis of the upper side is found to be composed of very regular long hexagonal cells (0·045 mm. long, 0·03 broad) which include no stomata between them. (Fig. 14.) The contents of these cells consist either of very small light-refracting granules, or very brilliant drops and scales, or, finally, of delicate crystals, which appear as four-sided needles, or scales and tables. This cell contents is soluble in alcohol and ether and runs together in potash solution to drops refracting light strongly. The epidermis cells of the under side are a little longer (0·064 mm.), and inclose between them numerous stomata margined by swelled thickened guard cells (0·04 long, 0·0288 broad). In a transverse section the epidermal contour appears to be slightly undulated. Next to the epidermal layer of this side, which is covered by a thick yellow-brownish cuticle, follows a *subepidermal layer* of very much thickened cells furnished with narrow lumens. These cells on the upper side stand further apart from each other, are larger (reaching 0·063 : 0·036 mm.); on the under side they are closer to one another, smaller (0·030 mm.), thick-walled and more or less circular. (Fig. 16.) A similar cell occurs here and there in the mesophyll. The mesophyll consists of a wide-meshed tissue of oblong (under the upper side) o quadratic (on the under side) cells. In a longi-udinal section or softened in a macerated preparation hese supporting cells appear as more or less long (1·8 mm. or over), thick fibres, furnished with a small hollow (bast-like fibres); those occurring in the mesophyll are smaller and cylindrical; those at the margin larger and spindle-shaped. They are not woody (are not coloured either with phloroglucin or aniline sulphate). There occur besides in the mesophyll crystal cells filled with raphides, which are somewhat larger than the other parenchyma cells and somewhat elongated in the direction of the axis of the leaf (0·1192 : 0·0128 mm.). The vascular bundles show a prosenchyma consisting of netted porous cells, smaller (scalariform) and larger (spiral) vessels, which are accompanied by numerous bast-like fibres. There occur besides fibre-like series of cells, which at first sight appear to conceal in each cell a concretion of oxalate of lime. But these do not appear clear under the polarizer microscope; they are not destroyed after prolonged treatment with Schulze's reagent; and finally they are found in the ash of the leaf in the same form. They appear to me to be aggregations of silica, which have formed with great regularity in the cell walls of this fibre-like series (Fig. 17). In small depressions in the epidermis of the underside of the Faham leaf occur glandules which consist almost always of one stalk-cell and a bladder-shaped head; seen from the surface these appear like round brown spots about the size of the stomata (Fig. 18). Their contents when boiled with potash solution are coloured turmeric yellow. The exudation from the Faham leaves is of a light golden yellow colour; it has an agreeable slightly cinnamon-like odour, and a somewhat astringent taste.

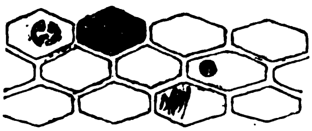

Fig. 14.—*Angræcum fragrans.* Epidermis (above).

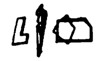

Fig. 15.—*A. fragrans.* Coumarin crystals.

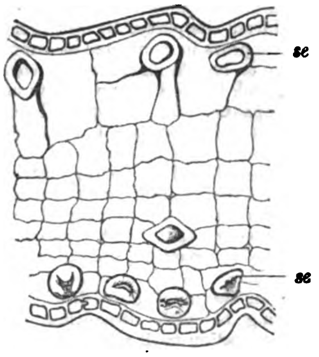

Fig. 16.—*A. fragrans*—Transverse section: *s e*, subepidermal supporting-cell layer.

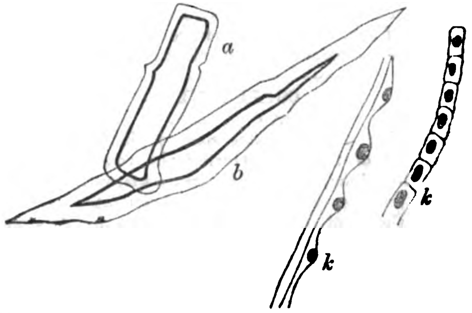

Fig. 71.—*A. fragrans.*—Separate supporting cells (bast-like fibres): *a*, from the mesophyll; *b*, from the margin; *k*, silica aggregations.

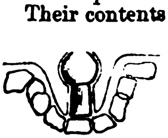

Fig 18.—*A. fragrans.*—Glandule.

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* Reprinted from the "Zeitschrift" of the Austrian Pharmaceutical Association, and communicated by the author, to whose courtesy we are indebted for the use of he wood engravings illustrating the paper.

† See Vogl's Comment.

GUM SAVAKIN.*

BY GEORGE REIMANN, PH.G.

This gum is gathered near the west coast of the Red Sea, further east than the other varieties of gum arabic, and is shipped from the port of Suakin or Savakin; hence its name. It appears in commerce as subglobular tears, which are more or less broken, have a conchoidal glass-like fracture, and, in consequence of numerous fissures, appear quite opaque. It is imported in considerable quantity and not unfrequently sold for medicinal use.

A mucilage made with 8 ounces of this gum to one pint of water was found to be very thick and viscid, a great deal of the gum remaining, as it seemed, undissolved; this was strained out. On diluting the mucilage with water it was noticed that what appeared to be small transparent globules separated, and upon repeated shaking would not dissolve. Some of these globules were collected by diluting the mucilage with water, stirring constantly, allowing to settle, decanting the water, and repeating this operation until all the soluble matter had been removed. The globules were found to be insoluble in boiling water, though on the addition of solution of caustic potassa, or other caustic alkali, they were dissolved, but the salts of the alkalies were without action. A quantity of the globules were spread on panes of glass and dried, yielding thin transparent scales. On boiling these with water they would merely swell up and be transformed into transparent globules again.

These experiments show that they are analogous to and doubtless identical with *gummic acid,* which seems to pre-exist in the gum in the free state, and in the mucilage is held in suspension, while from a dilute aqueous solution it separates as colourless globules.

Numerous expedients have been tried to prevent this precipitation, and the only one found successful was to carefully add, before straining, to one-half of the mucilage sufficient solution of caustic potassa to make it very slightly alkaline, then add the other half of the mucilage and shake the mixture well, which should now have a slight acid reaction. After it has stood a little while it can be strained without loss, and may be mixed with water and otherwise used like that prepared from Kordofan gum.

Five grams of the gum were incinerated and yielded ·19 gram of ash, equal to 3·8 per cent. Analysis showed the presence of calcium, magnesium and potassium.

COFFEE OIL.†

BY C. O. CECH.

The author communicates some preliminary work on the subject of this oil. During the roasting of coffee berries the odour of the oil is very apparent, and it may be seen on the surface of the concentrated extract of coffee in the form of small drops. The quantity of oil present varies according to the source and condition of the berries, being from 8—13 per cent., and of this at least one half is volatilized during the process of roasting. No considerable escape of gas or oil vapour occurs during the roasting until the berries turn brown. At that stage, the berries are turned out and tossed in the air so as to cool them very rapidly and prevent their burning; the oil vapour is thus lost, but might be saved by connecting the roasting drum with an exhauster which would prevent the risk of the berries catching fire, and would render it possible to remove and condense the vapour of the oil. The oil thus obtained would doubtless be of valu e for liqueurs.

The preparation of the oil was carried out by extracting it from 50 lbs. of powdered coffee berries of various kinds by means of ether-alcohol. In this way about 1200 grams of a green, transparent, thick oil were obtained. It deposited crystals of caffeine after standing for a time; and after three years separated into crystalline fatty acids, and a clear green layer of liquid oil, the crystals forming about two-thirds of the whole.

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* From the *American Journal of Pharmacy,* April, 1881.

† From the *J. pr. Chem.,* [2], 22, 395—398. Reprinted from the *Journal of the Chemical Society,* March, 1881.

The Pharmaceutical Journal.

SATURDAY, MAY 7, 1881.

THE ANNUAL REPORT OF THE COUNCIL.

The review of the Society's affairs presented in the report which will this week be circulated among Members of the Society closely resembles that of the previous year in being free from reference to matters upon which there has been any wide divergence of opinion, or by which the interest of the pharmaceutical community has been unusually excited. The greater part of the report is devoted to giving the customary account of the financial position of the Society, of the additions to its Museum and Library, the results of the examinations, and of the proceedings taken against persons who have infringed the Pharmacy Act. In regard to the Society's finances, it is pointed out with regret that there has been during the year 1880 a decrease of revenue as compared with the year 1879. One of the causes assigned for this is a falling off in the number of candidates for examination, there having been two hundred and forty-seven fewer candidates for the Preliminary, three less for the Minor, nine less for the Major, and nineteen less for the Modified examination, so that the receipts from examination fees amounted to nearly five hundred pounds less than in the previous year.

The income from subscriptions has on the whole increased, for though there has been a slight diminution in the number of Members of the Society, chiefly as a result of deaths, there has been more than a corresponding increase in the number of Associates and Apprentices connected with the Society.

Another circumstance that has operated to make the balance in hand at the close of the past year less than that of the previous year has been the exceptionally heavy expenditure on account of law costs, the publication of the 'Progress of Pharmacy,' the Library Catalogue, and the Index to the Journal for the ten years from 1868 to 1878.

The cost of the index has been one hundred and forty-seven pounds six shillings and eightpence, and this amount has been charged to the Journal account for the past year, as well as the sum of six hudnred and ninety pounds four shillings and threepence for postage of the Journal to Members and other persons entitled to receive it. Notwithstanding these large items of expenditure charged to the Journal account, the total expense of the publication for the year amounts to only six hundred and eighty pounds nineteen shillings and sevenpence, that being the difference between the receipts and expenditure, as against seven hundred and forty-nine pounds four shillings and elevenpence in the previous year. Consequently, the Journal account this year shows a decided improvement on last year, and if the expense incurred for postage were deducted, there would be a profit of nine pounds four shillings and eightpence, without making any allowance for the large number of copies distributed gratuitously to Members, Associates and others.

During the past year, between three hundred and four hundred books and pamphlets have been added to the Society's Library, many of these having been presented, while others have been purchased by order of the Committee. Some four thousand copies of the new Library Catalogue have been issued, and the report states that coincident with the issue of this catalogue there has been an increase in the number of books borrowed, though there has been at the same time a considerable decrease in the number of visitors to the Library. It may, therefore, be inferred that the catalogue has proved useful in enabling readers to obtain the books they require without having to come to the reading room. The facilities for study in the Society's Library have also been increased by placing two microscopes there for the use of students.

Applications have been made for about a thousand copies of the Index to the Journal from 1868 to 1878; but the Council expresses regret that greater advantage is not taken of the opportunity for reference presented by this Index, which is supplied without charge to any Member or Associate of the Society on application to the Secretary. If we may judge from some of the inquiries addressed to us from time to time a reference to this Index would in many instances be found to give a clue to the information desired.

The Museum has during the year received considerable augmentation from various sources. Many specimens have been received from the Indian Museum through the authorities at Kew, and several valuable contributions have been made by chemical manufacturers in Glasgow. The very successful exhibition of articles interesting to pharmacists, held last May in the Society's rooms, has been also a means of adding to the Museum collections. Besides making additions of this kind it has been possible to send duplicate specimens to local associations and to interchange them with British and Continental universities and with eminent pharmacists at home and abroad.

The Evening Meetings of the Society during the past session have been on the whole less satisfactory than might be desired, and though the papers brought forward have not been deficient in quality they have been scarcely so numerous as could be desired.

The action of the Society's executive in enforcing the provisions of the Pharmacy Act has generally been attended with satisfactory results; but the adverse decision of the House of Lords in the case between the Society and the London and Provincial Supply Association having demonstrated the necessity for an amendment of the Act, a committee was appointed to draft a Bill in order to render the restrictions on the practice of pharmacy and the sale of poisons more definite. As will be seen from the report of the Council's proceedings this week, steps are now being taken to provide for a representation of the Council's views on this subject before the Royal Commission that has been appointed to inquire into the Medical Act; it may be hoped that, ere the time for presenting the Annual Report again comes round, some satisfactory progress may have been made towards providing a remedy for the evils that have to be complained of in connection with the business of pharmacy.

The Benevolent Fund still continues to present a falling off in subscriptions and donations, and there appears to be a growing tendency to revert to the former practice of confining its application to Members or Associates of the Society, since the throwing open of this charity to all members of the trade has not been responded to by such a more general support of it as might reasonably have been expected. A large proportion of the applications for assistance come from persons who have never contributed to the Fund, and the disproportion between the total number of registered chemists and druggists and those who subscribe to it has induced many who have hitherto subscribed to withhold further contributions. This is a matter that we have repeatedly urged upon the consideration of chemists and druggists, and we still hope that they may be induced to take a more general interest in the well-being of the charity.

The election of new members of Council for the ensuing year has again furnished occasion for a discussion as to disability for holding that position, and on the one hand several correspondents have stated their objection to its being held by anyone specially engaged in carrying on the business of pharmaceutical instruction which it is part of the duty of the Council to regulate, while on the other hand the particular candidate for election as a member of Council who has been thus objected to replies in his defence. His chief arguments are that the objections to his candidature are trivial, and that they only come from a few young members, but that cannot be admitted when it is remembered that Mr. REYNOLDS and Mr. BARNARD PROCTOR are among the number. The reasons that exist for the disqualification of a member of the Council from being appointed a member of the Board of Examiners are self-evident, and we venture to think that, in addition to what has been urged by correspondents on the subject, those reasons should be regarded as having still greater cogency in demonstrating the utter incompatibility between the functions of a teacher of candidates for examination and those of a member of the Society's Council. We would therefore suggest that Mr. WILLS's interest in the welfare of our Society would be more appropriately exercised in undivided attention to the educational work in which he is engaged than by seeking at the same time a seat upon the Council.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, May 4, 1881.

MR. THOMAS GREENISH, PRESIDENT,

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present—Messrs. Andrews, Atkins, Bottle, Butt, Churchill, Frazer, Gostling, Hampson, Hills, Radley, Richardson, Robbins, Sandford, Savage, Squire, Symes and Williams.

The minutes of the previous meeting were read and confirmed.

ROYAL COMMISSION ON THE MEDICAL ACTS.

The SECRETARY reported that the *London Gazette* of that day contained the appointment of a Royal Commission on the Medical Acts. The following is the announcement referred to:—

"*Whitehall, May* 2, 1881.

"The Queen has been pleased to issue a Commission under Her Royal Sign Manual in words and to the effect following:—

"VICTORIA, R.

"VICTORIA, by the Grace of God of the United Kingdom of Great Britain and Ireland Queen, Defender of the Faith, to Our right trusty and right well-beloved Cousin Robert Adam Philips Haldane, Earl of Camperdown; the Right Reverend Father in God William Connor, Bishop of Peterborough; Our right trusty and well-beloved Councillor William Henry Ford Cogan; Our right trusty and well-beloved Councillor Sir George Jessel, Knight, Master or Keeper of the Rolls and Records in Chancery; our right trusty and well-beloved Councillor George Sclater-Booth; Our trusty and well-beloved Sir William Jenner, Baronet, Knight Commander of Our Most Honourable Order of the Bath; our trusty and well-beloved John Simon, Esquire, Companion of Our Most Honourable Order of the Bath; Our trusty and well-beloved Thomas Henry Huxley, Esquire, Doctor of Laws; Our trusty and well-beloved Robert McDonnell, Esquire, Doctor of Medicine; Our trusty and well-beloved William Turner, Esquire, Bachelor of Medicine; and Our trusty and well-beloved James Bryce, Esquire, Greeting!

"Whereas it is of importance to all classes of Our subjects that the conditions under which persons are permitted to represent themselves as qualified medical practitioners should be such as to afford the best attainable security for their skill and knowledge in medicine and surgery.

"And whereas powers in relation to the education and examination for a grant of medical degrees, diplomas, or licences to medical practitioners are by various statutes and charters vested in certain universities, medical colleges, and other bodies in the United Kingdom.

"And whereas under 'The Medical Act, 1858,' and the Acts amending the same, the General Council of Medical Education and Registration was constituted, and vested with a superintendence over the exercise of the said powers, and also with entering in a Register of Medical Practitioners, and removing therefrom the holders of certain medical qualifications obtained in the United Kingdom, exclusive of those obtained in Our Colonies or in Foreign States.

"And whereas by the last-mentioned Acts certain exclusive privileges were conferred on the persons so registered, and persons not so registered were placed under certain restrictions, disabilities and penalties.

"And whereas divers representations have been made in Parliament and otherwise, and both from Our subjects in the United Kingdom, and from the Governments of Our Possessions out of the United Kingdom, in relation to the unsatisfactory position of the above matters.

"And whereas We have thought it expedient that, with a view to legislation, further inquiries should be made into the above matters, and that a Commission should forthwith issue to inquire into the grant of medical degrees, memberships, fellowships, licences, and other diplomas by universities, colleges, and bodies in the United Kingdom, and the courses of education and examination, payments, and other conditions required as a preliminary to such grant, and into the skill and knowledge which such degrees, memberships, fellowships, licences, or diplomas represent; and further to inquire into the conditions and manner under or in which medical practitioners are entered in and are struck off the Register of Medical Practitioners, and the privileges of registered and the disabilities of unregistered practitioners, and the position of medical practitioners so registered in Our possessions out of the United Kingdom, and the position in the United Kingdom of medical practitioners educated in Our possessions out of the United Kingdom or in a Foreign State.

"And further to inquire into the constitution, functions, powers, and procedure of the General Council of Medical Education and Registration, and their relation to the above-mentioned universities, colleges and bodies, and to the medical profession.

"And further to inquire into the result of 'The Medical Act, 1858,' and the Acts amending the same, and into all matters dealt with by those Acts.

"Now know ye, that We, reposing great trust and confidence in your knowledge, discretion, and ability, have authorized and appointed, and do by these presents authorize and appoint you, the said Robert Adam Philips Haldane, Earl of Camperdown, William Connor, Bishop of Peterborough, William Henry Ford Cogan, Sir George Jessel, George Sclater-Booth, Sir William Jenner, John Simon, Thomas Henry Huxley, Robert McDonnell, William Turner and James Bryce to be Our Commissioners for the purposes aforesaid.

"And for the better effecting the purposes of this Our Commission, We do give and grant unto you, or any three or more of you, full power and authority to call before you, or any three or more of you, such persons as you shall judge necessary by whom you may be the better informed of the truth on the subjects herein submitted for your consideration, and every matter connected therewith; and also to call for, have access to, and examine all such books, documents, papers, and records as may afford the fullest information on the subjects of this inquiry; and to inquire of and concerning the premises by all other lawful ways and means whatsoever.

"And Our further will and pleasure is that you, or any three or more of you, do report to Us, with all convenient speed, under your hands and seals, the result of your inquiries into the above matters, and what amendments are required in the above-mentioned Acts, and what provisions it is expedient to make in the matters above-mentioned, or any of them.

"And We further will and command, and by these presents ordain, that this Our Commission shall continue in full force and virtue, and that you, Our said Commissioners, or any three or more of you, may from time to time proceed in the execution thereof, although the same be not continued from time to time by adjournment.

"And for the purpose of aiding you in such matters, We hereby appoint Our trusty and well-beloved John White, Esquire, Barrister-at-Law, to be Secretary to this Our Commission.

"Given at Our Court at *Saint James*, the thirtieth day of April, one thousand eight hundred and eighty-one, in the forty-fourth year of Our reign.

"By Her Majesty's Command,

"W. V. HARCOURT."

The VICE-PRESIDENT said it would be remembered that a resolution had been passed by the Council that the Pharmacy Acts Amendment Committee should formulate all matters which it thought should be submitted to the Royal Commission and present a report to the Council for its approval. The question now seemed to be approaching a crisis, the Royal Commission had become an accomplished fact, and therefore he thought the Committee should proceed to its work without delay, even without waiting for the incoming Council.

Mr. HAMPSON was very glad the Vice-President had introduced this matter, and thought it desirable that the Committee should be empowered to act, without waiting for the approval of its report by the Council. He should submit a resolution on the subject later in the day, which he hoped the Council would sanction.

THE LATE MR. MACKAY.

The SECRETARY said he had to perform one of the most painful duties which had ever fallen to his lot at that Council table, namely, to report the decease of Mr. Mackay, of Edinburgh, on April 19.

The PRESIDENT said since the last meeting, the Council had lost one of its most able members. Mr. Mackay had been more or less associated with the Pharmaceutical Society since it was established forty years ago, and his name seemed interwoven with pharmacy from that period to the present. Mr. Mackay assisted very much in the establishment of the Society and was especially active with regard to the North British Branch; in fact, up to the very time of his death, he may be said to have been the very life and soul of it. As a member of that Council Mr. Mackay was not given to much speaking, but when he did speak, he spoke with considerable power. He had a very happy knack of seizing on the salient points of an argument, and always seemed to have a thorough mental grasp of the subject before him. As President of this Society, he had felt it his duty to go to Edinburgh and attend the funeral, in order not only to convey to Mrs. Mackay and to the members of the family the sympathy of the Council in their loss, but also to show by his presence, as President, the sense which this Council entertained of the loss which the best interests of pharmacy generally had sustained in the death of Mr. Mackay. He might mention that Mr. Mackay's funeral was attended by a very large number of his fellow citizens, showing how much he had been respected and his loss was deplored. He now begged to move—

> "That this Council desire to place on record their deep feeling of regret occasioned by the death of their late valued colleague, John Mackay, whose presence at their sittings during a period of twenty-one years will ever be remembered as a source of unmixed pleasure to themselves and never-failing benefit to the Pharmaceutical Society of Great Britain, more especially in the North British Branch, where from the commencement in 1841, he admirably performed the laborious duties of Honorary Secretary. The Council would also offer to Mrs. Mackay and her family an expression of sincere sympathy in the affliction which has fallen on them in their sudden bereavement, and desire that a copy of this resolution, signed by the President and Vice-President, be forwarded to them."

The VICE-PRESIDENT said he seconded this motion with the greatest sincerity, both as Vice President for the moment, and as a private member of the Council. He had not had that close intimacy and personal acquaintance with Mr. Mackay which he knew many others at the Council table had, but he knew him quite sufficiently to feel the very highest admiration for his abilities, and for the singleness and straightforwardness of his conduct. He would like, therefore, in these two or three observations to bear testimony to the loss which the Society had experienced. He seconded the motion with the sincerest feeling that it was right that some such record should be placed on the books, and that some such testimony of appreciation of her late husband should be sent to Mrs. Mackay.

Mr. SANDFORD said, as the oldest member of the Council, he might be indulged for a moment in expressing his great regret at the loss which the Pharmaceutical Society had sustained, not simply the Council. He little thought when he saw his friend Mr. Mackay sitting opposite him that day month, that the Council would so soon be deprived of his presence there. All the members of the Council knew how great an advantage it always was to have Mr. Mackay with them; they knew how earnestly he felt the honour of the Society; they knew how well he represented Scotland at that Council table; but they also knew how perfectly he promoted the interests of the Pharmaceutical Society in Scotland. He was sure his friend Mr. Frazer would be with him when he said that Mr. Mackay was the life and soul of the Pharmaceutical Society north of the Tweed. It was no common man whom they had lost, and when the paper was read recently announcing that Mr. Mackay would remain on the Council by lot during the ensuing year, they all felt that for at least twelve months they would have the advantage of sound counsel and advice from Mr. Mackay. It had pleased God to remove him from this world, and he knew no man who had left this world more deeply respected than their friend, Mr. Mackay. The Vice-President had said he had not had the privilege of the intimate personal acquaintance with Mr. Mackay that some of them had had. He (Mr. Sandford), for one, had been very intimately connected with him. He saw him not simply at that table, but always at his own house when Mr. Mackay came to London, and on many occasions he had had the privilege of staying with him in Edinburgh. He was known at the Council as a man of good sound practical common sense; but to know him thoroughly one required to see him in his family, and to see how he was beloved there, and he might say how he deserved the love of his family. To see them together was a most delightful thing. He would not trouble the Council further, but he could not allow the resolution to pass without expressing his most cordial concurrence with it.

Mr. HILLS also attempted to address the Council on the motion, but was unable to say more than a very few words expressive of his agreement with all Mr. Sandford had said, and of the blow he felt the death of his old friend of forty-four years' standing to be.

Mr. BOTTLE, as an old member of the Council, desired to add an expression of his sincere regret at the loss the Council had sustained in the death of their late friend. It had been his privilege to know Mr. Mackay, and he esteemed it as one of the greatest privileges of his life. He made his acquaintance at that table, and always met him with the greatest pleasure; but, as Mr. Sandford had said, to know John Mackay was to know him in his own home; to see him amongst his friends and his family; to see him beloved as such men only were esteemed and beloved. He would only add further that he rejoiced very much that the President had gone down to Scotland to attend the funeral as the representative of the Council. He should himself have gone had his health permitted him, but it was absolutely impossible for him to do so.

Mr. FRAZER said he could not be altogether silent on such an occasion, though he was not sure that silence would not be more eloquent in testifying to the high appreciation of and esteem in which he held his late friend. It was not easy for him to realize the loss he personally had sustained in missing from his side at that table him by whose persuasive eloquence—as firm, however, as it was persuasive—he first mixed himself in any degree among his fellow pharmacists. That was when the late Mr. Jacob Bell first visited Scotland. He fought very hard and long against the arguments used by Mr. Mackay to get him to the Glasgow breakfast, and specially to the Edinburgh dinner, the very first public entertainment at which he ever was present: but in the end, he, like many others in Scotland, had to yield. Since then, and specially during the ten years since he took his seat beside him there, their intercourse had been of the closest, and had been to him a most profitable, as well as pleasant one. Though they took different views of many of the questions that had been discussed there, not for one instant had their intimate friendship been lessened or even endangered. After what had been said already of Mr. Mackay's great services to that Society, he need not add more on this subject. But this he would add, that while there were at the table, still, gentlemen who had had the interests of the Society as much at heart as their departed friend, he was sure there was not one who would think he did them injustice when he affirmed that none could have them more than Mr. Mackay. One thing he would also add, that while Mr. Mackay's great good sense prevented the parading of his religious views, he never, when the occasion called for it, disguised them. Another thing he thought he ought to add. It had been his privilege to be present during the last moments of their friend, and subsequently to that he had had some intercourse with his family, and he might convey to the members of Council the intense satisfaction that it gave to the family to find that the Council was represented at the funeral by the President. There were also letters from other gentlemen, who, under the same circumstances as Mr. Bottle, were prevented from being present. It so happened also that the annual meeting of the Edinburgh Council had been held within five hours of Mr. Mackay's death, and if a thunderbolt had fallen amongst those present they could not have been more horror-stricken.

Mr. **Hampson** said he should like to add a word or two as representing the younger members of the Council, and to pay his tribute of respect to the memory of Mr. Mackay and express his sense of the serious loss sustained by the Council, especially by the Scotch friends, though the most serious loss of all was that sustained by his bereaved family.

Mr. **Williams** said every member of the Council must agree with the sentiments which had been so ably expressed. They all felt Mr. Mackay's loss very deeply; he certainly did, and if his own health had permitted should have attended the funeral.

The motion was then carried unanimously.

Nomination of a Member of Council.

The **President** said it was now his duty to nominate a member of the Society to fill the vacancy in the Council, and he begged, therefore, to nominate—

Mr. **James Robertson Young**, North Bridge, Edinburgh. Mr. Young was a very able man, probably one of the best men that could be got to supply the place of him whom they had lost. He should add that Mr. Young's nomination would be very agreeable to his brethren in Scotland.

Mr. **Frazer** seconded the motion, and said he was quite sure there would be but one voice at the Council when Mr. Young arrived there.

The **Vice-President** supported the motion. He had made the acquaintance of Mr. Young when in Edinburgh, and he was quite sure that he would grace the Council table, as well as add to its efficiency.

The motion was then agreed to unanimously.

Deputation of Examiners from Scotland.

The **Secretary** read a letter from the North British Branch announcing that the Board of Examiners in Edinburgh had considered the invitation of the Council to send a deputation to the examination in London in June, and had decided that the deputation should consist of the Chairman (Mr. Stephenson), and Messrs. Borland and Kinninmont.

The Annual Report.

The Council then went into committee to consider the draft report as amended. A slight addition was made to it, and the Council having resumed, it was ordered to be printed and issued with the voting papers for the election of Council and Auditors.

The following, being duly registered as Pharmaceutical Chemists, were respectively granted a diploma stamped with the seal of the Society:—

Bevis, Walter.
Cann, James.
Chaplin, John Henry.
Clayton, John William.
Garland, Thomas William.
Goldby, Frank.
Hill, John Rutherford.
Matthews, Herbert Rouse.
Parker, William.
Preston, Henry.
Rheeder, Thomas.
Thomas, John.
Thompson, Arthur.
Walgate, Septimus.
Williams, Stephen.

Elections.

MEMBERS.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Bevis, Walter	Newport (I. of W.).
Coverdale, George	Leeds.
Dodd, William Ralph	London.
Elborne, William	London.
Garland, Thomas William	Acocks Green.
Goldby, Frank	Witney.
Hill, John Rutherford	Edinburgh.
Hope, Arthur Peach	Wellingborough.
Lees, David	Glasgow.
Parker, William	Thirsk.
Preston, Henry	Ollerton.
Slicer, Walter	Bingley.
Thompson, Arthur	London.
Walgate, Septimus	London.
Williams, Stephen	Brighton.
Wimpenny, John McMillan	Southport.

Chemists and Druggists.

The following registered chemists and druggists, who were in business on their own account before August 1, 1868, having tendered their subscriptions for the current year, were elected "Members" of the Society:—

Bickford, John Thomas	Exmouth.
Bowden, Ambrose	London.
Topham, John Samuel	Exeter.
Wolferstan, George Dacre	Midhurst.

ASSOCIATES IN BUSINESS.

The following having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Baines, Francis	Corsham.
Barker, Alfred William	London.
Biddles, William Byron	Reading.
Bright, Frederick	Beckenham.
Brown, Thomas Laud	Ripon.
Campbell, Charles	Hull.
Carter, Henry Ayling	London.
Chapman, Ingram William	Crowle.
Cole, Edward Henry	Leeds.
Crichton, Alexander	Leith.
Cuttle, Arthur Edward	Scarborough.
De Peare, John Thomas	London.
Drew, John	Birmingham.
Evison, Alfred	Alfreton.

Foggan, George	Bedlington.
Fraser, John	Helmsdale.
Furness, Joseph Machin	Sheffield.
Grant, Donald	Portland.
Greenwood, Dennis	Cambridge.
Hall, Alfred Lee	Winchcombe.
Hannaford, William	Liverpool.
Hart, Arthur	Putney.
Hayhoe, William	London.
Hill, Ernest	New Swindon.
Hinksman, John	Carluke.
Hobson, George William	Buxton.
Illsley, Thomas Brown	Ripley.
Jones, Samuel	Holywell.
Jones, Thomas Mantle	Cleobury Mortimer.
Joseph, Arthur Iorwerth	St. Leonards-on-Sea.
McCrindle, Thomas	Edmonton.
Macdonald, Ewan	Cheltenham.
Maxey, John Thomas	Wisbech.
Mager, William Kelk	Queenstown (Cape Colony).
Neale, William James	Liverpool.
Ogston, William	Paisley.
Parrott, William Searle	Watford.
Pigott, Samuel	Manchester.
Ragg, William Watkins	Edmonton.
Ritson, George	Sunderland.
Salmon, Thomas	Denbigh.
Scobie, James	Edinburgh.
Shilton, James	Birmingham.
Shone, John	Whitchurch (Salop).
Simpson, William	Glasgow.
Swindle, Norman Vickers	Keswick.
Thompson, Arthur Stevens	London.
Thornber, William	Accrington.
Towler, George Bland	Liverpool.
Vaughan, John	London.
Venables, Samuel Henry	Kington.
Walker, James	Galashiels.
Walker, Thompson Farmery	Brotton.
Wilkins, Robert Elliott	London.
Williams, David Henry	New Southgate.
Wilson, William Joseph	Oxford.

Modified.

Bletsoe, John	Richmond (Surrey).
Charlesworth, Charles E.	Manchester.
Dwyer, John	London.
Johnson, Arthur	Rotherham.
Widdowson, Richard	Bulwell.

ASSOCIATES.

The following having passed the Minor examination, and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Aplin, Isaac Weston	Yeovil.
Atherton, John Henry	Wigan.
Baker, Charles Frederick	Hitchin.
Baker, Walter Robert	London.
Barlow, Charles	Prescot.
Barnes, Thomas	Preston.
Bayfield, Gabriel Thomas	Norwich.
Billington, John	Northwich.
Braithwaite, John Oldham	London.
Briggs, George	Leeds.
Briggs, William	Lancaster.
Chabôt, Frank	London.
Clark, Edward John	Swansea.
Clarke, Henry Robt. Stanhope	Malvern.
Davies, Rees	Swansea.
Ellard, James	London.
Esam, Richard	Stamford.
Fielder, Arthur Buckley	Winchester.
Forret, John Alexander	St. Andrews.
Flintan, Francis Robert	Weybridge.
Freeman, Frank	West Dulwich.
George, Alfred Walter	Gt. Yarmouth.
Hewitt, John Richard	Birmingham.
Holt, John	Aislaby.
Horrell, Alfred Charles Julian	Dartford.
Hughes, John Smith	Spalding.
Jowett, Henry	Leeds.
Joy, Francis John Jessopp	Cardiff.
Kinross, William Malloch	Edinburgh.
Kirkby, William	Ripon.
Leicester, Thomas	Chester.
Lewis, Jonas Henry	London.
Llewellyn, Lewis Herbert	Shrewsbury.
Maxey, William Henry	Boston.
Naysmith, Andrew	Arbroath.
Nettle, William R. P.	Plymouth.
Orchard, Arthur Bishop C.	London.
Page, Robert Steele	London.
Procter, George Woodyatt	Sunderland.
Ridgley, George Stevens	Gillingham.
Roberts, George	Dalston.
Robinson, Herbert E. J.	London.
Roekledge, Francis E.	Easingwold.
Seymour, Frederick Seth	Wimborne.
Shaw, Herbert	Grantham.
Skinner, Alfred James Page	Seaton.
Skinner, Richard	Oxford.
Staley, Henry	Burton-on-Trent.
Tait, Robert	Edinburgh.
Turnbull, William Scott	Edinburgh.
Walker, Charles	Birstwith.
Walker, Edward	Leeds.
Wallbridge, Henry Alfred	London.
Westwater, George	Lochgelly.
Whigham, Robert Laing	Cardigan.
Watts, George William	Clapham.
Wright, Robert	Buxton.

APPRENTICES OR STUDENTS.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Atkinson, Robert Burrow	Pontefract.
Berry, James Henry	Bradford.
Bice, James	St. Ewe.
Bond, Arthur S.	Bristol.
Bramald, Frederick Dixon	Wakefield.
Bruce, Joseph Percy	Hastings.
Burgess, Arthur Henry	Alderley Edge.
Close, Thomas	Middlesborough.
Cumber, Charles Davies	Guernsey.
Davies, Francis	Newcastle Emlyn.
Day, Henry William	Margate.
Elsdon, Herbert William	Wells (Norfolk).
Evans, Daniel	Rhos.
Feltham, Charles	Tamworth
Gregory, Matthew Joseph	Worksop.
Grieve, William	Crieff.
Harvey, Joseph Charles	Halesworth.
Hickmott, Albert Ernest	London.
Hill, Arthur Croft	London.
Jones, Frank	Manchester.
Lamacraft, Charles Arthur	Putney.
Lesiter, Frederick William	Richmond (Surrey).
Lister, William Benjamin	London.
Mackay, David James	Edinburgh.
Mainprize, John Vickerman	Scarborough.
Nicholls, Charles	Wellington (Somerset).
Nichols, William Hartley	Leeds.
Parker, Frank Powdrell	Whitchurch (Salop).
Schofield, Samuel Reuben	Abingdon.
Thrift, Robert	Newcastle-on-Tyne.
Toplis, John Walter	St. John's Wood.
Trezise, George T. E.	Wellingborough.
Wright, Charles Edward	Burton-on-Trent.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The names of the following persons, who had severally made the required declaration and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Robinson Brown, 222, High Street, Dudley.
James Maclagan, 33, Earl Grey Street, Edinburgh.

HONORARY AND CORRESPONDING MEMBERS.

The following gentlemen, whose names were selected last month, were unanimously elected honorary and corresponding members:—

Professor Attfield, F.R.S., London.
Professor Michael Foster, F.R.S., Cambridge.
Dr. Lyon Playfair, M.P., C.B., London.
Professor E. Russow, Dorpat.

REPORTS OF COMMITTEES.

HOUSE.

The report of this Committee included a statement of the estimates obtained for putting new sashes in three windows and painting the outside of the house, and reported that these had been accepted and the work put in hand. It also stated that the tablets for the hall and lecture-theatre were in a forward state, and the Secretary had been requested to make a list of the names to be placed on the respective boards, in accordance with the resolution to that effect.

The report and recommendations of the Committee were received and adopted.

Lists of Prizemen.

The SECRETARY submitted to the Council a list of first prizemen in the School of Pharmacy from 1842 to the present time, also lists of Pereira Medallists, Jacob Bell Scholars and winners of first prizes for Herbaria. Also a list of legacies to the Benovolent Fund.

The PRESIDENT said he believed all the members of Council had had copies of the lists.

It was moved by Mr. GOSTLING and seconded by Mr. HAMPSON—

> "That the lists of prize winners and others now submitted to the Council be referred to the House Committee to give the necessary instructions for their being inscribed on the tablets which have been ordered for that purpose."

Mr. WILLIAMS did not think the lists as they stood ought to be placed on the tablet, for some names were repeated several times. He thought what was wanted was a list of prizemen, not a list of the actual prizes they took, and he would suggest that the Committee have power to revise the lists.

Mr. BUTT agreed with Mr. Williams. He had looked through the list, and there were several mistakes in it. He thought the Committee should have power to revise it.

The PRESIDENT said he was quite prepared to accept the suggested alteration, that the Committee have power to revise the lists.

Mr. SANDFORD asked how it was there were eleven first prizemen in one year.

The VICE-PRESIDENT said he could explain how that arose, as it happened in the year in which his name appeared. At that time it was thought unfair to certain students that they should be put into the same examinations with young men attending the practical class. One set of students devoted their whole time to studies, whilst the others only attended the lectures, and were engaged in business during the other part of the day. The result was they did not enter the same examinations, and there were two first prizemen for each of the three classes of lectures.

The PRESIDENT thought the matter had better be left to the Committee, who, he had no doubt, would go fully into it.

Mr. SANDFORD asked if the resolution included the list of donors to the Benevolent Fund.

The PRESIDENT said, No.

Donors to the Benevolent Fund.

The Council then went into committee to consider what names should appear on the list of donors to the Benevolent Fund.

On resuming,

Mr. WILLIAMS moved—

> "That the list of names of donors to the Benevolent Fund to be placed on the proposed board include all names of those who have given twenty guineas or upwards to the Fund before July 1, 1881, with the total amounts against each name.
>
> "That it be an instruction to the Benevolent Fund Committee to add to the list at their discretion the names of donors of further amounts, provided that no such amount shall be less than twenty guineas.
>
> "That the same regulation shall hold good with respect to the names of firms giving donations, with the exception that the minimum amount be forty guineas."

Mr. ANDREWS seconded the motion.

Mr. SANDFORD said some gentlemen had given twenty guineas in one sum, and had also given money in the whole amounting to fifty guineas. According to the strict reading of the resolution formerly agreed to, those gentlemen would only appear as donors of twenty guineas. He did not read it in that way himself, for he thought when men had given a single twenty guineas and then further sums, the gross sum should appear, just in the same way as a man who gave twenty guineas now, and then afterwards gave more, that sum would be added to his name. Others had never given twenty guineas at any one time, although their accumulated gifts might amount to fifty guineas, or one hundred guineas. As the resolution now stood, their names could not appear at all.

Mr. BUTT thought the existing resolution (see before, p. 738) would be quite clear with the addition of the word "previous," so as to provide for adding the amounts given previously to a donation of twenty guineas, as well as those sums given afterwards. He moved an amendment to that effect.

Mr. ROBBINS asked what was the limit to be put; if it extended to any small amount it would include annual subscriptions, and many people would give money as donations instead of subscriptions; which might affect the charity.

Mr. SYMES said this matter had already been discussed several times, and he thought it was pure waste of time for the Council to go over a matter again which had been so thoroughly discussed.

The VICE-PRESIDENT said supposing a man gave £3 a year until it came to twenty guineas, would that entitle him to be placed on the board, according to Mr. Williams's motion?

Mr. WILLIAMS said he proposed that it be at the discretion of the Committee.

Mr. BUTT said that should only take effect after he had once given twenty guineas in one sum.

The VICE-PRESIDENT said he understood the amendment to mean that nobody's name should appear on the board who had not at some time or other given twenty guineas in one sum.

Mr. BUTT said that was his meaning, and that was what the Committee of the Council had already agreed to.

Mr. WILLIAMS said the Secretary, in trying to draw up a list to be placed on the board according to the existing resolution, found he would have to omit many names which they would all desire to see upon it, and he (Mr. Williams) therefore moved the resolution to get over the difficulty. It was a totally distinct proposition from the amendment of Mr. Butt.

Mr. RICHARDSON supported the motion.

After some further discussion,

Mr. ATKINS said he could scarcely recognize the view

Mr. Williams put forward. If the sum was to be cumulative, why not begin with a guinea? He thought the idea was to obtain large donations in lump sums.

Mr. WILLIAMS said in deference to the wishes of several members, he would insert the words "in sums of not less than five guineas at any one time." He should also propose that the existing resolution be rescinded.

Mr. SANDFORD opposed the motion; he said he knew the course he advocated shut out his own name; but he maintained he had no right to have his name on the board, not having given twenty guineas in one sum.

The VICE-PRESIDENT said Mr. Sandford represented a certain class of donors; he, on the other hand, had never given sixpence as a donation, and, therefore, stood in a different category. Mr. Sandford had argued that nothing less than a twenty guineas donation entitled a man to have his name on the board; he, on the other hand, considered the Fund had received the benefit of Mr. Sandford's two ten guineas donations, and would like to record the obligation of the Society to Mr. Sandford for his munificence, whether it was done in one or two sums. It was not merely from the donor's point of view the matter should be argued. He hoped the Council would now reverse the resolution previously passed.

Mr. BUTT's amendment was then put and lost by a large majority.

Mr. WILLIAMS's resolution as amended was then put and carried in the following form:—

> "That the list of names of donors to the Benevolent Fund to be placed on the proposed board include all names of those who have given twenty guineas or upwards in the aggregate in sums of not less than five guineas at any one time, before the 1st July, 1881, with the total amounts against each name.
>
> "That it be an instruction to the Benevolent Fund Committee to add to the list the names of donors of further amounts in sums of not less than five guineas at any one time, provided that no such amount shall be recorded until the donation amounts to the sum of twenty guineas in the aggregate.
>
> "That the same regulations shall hold good with respect to the names of firms giving donations, with the exception that the minimum amount be forty guineas."

It was further resolved:—

> "That the following resolution of the Council of March 2, 1881, be rescinded:—
>
> "That the names of donors of twenty guineas and upwards in one sum be inscribed on the tablet.
>
> "That a donation of forty guineas and upwards made by a firm shall entitle the firm or co-partnership to be also inscribed thereon."

FINANCE.

The report of the Committee, including the recommendations for the payment of sundry accounts, was received and adopted.

BENEVOLENT FUND.

The report of this Committee included a recommendation of the following grants:—

£5 to a former associate, aged 56.

£16 to the widow of a registered chemist and druggist, for the purpose of placing two of her boys, aged 13 and 11, in a school.

£10 to a former member, aged 59. Applicant has had six previous grants.

£10 to a registered chemist and druggist, aged 69.

£10 to a registered chemist and druggist (female), who has had five previous grants of like amount.

£5 to a registered chemist and druggist, aged 48, suffering from an accident.

£5 to a former member, whose case was deferred last month for further inquiries.

£5 to a former member, aged 50, whose case had previously not been entertained, but applicant had attended personally. The grant was made subject to further inquiries being satisfactorily answered.

The SECRETARY said there was another case which he had omitted to bring before the Committee on the previous day, and which one of the members of the Council would be prepared to speak to.

The Council went into committee to consider the case, which was briefly described by Mr. Savage, and a grant of £10 was directed to be made.

Mr. ATKINS desired to thank the Council for a grant made last month, which passed through his hands and the recipient of which had desired him to convey her thanks to the Council.

The report and recommendations were then received and adopted.

LIBRARY, MUSEUM AND LABORATORY.

Librarian's Report.

The Librarian's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
March . .	Day . .	435	24	6	16
	Evening .	134	10	1	6

Circulation of books.	Town.	Country.	Total.
March	206	172	378

Carriage paid . . £3 0*s.* 5½*d.*

The under-mentioned donations to the Library had been received:—

Université libre de Bruxelles, Catalogue de la Bibliothèque, 1869-75. From the UNIVERSITÉ.

Flora of British India, by Hooker, etc., part 8. From H.M. SECRETARY OF STATE FOR INDIA.

Dentists' Register, 1881. From the GENERAL MEDICAL COUNCIL.

Fraser (T. R.), On the Kombé Arrow Poison. From the AUTHOR.

Treffner (E.), Beiträge zur Chemie der Laubmoose, 1881.

Untersuchung des Bieres auf Bitterstoffe. From Professor DRAGENDORFF.

The Committee recommended that the usual letter of thanks be sent to the respective donors.

The Committee also recommended the purchase of the under-mentioned works:—

Ganot, Elements of Physics, 9th ed., 1879.

Jackson (B. D.), Guide to the Literature of Botany, 1881.

Payen, Industrial Chemistry, 1878. (Second Copy.)

The Committee had ordered that the Library and Museum be closed from Thursday, April 14, at 5 p.m., to Tuesday, April 19, at 9 a.m.

Curator's Report.

Attendance.	Total.	Highest.	Lowest.	Average.
Morning . .	283	26	2	11
Evening .	65	8	0	3

The following donations were reported:—

Fine specimen of Crystallized Iodo-cyanide of Mercury and Potassium. From Mr. W. COPNEY.

A fine specimen of Crystallized Barbaloin. From Messrs. T. and H. SMITH and Co.

Specimen of the "Wanika" Poison. From Dr. SYDNEY RINGER.

Specimen of Tannin. From Mr. E. N. BUTT.

Specimen of Oolachan Oil. From Messrs. BURGOYNE, BURBIDGE, CYRIAX & FARRIES.

Specimens of *Naregamia eláta*, *Mentha incana*, Volatile Oil of *Nardostachys Jatamansi* and Herbarium specimens, in flower, of the *Zingiber officinale*. From Dr. DYMOCK, Bombay.

Specimens of Kurchi Bark and Seeds, False Kurchi Bark and Kurchicine. From the BABOO RAM CHUNDRA DUTTA, Calcutta.

Specimen of Artificial Oil of Meadowsweet and Paraoxybenzoic Aldehyde. From Mr. W. R. DUNSTAN.

The Committee recommended that the usual letter of thanks be sent to the respective donors.

Letters of thanks for duplicate specimens had been received from the Leicester Chemists' Assistants and Apprentices' Association, the Aberdeen Society of Chemists and Druggists, and Professor Fristedt of Upsala, and from Mr. C. E. Stuart for loan of specimens from the Museum for illustrating a lecture.

The Professors had attended the Committee and reported favourably of their respective classes.

PHARMACY ACT AMENDMENT.

The report of this Committee included the following correspondence from the Privy Council with regard to the Pharmacy Act.

[*Copy.*]
"Privy Council Office,
"6*th April*, 1881.

"Sir,—I have submitted to the Lord President of the Council your letter of February 16 last, and the draft Bill which accompanied it entitled 'An Act to further regulate the Sale of Poisons, and to alter and amend the Pharmacy Act, 1852, and the Acts amending the same.'

"The Lord President instructs me to acquaint you, for the information of the Council of the Pharmaceutical Society, that after a review of the whole correspondence which has passed upon this subject, and a careful consideration of the Bill framed under the direction of the Society, his lordship is not prepared to submit the Bill for the consideration of Parliament.

"I am, Sir,
"Your obedient servant,
(Signed) "C. L. PEEL.

"Elias Bremridge, Esq.,
"Pharmaceutical Society,
"17, Bloomsbury Square."

"13*th April*, 1881.

"C. L. Peel, Esq.,
"Privy Council Office.

"Sir,—I have submitted your letter of the 6th inst. to the President and a Committee of the Council of this Society, by whom I am instructed to ask the Lord President to favour a small deputation from the Council with an interview on the subject of the Draft Bill entitled 'An Act to further regulate the Sale of Poisons and to alter and amend the Pharmacy Act, 1852, and the Acts amending the same.'

"I am, Sir,
"Your obedient servant,
(Signed) "ELIAS BREMRIDGE,
"*Secretary.*"

"Council Office,
"19*th April*, 1881.

"Sir.—I have submitted to the Lord President of the Council your letter of the 13th inst., and I am directed to inform you that his lordship will be ready to receive a deputation from the Council of the Pharmaceutical Society on the subject of the Draft Bill 'To further regulate the Sale of Poisons and to alter and amend the Pharmacy Act, 1852, and the Acts amending the same,' after the House of Lords meets in May next.

"I am to add that you shall be informed as soon as the Lord President is able to fix a day for receiving the deputation.

"I am, Sir,
"Your obedient servant,
(Signed) "E. HARRISON.

"The Secretary,
"Pharmaceutical Society,
"17, Bloomsbury Square, W.C."

The report also recommended the appointment of certain gentlemen as a deputation to wait on the Lord President of the Council, when he should signify his willingness to receive them.

The report and recommendations of the Committee were received and adopted.

ROYAL COMMISSION ON THE MEDICAL ACTS.

Mr. HAMPSON then moved—

"That the Pharmacy Act Amendment Committee be empowered to represent this Council in respect to all matters they might think it necessary to bring before the Royal Commission appointed by the Queen to inquire into the operation of the Medical Acts, etc."

He said the Royal Commission was appointed and would shortly begin its labours. The Council had heard that morning, that by the resolution which stood in the books the Pharmacy Act Amendment Committee had no power to act except after going into various subjects and reporting to the Council, and then the Council could, if it thought proper, give the Committee further instructions. But the Council would see that if immediate steps were to be taken to obtain a hearing before the Royal Commission, it would be necessary to enlarge the powers of the Committee, and that was the object of the motion. Of course, he bore in mind the resolutions passed by the Council. In the first place, there was one passed with reference to the question of counter prescribing, about which it was not necessary to enter into details; but the Committee decided that it would be advisable to have its views represented before the Commission, so that when the Bill was framed there should be a satisfactory arrangement, and that this vexed question might cease to exist. The question of the Pharmacopœia was another which the Council had decided should be brought before the Royal Commission; and those were the only subjects which had been decided upon. He wanted the Committee to be entrusted with powers to bring about an interview, and to take the necessary steps to represent the Council, and he felt sure the Committee might be trusted in this matter.

The VICE-PRESIDENT said he had agreed to second the motion, but he must candidly admit that to his mind it seemed somewhat unconstitutional; still he thought it was necessary under the present peculiar circumstances. He would rather that the Committee had drawn up certain suggestions which the Council could have deliberated upon and approved before the Committee represented those views to any Commission at all. That would have been a preferable course; but he feared the gazetting of the Commission scarcely left time to go through this more desirable form, and therefore he would urge the Council to give a larger amount of power to the Committee than under ordinary circumstances any Committee ought to possess. Supposing he were to remain on the Committee, he, for one, should desire to do as little as possible without the full concurrence of the Council; but at times it would be necessary to act independently. He said this because he should not like this course to be treated as a precedent.

The PRESIDENT said it was somewhat unconstitutional to empower a Committee to represent the Council, but he thought that the motion might be improved by an alteration in the phraseology. He agreed that the fullest powers should be given to the Committee, so that it might act on very short notice when there was not time to take the opinion of the Council.

Mr. ROBBINS suggested the addition of the words "in case of emergency."

Mr. WILLIAMS thought the expression "to represent the Council" rather a strong one. He should not object to the Committee being empowered to act to the best of its ability.

Mr. ATKINS said he was much disappointed that the name of the President did not appear as one of the Royal Commissioners, it would have been a most graceful compliment to the lower branch of the great profession of medicine. The Council must, however, entrust the

Committee with very full if not plenary powers. As to the preparation of a new Pharmacopœia, there could be scarcely any possible division of opinion; and on the vexed question of counter prescribing, on which there had been a difference of opinion at that Board, it was well known that the Committee was pretty fairly divided, both views being represented; and he was perfectly sure that on a delicate point of that kind, if the members of the Committee felt in a difficulty, they would wait for a meeting of Council, and confer with their brethren. With that expression of opinion he should vote for the motion, because the subject required prompt action.

The Vice-President said if the Committee appeared in any way before the Royal Commission it must appear with all the force which the Society could give it. If the Committee appeared as individuals, or as a section of a body, it would not add to the weight of anything it had to propose. He thought, therefore, that when the admission to a departure from strict constitutionalism was being made, it would be better for the Council to give the Committee the title of being its representative for the time being.

Mr. Squire thought that in the case of so important a matter as representing the Council before a Royal Commission, there would be no difficulty in calling a special meeting of the Council, if necessary, any more than there would in calling the Committee on which there were several country members. After all it would be only calling a few more members from the country, and a few more from town; the matter would then be more fully discussed, and the result would have more weight.

Mr. Savage understood that the objection was rather to the words than the spirit of the motion. He would suggest, therefore, that the words be "that in case of urgency, power be delegated to the Committee to take such action as they may think necessary."

Mr. Frazer said every Commission or Committee had powers to act on certain fixed lines, but the Society's deputation would not be able to show any fixed lines on which it could act. If the Committee had simply power to watch this matter, and call the Council together in case of any emergency, it could not represent the Council. He did not know whether there was any hurry, whether Royal Commissions were rapid or slow in action; if they were rapid, it would be necessary to call a special meeting of the Council.

Mr. Symes said the present was a special emergency requiring special action, and the Council could certainly grant special powers. If it had any fear of not being duly represented on the Committee it could add to it; but if it had perfect confidence in the Committee it might delegate full powers to it. Watching would not prevent the evil. The Committee ought to have the power to protect the interests of chemists and druggists generally in the matters which had been already discussed, and in any others which might occur in the Medical Bill.

Mr. Williams said, this Committee would cease to exist that day fortnight.

Mr. Symes said the mischief might be done in that time.

Mr. Williams said the first thing would be to apply for permission to be heard by the Royal Commission. He was not opposing the motion; but it was an expiring Council, and the Committee appointed last June would expire that day fortnight.

Mr. Symes said that was a theoretical difficulty only; the Committee could act until another was appointed.

Mr. Sandford said his difficulty was that according to the wording of the motion the Committee would be empowered to represent the Council before the Commission, that is, that that Committee and no other persons could go before the Commission, and give evidence on behalf of the Council. He presumed the Council would empower the Committee to request other persons besides the members themselves to give evidence.

The President said he thought it would be competent for the Committee to name persons outside the Council to appear before the Commission as witnesses.

The Vice-President said nobody but members of the Council could represent the Council.

Mr. Bottle said that was just the point; he thought no one elected on that Committee outside the Council could go before the Royal Commission and represent the Council. He hoped the motion would be withdrawn, for it seemed to him a perfectly new direction in which the Council were stepping, and unnecessarily so. He did not believe this Royal Commission would make any move within the next fortnight, requiring any representation of that Council before it. The Council would meet again in a fortnight, and if necessary could be summoned a little earlier to take into consideration what, if anything, it desired to put before the Commission. He would urge, therefore, that the matter be allowed to stand for a fortnight, and then what was cropping up could be noted, and the new Council could appoint a Committee to represent it. He would much rather a precedent were not made of delegating to a small section such an important matter as representing the Council.

Mr. Frazer asked if it would not be very awkward, supposing the Royal Commission summoned some one member from that Council, irrespective of the Committee, to give evidence before it. If he gave evidence contrary to the Committee, the Council would represent a divided house.

Mr. Savage said that was one reason why he suggested the words "they should take such action as might be necessary."

Mr. Gostling said he saw the difficulty which existed in the minds of many members in reference to the motion, and whilst recognizing the possibility of the fact that the Royal Commission might be in existence for some considerable time, he thought it would not be necessary to act until a new Council was elected. He thought the present Pharmacy Act Amendment Committee should have more power; he would therefore propose an amendment:—

> "That the Pharmacy Act Amendment Committee be empowered to act at their discretion on the part of the Council of this Society with regard to the Royal Commission on Medical Bills."

The Committee required a little more power than it had at present, and it would be a pity to allow this Committee to lapse at the present time, when it might be necessary that it should really be heard before the Royal Commission.

Mr. Robbins said "in case of urgency" would be better than "at their discretion."

Mr. Gostling said he would not object to add those words.

Mr. Richardson said he was not prepared to vote for the motion. He agreed with Mr. Squire and Mr. Bottle that if there was any necessity for acting, it would be as little trouble to call the whole Council together as to call the Committee. The President and Secretary were quite competent to watch the progress of this Commission, and he had sufficient confidence in them to know that they would watch the interests of the Society and of the trade for the next month. He demurred to what had been said by the Vice-President, as to any member of the Council not on the Committee being debarred from giving evidence before the Commission.

The Vice-President said he did not mean to convey that.

Mr. Richardson said this was one of the most important crises in the history of the Society. He hoped the evidence compiled by the Commission would give occasion for new legislation, both in respect to medicine and pharmacy. He had peculiar views on the subject, but would not promulgate them then, though he believed they were held by some of the most eminent men in the medical profession. It was quite possible that both medicine and pharmacy would be brought under one governing power. He hoped that any pharmacists who had given attention to the subject would not be excluded from giving evidence before the Commission.

The PRESIDENT said he was not at all insensible to the gravity of the position, or to the fact that it was necessary that the Council should take all steps, and be perfectly prepared at a moment's notice to act, and that the very largest powers should be given to the Committee. His principal objection was to the wording of the motion. What was meant was understood now, but it was quite possible that at some future time this might be taken as a precedent, and land the Council in a difficulty.

Mr. HAMPSON said he was quite ready to accept any verbal amendment which would not interfere with the scope of the motion. It must be borne in mind that there were certain lines of action already agreed to in respect of what should be brought before the Commission. There were two leading questions, the prescribing question and the question of the Pharmacopœia, and there were certain definite lines which the Council had agreed upon. It must also be remembered that the Committee would meet very shortly, and make a report next month. This would not exclude the preparation or the acceptance of a report, and if the Councl considered at any time the Committee was overstepping its proper duty, it would have power to step in and stop anything which might be objectionable. But he felt it absolutely necessary that some Committee should have the power of acting as occasion required. In the first place, it was necessary for the Committee to make a formal application to be heard before the Commission. The next step would be to formulate its views on the Pharmacopœia question, and those views would be brought before the Council for ratification or rejection. It was especially in the initiatory stages that the Committee required this extra power. If the Council did not wish it, it would be much better the Committee should cease to exist.

Mr. ANDREWS said there was one point he felt bound to allude to. Mr. Richardson said something about holding peculiar views with respect to the connection of medicine and pharmacy, and seemed to insinuate a sort of wish that pharmacy should be brought under the regulation of medical men. He hoped he had misunderstood him, but at any rate such a view ought not to go unchallenged. It would be a very bad day indeed for pharmacists if they were brought under the power of medical men.

Mr. SYMES said he was about to rise to protest against such an idea.

Mr. RICHARDSON said he was not going to discuss this matter, but Mr. Andrews had entirely misunderstood his meaning. He should be prepared at some future time to go into the subject, but he would only say now that his idea was to get pharmacists properly and legitimately recognized by the State and the public if possible.

Mr. GOSTLING then presented his amendment in the following form:—

> "That the Pharmacy Act Amendment Committee be empowered to act at their discretion on the part of the Council of this Society with regard to the Royal Commission on Medical Bills, and that they be instructed to take immediate steps for the proper representation of the Council before the Royal Commission in the event of opportunity arising for that purpose."

The VICE-PRESIDENT asked in what respect this differed from the motion.

Mr. GOSTLING said it did not provide that the Committee should represent the Council.

Mr. SYMES said the Committee as such had no power to apply to the Commission; it must apply as representing the Council.

Mr. GOSTLING said it was highly important that the Committee should have sufficient power to go itself or appoint or invite persons to go and give evidence before the Commission, in order that the interests of pharmacy might be properly represented.

Mr. FRAZER suggested that the words "all matters," should be confined to all matters within the lines on which the Council had decided.

Mr. GOSTLING said he, of course, intended that.

Mr. SANDFORD seconded the amendment, thinking it preferable to the motion, for this reason, that although it gave the Committee power to act for the Council, as, of course, every Committee must have power, yet it did, in the event of having an opportunity to appear before the Royal Commission, charge the Committee to take such steps, perhaps to call the Council together, or look around amongst their fellow members of the Council and be aided by others who were not members of the Committee. In that way it would better represent the Council and the Society before the Commission than by simply trusting to the Committee to represent the Council. He could point to many eminent pharmacists who had been on the Council, but were not now members, who might give very valuable evidence, and if the amendment was passed it would open the door for those men to be invited.

Mr. ATKINS said, with all due respect, he could not see any distinction in principle between the amendment and the original motion. He had hoped that Mr. Gostling would have made a substantial amendment of principle in which he could heartily have gone with him, to the effect that the Committee, in the event of anything exceptional arising, should be empowered to call the Council together specially. With such an addition he should go in for heartily trusting the Committee.

Mr. HAMPSON said if the Council considered the amendment an improvement with regard to phraseology, he did not object; it certainly gave the Committee quite as much power to act as the words of the motion. All the discussion seemed to denote that there was a want of confidence in the Committee. In a few days the Committee would have to meet, under any circumstances; but when it felt it was entrusted with full responsibility, it would perhaps meet sooner, and the result would be that certain definite steps would be proposed, the first step being to apply that it be heard before the Royal Commission. Then it would have to formulate the views to be put forward, which must be discussed by the Council. The Council would not be giving the Committee *carte blanche*; it would have to report month by month, when all the points raised could be discussed.

Mr. CHURCHILL thought the Council had not fully grasped Mr. Sandford's idea, that the Committee should look round, if it were to give evidence before the Commission, and get the evidence of some past members of Council, or eminent men who did not happen to be on the Committee; otherwise he did not see much difference in the two.

Mr. SAVAGE said the difference was this; in the one, as the Vice-President had said, the Committee was limited to monopolize the representation of the Council only, whilst the amendment went beyond that, and therefore it was preferable.

Mr. GOSTLING said the amendment was not intended either to lessen or to increase the power of the Committee, nor did he bring it forward with any idea of want of confidence in the Committee; it was only to avoid the precedent which it was feared would be established by a Committee being appointed to represent the Council.

The amendment was then put and lost.

Mr. SQUIRE then moved as an amendment—

> "That the Council apply for leave to be heard before the Royal Commission, and a special meeting of the Council be called when leave has been obtained to be heard."

He proposed the amendment for the reasons he gave when speaking a few moments before. Since then Mr. Hampson had said the Committee did not ask for plenary powers because it would report month by month to the Council, which could then criticize the views of the Committee. Now the only reason for giving these special powers was special urgency, and that a special meeting of the Council could not be called. But if the Committee were to report month by month to the Council, and therefore the Council had control over it, there was no cause for urgency, and even if there were, it seemed to him quite as easy to call the Council together as to call a meeting of the Committee.

Mr. **Bottle** had much pleasure in seconding the amendment, because it appeared to him it was travelling in the way the Council had been accustomed to travel. It did not delegate unknown power to any Committee; it did not offer an insult to the Royal Commision by delegating a Committee to go to do the work of the Council; the Council undertook to do its own work in its own way.

Mr. **Symes** asked why appoint a Committee at all, if it were as easy to do all the work of the Society by the Council?

Mr. **Richardson** said this was a very different matter to an ordinary Committee for carrying out the work of the Council, and he was astonished at Mr. Symes, with his capacity for business, asking such a simple question. This was a matter which would probably not occur again in the lifetime of anyone present, and it was of sufficient gravity to justify a special meeting being called if necessary. He should, therefore, heartily support the amendment.

The **Vice-President** said that to him Mr. Symes's remark did not appear at all out of place. Mr. Symes had probably, by a rapid process in his own mind, arrived at this logical conclusion, that if the Council made an application to be heard, and an answer was received—what would then be the course of the Council? The Council would go into committee, and draw up certain matters upon which it should be heard and the lines it should take; that would be approved by the Council, and then a committee would be appointed, or some one to be heard before the Royal Commission. It seemed to him that would be only doing by a more roundabout process that which was now proposed. Personally he should prefer the ordinary course to be followed, but in the present case it would be inconvenient.

Mr. **Frazer** thought Mr. Symes had given a very strong argument against his own views. He said, why appoint any committee if the Council were to do all the work? But the fact was the Committees were appointed for carrying out certain work, such as painting, and told what to do, but under Mr. Hampson's motion, as it now stood, the Council would be giving the Committee power to do anything it liked.

Mr. **Hampson** said the Committee had already received instructions. Some gentlemen seemed to think this was a new matter sprung on the Council. The question of the Pharmacopœia had been before the Council three or four times, and the prescribing question also; and members of the Committee had the views of the Council indelibly fixed upon their brains. They had also the minutes to refer to, if necessary. A report would be made in due course to the next Council, so that it would still retain full powers. The amendment was a vote of want of confidence in the Committee. He had stood up time after time for strict constitutional procedure, but he thought the Council would be perfectly safe in passing this motion.

Mr. **Squire** said he had no such idea in his mind.

The amendment was then put, and lost by nine votes to eight.

The original motion was then put and carried.

Reports of Committees—*continued.*

GENERAL PURPOSES.

The report of this Committee included the usual letter from the Solicitor, reporting what had been done with regard to cases placed in his hands. Certain other cases of alleged infringement of the Pharmacy Acts also had come before the Committee.

The report and recommendations of the Committee were received and adopted.

EXHIBITION OF APPARATUS.

This Committee had held several meetings, at which it had resolved that articles which had before been exhibited should be again admitted, as many persons might be present who had not visited the last Exhibition. Various applications for space had been received, and most of them had been complied with.

Mr. **Atkins** hoped care would been taken to protect articles sent for exhibition, as some had been lost on the last occasion.

Mr. **Williams** said he gathered from the report that the applications were not very numerous. He should like to know if the Committee could give any explanation of this.

Mr. **Richardson** said there was a very important exhibition at South Kensington this year which might rather clash with this one.

Mr. **Robbins** said arrangements had been made by which the doors of the museum could be fastened if the Curator had to leave, with a view to affording more protection to the exhibits.

Mr. **Symes** said he could not but agree with the decision of the Committee not to admit proprietary articles; but it seemed to him there was rather a tendency on the part of the Committee to draw the string rather tightly. The character of the circular seemed to suggest that the Committee last year had been rather overdone with applications, and until the last half-hour he had been under the impression that it was the same this year. He feared the Committee had been rather too precise in its requirements.

The **President** asked Mr. Symes to indicate what part of the circular he referred to.

Mr. **Symes** said he did not object to the circular as a whole; but there had been remarks made which seemed to imply that there was a little stiffness, which might have frightened some people. It was quite right that a preference should be given to new things; but he had found a maker of a mixing machine doubted whether he could send in his machine again, though it had certain improvements in it. However, he was now going to send it. He thought a few days' grace might be given, and many more things might be sent in.

The **President** said the Committee had very much relaxed the regulations with regard to the admission of exhibits, and had taken more trouble than usual this year in the matter. The Committee had met every week, and had gone very carefully into applications with the Curator, who was on the spot to answer all inquiries. He said, without the slightest hesitation, that it was impossible for anyone acquainted with what the Committee had done to find any reasonable cause of complaint with it.

Mr. **Williams** called attention to the advertisement which appeared in the Journal, which stated that it was an Exhibition of Chemical and Pharmaceutical Apparatus, etc. He happened the other day to ask a manufacturing chemist if he was going to exhibit, when he said: "Oh, no; you do not expect me to exhibit. You only want apparatus." He was afraid that some others might have been misled in the same way.

Mr. **Robbins** wished Mr. Symes would mention what the Committee had omitted to do which it ought to have done. He agreed with the President that the Committee had done everything possible to make the Exhibition a success. It at first anticipated more applications than there would be room for, and therefore it could not at first say what room could be given to each applicant. After a time, it found that the applications were not coming in so fast as was expected, and he then wrote to the President, and suggested that all applicants should be at once communicated with, and this had been done.

The **President** having read the invitation, which had been published,

Mr. **Symes** thought one member of the Committee had partly explained the cause why the applications had no been so numerous. The Committee thought it was going to be overdone with applications; he had been told by someone who had sent in an application ten days ago that he had not yet received an answer. He could mention another case in which a gentleman had sent a very beautiful specimen of an article which no doubt all had on their shelves, but not in such a beautiful form, and this was declined. He could quite understand that this kind of thing would tend to limit the Exhibition. Still, if the Exhibition were only half as successful as the last one, it would form a centre of meeting, and would do a great deal of good.

The **President** protested against this sort of criticism of a committee appointed by the Council; if it were pursued it would be impossible to get gentlemen to act on a Committee for an Exhibition or for any other business. If any remarks were to be made with regard to special applications the names should be given, so that the cases might be inquired into, and it might be seen whether there was any *bonâ fide* grievance or not; he did not believe there was for one moment. If a Committee were appointed it must exercise some discrimination, or else it might as well be left to the Curator to take in everything which came.

Mr. **Savage** said he gathered that parties applied in the first instance for larger space than the Committee could entertain, and then the Committee replied at once, and said they could not have so much space

The **President** said the Committee did not reply at once, because it could not tell the amount of room that would be applied for, and, therefore, it could not determine the amount of space to be allotted to each individual. Replies were sent, however, as soon as possible.

Mr. **Hampson** was quite content to leave the matter in the hands of the Committee. He had not heard anything which would indicate the Committee was not doing its duty.

Mr. **Butt** said the previous Saturday was the last day for sending in applications, and since then the Committee had met, and every application had been considered, and the amount of space to be given to each individual carefully gone into; but until all the applications had been received it was utterly impossible to allot the required space. He believed every applicant had been written to, and informed that the exhibit would be received and space allotted, except to Messrs. Maw, who desired to send in a large dispensing counter, for which there would not be space in any room in the house. Every case had been fairly considered, and not the slightest objection could be taken to the action of the Committee.

The report of the Committee was then received and adopted.

SPECIAL COMMITTEE TO INQUIRE INTO THE RELATION OF PHARMACEUTICAL EDUCATION TO EXAMINATION.

The **Vice-President** said he would move presently:—

> "That the report and recommendations of the Special Committee appointed 'to inquire into and consider the relation to each other of pharmaceutical education and the pharmaceutical examinations,' be received.
>
> "That printed copies of the report be distributed amongst the members of the Council; and that the discussion upon it be deferred until a future early meeting of the Council."

He would suggest, therefore, that the whole report be not read now, but he would only read a few portions, sufficient to justify the Council in agreeing to the motion. The report commenced by stating that the Committee had laid down a definite plan for its own action, which was given *in extenso*. Having done that, the Committee went on to report that it had had frequent and prolonged interviews with the three Professors of the Society, with four members of the Board of Examiners, deputed to represent that body, and with three gentlemen of large experience in scientific teaching and examination, not connected with the Society. In addition to much information thus conveyed by word of mouth, these gentlemen had favoured the Committee with a condensed summary of their views in writing. The individual members of the Committee had also contributed the knowledge and experience they possessed. They had discussed and re-discussed these points; and then came a number of facts and statistics, and certain points upon which strong expressions of opinion had been given, all of which would, he hoped, prove very interesting to all other members of the Council. The Committee had then made the following recommendations:

"1. That candidates for examination be required to produce evidence of apprenticeship or pupilage of not less than three years with some duly registered chemist and druggist.

"2. That the Preliminary examination, or its recognized equivalent, be passed prior to the apprenticeship or pupilage. This can be insured by prohibiting a candidate from presenting himself for the Minor examination until three years after he has been certified to have passed the Preliminary examination.

"3. That upon presenting himself for the Minor examination the candidate be required to produce evidence to show, in addition to the requirements indicated in Nos. 1 and 2, that he has within the time then present and the date of his Preliminary examination attended a course of lectures on chemistry, a course of lectures on botany, a course of lectures on materia medica, and a course of instruction in practical chemistry, of a scope and character hereafter to be defined.

"4. That the Minor examination be divided into two portions:—the technical: comprising practical dispensing, prescriptions and pharmacy; and the scientific: comprising chemistry, botany and materia medica. These parts to be undertaken on two separate days, but as portions of one examination the portion which includes chemistry, botany and materia medica to be partly written and partly *vivâ voce*."

He should not ask for any expression of opinion on these proposals now, and would only say further that the Committee had given this matter very deep consideration, and though the Council might not consider the results wise, he did assure them that every one of these recommendations was worth serious consideration.

Mr. **Bottle** seconded the motion, and desired to thank the Committee for the very careful consideration it had given to the matter.

The motion was then put and carried unanimously.

THE ROYAL BOTANIC SOCIETY.

On the motion of Mr. **Symes**, it was resolved:—

> "That the sum of twenty guineas be paid to the Royal Botanic Society for the privilege of Professor Bentley's class attending the lectures given by the Professor in the Society's Gardens."

INTERNATIONAL PHARMACEUTICAL CONGRESS.

This Committee had held four meetings during the month. The names of Professor Redwood, Dr. Paul, and Messrs. Barclay, Carteighe, Reynolds and Robbins had been added to it. Mr. Richard Bremridge had been appointed Secretary to the Executive Committee. He had read to the Committee a copy of a letter which had been sent in November last to presidents of pharmaceutical societies and distinguished pharmacists in Australia, Austria, Belgium, Brazil, Canada, Denmark, France, Germany, Greece, Holland, Ireland, Italy, New Zealand, Portugal, Russia, Spain and the United States. A circular of invitation had also been sent out, to the number of about three hundred and fifty, many replies to which had been received. It was proposed that the Congress should be opened by a conversazione to be held by the President of the Pharmaceutical Society, in the house of the Society, on the evening of Saturday, July 30

STATEMENT OF ATTENDANCE OF MEMBERS OF COUNCIL ON COMMITTEES FOR THE YEAR 1880-81.

	Committees held Once a Month or Oftener.		Committees held Occasionally.				
	Finance.	Library, Museum, and Laboratory.	House.	Benevolent Fund.	General Purposes.	Special Committees.	Total Number of Attendances.
Number of Committee Meetings held.	10	12	9	11	10		
Andrews (*London*)	7	8	4	*	8	9	36
Atkins (*Salisbury*)	*	*	*	*	0	5	5
Bottle (*Dover*)	*	8	6	8	6	8	36
Butt (*London*)	*	10†	7†	9	8	18	52
Churchill (*Birmingham*)	*	*	*	4	6	*	10
Frazer (*Glasgow*)	*	*	*	*	1	*	1
Gostling (*Diss*)	10	5‡	4‡	*	10	6	35
Greenish (*London*)	1	12	9	10	9	36	77
Hampson (*London*)	*	8	6	9	10	19	52
Hills (*London*)	*	5	3	0	0	3	11
Mackay (*Edinburgh*)	*	*	*	4	3	1	8
Radley (*Southport*)	*	*	*	11	10	*	21
Richardson (*Leicester*)	5	10	7	*	4	*	26
Robbins (*London*)	*	11	8	10	9	11	49
Sandford (*London*)	*	10	6	7	4	16	43
Savage (*Brighton*)	9	*	*	*	10	2	21
Schacht (*Clifton*)	9	2	1	2	10	17	41
Squire (*London*)	4	3	2	*	5	4	18
Symes (*Liverpool*)	7	*	*	*	7	10	24
Williams (*London*)	*	11	7	9	9	9	45
Woolley (*Manchester*)	*	*	*	4	4	5	13

* Not appointed on this Committee. † Appointed on this Committee, October, 1880.

‡ Appointed on this Committee, December, 1880.

NUMBER OF ATTENDANCES OF MEMBERS OF COUNCIL AT COUNCIL MEETINGS FOR THE YEAR 1880-81.

Andrews, Frederick	11	Greenish, Thomas	11	Sandford, George Webb	12
Atkins, Samuel Ralph	11	Hampson, Robert	12	Savage, William Dawson	12
Bottle, Alexander	11	Hills, Thomas Hyde	12	Schacht, George Frederick	12
Butt, Edward Northway*	9	Mackay, John	7	Squire, Peter Wyatt	9
Churchill, Walter John	12	Radley, William Valentine	12	Symes, Charles	12
Frazer, Daniel	12	Richardson, John George Fredk.	10	Williams, John	12
Gostling, Thomas Preston	12	Robbins, John	12	Woolley, George Stephen	9

* Elected to the Council, August, 1880.

Number of Meetings during the year, 12.

and that the business meetings be held at the same address on Monday, Tuesday and Wednesday, August 1, 2, and 3, at 11 a.m., an interval of one hour for luncheon at one o'clock. On Tuesday, August 2, the guests would be entertained at a banquet at Willis's Rooms, and on Thursday, August 4, there would be an excursion to some place or places in the neighbourhood of London. Among the subjects suggested for discussion were the following:—

"1. What is the best method of securing the equalization of the strength of official preparations containing potent drugs common to the Pharmacopœias of all nations.

"2. Pharmaceutical education.

"3. Pharmacopœia revision."

The first presentation of the Hanbury Gold Medal would also take place at the Congress.

Mr. **Williams** said he noticed that the meetings of the Congress would take place on the same date as the meeting of the Council and the Committees, which met the day previously.

The **President** said it was proposed that the Council meeting should be adjourned to the following week.

The report of the Committee was then adopted unanimously.

Mr. **Savage** said he would defer the motion of which he had given notice, relative to the retirement of Mr. Sandford and Mr. Hills, to next month.

Report of Examinations.

April, 1881.

ENGLAND AND WALES.

	Candidates.		
	Examined.	Passed.	Failed.
Major, (21st)	7	4	3
„ (22nd)	7	1	6
„ (27th)	6	4	2
„ (28th)	7	4	3
	— 27	—13	—14
Minor, (21st)	21	10	11
„ (22nd)	21	9	12
„ (27th)	21	9	12
(28th)	20	11	9
(29th)	28	16	12
	—111	—55	—56
Modified, (27th) . . .	1	0	1
	139	68	71

SCOTLAND.

	Candidates.		
	Examined.	Passed.	Failed
Major (27th)	3	2	1
Minor, (27th)	8	4	4
„ (28th)	10	5	5
	—18	— 9	— 9
Modified, (28th) . . .	1	0	1
	22	11	11

Preliminary Examination.

Candidates.		
Examined.	Passed.	Failed.
334	150	184

21 Certificates had been received in lieu of the Society's examination:—

11 College of Preceptors.
5 University of Cambridge.
1 University of Edinburgh.
1 University of London.
2 University of Oxford.
1 Apothecaries' Hall, Dublin.

EXAMINATIONS IN LONDON.

April 21, 1881.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Ekin, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Seven candidates were examined. *Three* failed. The following *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bevis, Walter	Newport, I. W.
Cann, James	Dorking.
Chaplin, John Henry	Wakefield.
Garland, Thomas William	Acock's Green.

MINOR EXAMINATION.

Twenty-one candidates were examined. *Eleven* failed. The following *ten* passed, and were declared qualified to be registered as Chemists and Druggists:—

Aplin, Isaac Weston	Yeovil.
Atherton, John Henry	Wigan.
Barlow, Charles	Prescot.
Barnes, Thomas	Preston.
Billington, John	Northwich.
Braithwaite, John Oldham	London.
Briggs, George	Leeds.
Bull, Ezra John	Cambridge.
Clark, Edward John	Swansea.
Collis, Arthur Frederick	Cheadle.

April 22, 1881.

Present—Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Ekin, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

MAJOR EXAMINATION.

Seven candidates were examined. *Six* failed. *One* passed, and was declared qualified to be registered as a Pharmaceutical Chemist:—

Goldby, Frank	Abingdon.

MINOR EXAMINATION.

Twenty-one candidates were examined. *Twelve* failed. The following *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Briggs, William	Lancaster.
Clarke, Hy. Robert Stanhope	Malvern.
Cottman, Frederick	Salisbury.
Davies, Rees	Swansea.
Ellard, James	London.
Farrar, George	Ossett.
Flintan, Francis Robert	Weybridge.
Freeman, Frank	West Dulwich.
Gascoyne, Edward	Wolverhampton.

April 27, 1881.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Ekin, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

MAJOR EXAMINATION.

Six candidates were examined. *Two* failed. The following *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Matthews, Herbert Rouse	London.
Parker, William	Sessay.
Preston, Henry	Mansfield.
Rheeder, Thomas	Knaresborough.

MINOR EXAMINATION.

Twenty-one candidates were examined. *Twelve* failed. The following *nine* passed, and were declared qualified to be registered as Chemists and Druggists:—

Atkinson, Thomas	Penrith.
Grant, Thomas	Bristol.
Holt, John	Aislaby.
Hornby, Robert William	London.
Horrell, Alfred Charles Julian	Dartford.
Ison, Harry John	Wellington.
Jowett, Henry	Leeds.
Kay, Henry	Bradford.
Kirkby, William	Ripon.

MODIFIED EXAMINATION.

One candidate was examined, but failed to pass.

April 28, 1881.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Ekin, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

MAJOR EXAMINATION.

Seven candidates were examined. *Three* failed. The following *four* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Thomas, John	Crosswell.
Thompson, Arthur	Buxton.
Walgate, Septimus	Hull.
Williams, Stephen	Cardigan.

MINOR EXAMINATION.

Twenty candidates were examined. *Nine* failed. The following *eleven* passed, and were declared qualified to be registered as Chemists and Druggists:—

Chabôt, Frank	London.
Lewis, Jonas Henry	London.
Marshall, John David	Boston.
Orchard, Arthur Bishop Carey	London.
Page, Robert Steele	London.
Portway, Arthur Cyril	Southwark.
Pratt, George	Bishop Auckland.
Procter, George Woodyatt	Sunderland.
Skinner, Alfred James Page	Seaton.
Walker, Edward	Leeds.
Wilkinson, William Henry	London.

April 29, 1881.

Present—Mr. Schacht, Vice-President; Messrs. Allchin, Barnes, Benger, Brady, Carteighe, Corder, Ekin, Gale, T. E. Greenish, Linford, Martindale, Plowman, Southall and Taylor.

MINOR EXAMINATION.

Twenty-eight candidates were examined. *Twelve* failed. The following *sixteen* passed, and were declared qualified to be registered as Chemists and Druggists:—

Ashton, Charles Sampson	Yeovil.
Ridgley, George Stevens	Gillingham.
Rookledge, Francis Eyre	Easingwold.
Saul, William Osborne	Sibsey.
Seymour, Frederick Seth	Wimborne.
Shaw, Herbert	Grantham.
Skinner, Richard	Oxford.
Staley, Henry	Burton-on-Trent.
Stretch, Joseph Harling	Snaith.
Timms, William Henry	Worcester.
Trubshaw, Charles	Dudley.
Walker, Charles	Birstwith.
Wallbridge, Henry Alfred	London.
Watts, George William	Clapham.
Wilkinson, William	Whittlesea.
Young, James	London.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's Examination:—

Certificates of the College of Preceptors.

Barnes, James Burden	Knightsbridge.
Benjamin John Blake	Brecon.
Carter, Campbell J.	Woolwich.
Davis, Charles	Leamington.
Farthing, George Thompson	Spennymoor.
Francis, John Herbert	Wrexham.
Kernick, Hubert Rye	Cardiff.
Ridgley, Cromwell	Huntingdon.
Rollason, Abel	Bewdley.
Smith, Hopkin	Bridgend.
Wells, Gerald Ernest	Notting Hill.

Certificates of the University of Cambridge.

Churchyard, Oliver George	Ipswich.
Heaton, Simon Wood	Leeds.
Hodgson, Cuthbert	Otley.
Nott, Arthur H.	Devizes.
Trounson, Francis P.	Penzance.

Certificate of the University of Edinburgh.

Cargill, David A.	Arbroath.

Certificate of the University of London.

Toplis, John Walter	St. John's Wood.

Certificates of the University of Oxford.

King, James Hewlett	Bath.
Tull, Frederick Charles	Newbury.

Certificate of the Apothecaries' Hall, Dublin.

Deane, Albert Edward	Enniscorthy.

EXAMINATIONS IN EDINBURGH.

April, 1881.

Present—Messrs. Ainslie, Borland, Gilmour, Kemp, Kinninmont, Nesbit, Stephenson and Young.

MAJOR EXAMINATION.

27*th*.—*Three* candidates were examined. *One* failed. The following *two* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Clayton, John William	Preston.
Hill, John Rutherford	Lasswade.

MINOR EXAMINATION.

27*th*.—*Eight* candidates were examined. *Four* failed. The following *four* passed, and were declared qualified to be registered as Chemists and Druggists:—

Anderson, James	Dundee.
Coulthart, Thomas	Annan.
Dobson, Thomas Henry	Skipton.
Esam, Richard	Stamford.

28*th*.—*Ten* candidates were examined. *Five* failed. The following *five* passed, and were declared qualified to be registered as Chemists and Druggists:—

Hay, William	Aberdeen.
Jones, John	Liverpool.
Keith, John	Glasgow.
Richardson, Joseph William	Wakefield.
Welch, George Murray	Leith.

MODIFIED EXAMINATION.

28*th*.—*One* candidate was examined, but failed to pass.

Provincial Transactions.

THE CHEMISTS AND DRUGGISTS' TRADE ASSOCIATION OF GREAT BRITAIN.

Report of the Executive Committee, to be presented to the Fifth Annual General Meeting of the Members.

Prosecution under the Sale of Food and Drugs Act.—In July last several chemists residing at Stockport were summoned under the Sale of Food and Drugs Act for having sold sweet spirits of nitre, alleged to be "not of the nature, substance and quality, of the article demanded." The cases were investigated by the Secretary on the spot, and guided by the information thus obtained, and by the subsequent report of the Analytical Referee of the Association, your Committee passed a resolution instructing the Solicitor to defend and to take steps to obtain all necessary evidence. One case was taken as a test. The Solicitor conducted the defence and called as witnesses Professor Attfield, Mr. Umney, the representatives of the wholesale houses who supplied the nitre in question, and local chemists. It was proved that the specific gravity of the nitre was ·850, and that it was of good quality. After a protracted hearing the summons was dismissed by the Bench, £10 being allowed as costs.

The decision is of great importance to the trade, the line of defence being that spirits of nitre made according to other formularies than that of the British Pharmacopœia may legally be sold if of good quality.

This is the only case under the Act which the Association has been called upon to defend during the past year, and your Committee congratulates the trade on the significant fact that prosecutions against chemists and druggists for the sale of adulterated drugs are becoming year by year more rare. It will be within the recollection of the members that before the Association came into existence such prosecutions were of very frequent occurrence.

Your Committee takes this opportunity of publicly thanking the partners in those wholesale houses who have from time to time, at considerable trouble and expense, sent members of their firms, or representatives, to give evidence in support of cases under this statute, undertaken by the Association.

Weights and Measures Act.—Your Committee has, during the past year, defended three members of the Association in prosecutions under this Act of Parliament..

Mr. W. Wilkinson, of Lambeth Walk, Surrey, was summoned to appear before the magistrates at the Southwark Police Court on May 19, 1880, for having in his possession seventeen apothecaries' weights which were unjust, when a penalty of 1*s*. per weight was inflicted. This defence was ordered by your Committee on the grounds that it was the first instance in which apothecaries' weights had been called in question, and that no intimation had been given to the defendant that the inspector for the district had been supplied with standards for testing these weights. On the 27th of the same month the President of the Association addressed a letter to the President of the Board of Trade, directing his attention to the fact that chemists generally were not aware that standards for apothecaries' weights had been adopted by the Board of Trade, and that consequently they were liable to be summoned if found in possession of such weights unstamped, although no opportunity had been given them to have these weights stamped, and urging Mr. Chamberlain to order a notice to be sent to all inspectors of weights and measures, recommending them as soon as they were in possession of their standards to transmit a printed notice to chemists residing in their respective districts, informing them that their weights could be verified and stamped, and that a fair notice should be given before making an inspection.

In consequence of this, early in June, the following circular was issued by the Board of Trade to inspectors appointed under the Act:—

"Board of Trade (Standards Department),
"7, Old Palace Yard, S.W., *June*, 1880.

"*The Weights and Measures Act*,

"Sir,—I am directed by the Board of Trade to acquaint you, for the information of your local authority, that they have recently had their attention called to the operation of the above Act in regard to apothecaries' weights and measures. It has been represented that chemists and druggists generally are ignorant of the effects of the Order in Council of 14th August last with regard to their weights and measures, and that difficulties exist among the local inspectors as to the carrying out of this Act.

"The Board of Trade wish, therefore, to call attention to the subject and to explain how the matter stands.

"In the course of last year the Board of Trade received representations from the Pharmaceutical Society and others, in consequence of which they caused certain standards of apothecaries' weights and measures to be made and duly legalized, and copies of these standards have since been verified for the use of different local authorities in testing chemists' weights, etc.

"Copies of the correspondence on this subject are inclosed; and in the letter of 3rd March last from this Department, which was printed in the Pharmaceutical Society's Journal, is contained information as to the provisions and use of these standards.

"With reference to the representations contained in the communication of the Chemists' and Druggists' Trade Association of the 27th ultimo, I am to point out how important it is that, as soon as your local authority have determined to put the Act into operation in their districts, and have obtained standards, public notice should be given of their intention, and that this should be done before their inspector is authorized to visit the shops in their district. "I am, Sir,
"Your obedient servant,
(Signed) "T. H. Farrer."

Your Committee is of opinion that Mr. Chamberlain, by this prompt action, deserves the best thanks of the Association, as the local authorities immediately issued notices that the Act would not be put into operation until after an opportunity had been given to chemists to have their apothecaries' weights and measures verified.

About this time a letter from the Secretary appeared in the trade journals impressing on chemists and druggists the necessity of their obtaining, without delay, weights and measures agreeing with the requirements of the Act of Parliament.

On July 7 last Mr. Freeman of Ledbury was defended by the Solicitor in a summons charging him with having in his possession for use for trade, one 14lb. weight which was "false or unjust." The summons was dismissed on its being proved to the satisfaction of the bench that the weight was not used for the purpose of buying or selling goods.

In November last a communication was received at the office from Mr. Whittle, of Townshend Road, St. John's Wood, London, stating that a summons had been served upon him for having in his possession certain glass measures which the Marylebone inspector had examined and declared inaccurate, although they bore the verification mark of the York inspector, and were supplied to the defendant as duly tested measures by the York Glass Company, and that the case had been heard by the Marylebone Bench of Magistrates on the 1st November, and adjourned in order that a report might be obtained from the Board of Trade on the measures in question.

The case was investigated on the spot by the Secretary, and on the instructions of the Law and Parliamentary Committee, the Solicitor defended Mr. Whittle at the adjourned hearing which took place on December 6 last, when the magistrates withheld the reply of the Board of Trade and fined the defendant 6*d*. and the measures were ordered to be forfeited, leave of appeal being given. The appeal was at once entered by order of the same Committee, and on January 29 last was heard at the Guildhall, Broad Sanctuary, Westminster, when Mr. Besley and Mr. Tickle appeared for the appellant; Mr. Poland and Mr. Mead being for the respondents. After a long hearing, during which several technical legal points were raised by the counsel on both sides, the following judgment was given:—"No doubt an important and somewhat difficult question is raised in this case; but after having heard all the arguments of the learned counsel, on due consideration we are of opinion that this conviction must be quashed, there being, in our opinion, no proof that the appellant had in his possession, for use in his trade, a false or unjust measure within the meaning of the 25th clause in the Act of Parliament. The measures in question, whether they be accurate according to the imperial standard or not, bear the stamp of the Government inspector by whom they were issued as accurate, and there is no proof that they were known by the appellant to be inaccurate, or that they were known to be so at any time while he was in possession of them. For these reasons we think the conviction must be quashed."

On the application of the respondents' counsel, leave to appeal against this decision was given. No appeal has, however, been entered.

New Pharmacy Bill.—On the decision of the House of Lords being given in favour of the respondents in the appeal case of the Pharmaceutical Society *v.* The London and Provincial Supply Association, Limited, your Committee passed the following resolution, a copy of which was duly forwarded to the Secretary and Registrar of the Pharmaceutical Society:—"That this Committee heard with profound regret the decision of the House of Lords in the case of the Pharmaceutical Society *v.* The London and Provincial Supply Association, Limited, but learned with satisfaction that the Pharmaceutical Council had referred the decision of this case to the sub-committee appointed by them to consider desirable improvements in the Pharmacy Acts, and trust that the result of their deliberations will lead to such proposed amendments of the Act as this Association can assist in carrying through Parliament." At their meeting on December 10 last, your Committee resolved to ask the Council of the Society to provide the Association with copies of the draft of the proposed Bill to amend the Pharmacy Act, when finally agreed upon by the Council at its meeting convened for the fourteenth day of the same month, and expressing the hope that sufficient time would be allowed to enable the Executive to consider the clauses of the Bill, with a view to assist the Council by united action in carrying a satisfactory measure into law. A copy of the Bill, transmitted to your President by the courtesy of the President of the Society, came under the consideration of your Committee at their meeting on December 17 last, when resolutions were passed expressing approval of the principles expressed in clauses 1, 2, 3, 4, 8, 11, and 12, but suggesting certain modifications in clauses 5, 6, 7, 9, and 10. A copy of the Bill as amended was by order of your Committee forwarded to the Secretary of the Society with a request that he would submit the same to the Council. Some of the alterations suggested by your Committee have since been accepted by the Council, and the Bill in an amended form, came under the consideration of your Committee at its meeting on February 25 last, when the following resolution was passed:—"That this Executive having considered the provisions of the Bill to further regulate the sale of poisons, and to alter and amend the Pharmacy Act, 1852, and the Acts amending the same, placed before them by the wish of the Pharmaceutical Council, agree to its clauses, and hereby express their desire of co-operating with the said Council, with a view to carrying the Bill into law."

The Proceedings of Parliament.—The Medical Act, 1858, Amendment Bill, introduced into the House of Commons by Mr. Hardcastle, Sir Trevor Lawrence and Dr. Farquarson, contains one or two clauses inimical to the interests of the trade, and although the probability of its passing during the present session is extremely remote, it has been referred by your Committee to the consideration of the Law and Parliamentary Committee. It is entered for second reading on June 29 next.

Jury Service.—Your Executive at their first meeting instructed the Law and Parliamentary Committee to address the Government with a view of obtaining such an amendment of the Jury Act as may provide that the exemption from service on juries enjoyed by pharmaceutical chemists should be extended to all registered chemists and druggists. A memorial embodying these instructions was forwarded to Her Majesty's Principal Secretary of State for Home Affairs on October 6 last, and in due course acknowledged by him. This memorial has been printed in the trade journals. The question of jury service is dealt with in the 13th clause of the proposed new Pharmacy Bill, and your Executive trusts that the privilege of exemption from jury service may be extended to all members of the trade by the passing of that Bill into law.

Arbitration.—Your Committee has, by the aid of the Secretary, been instrumental in settling by arbitration a dispute between two members of the Association as to the right to sell under a specific title a certain article manufactured by one of them.

Infringements of the Pharmacy Act.—Acting under the instructions of the Executive, the Solicitor and Secretary have considered several cases of illegal trading in poisons. On February 18 last, a grocer, residing at Winchester, was fined 20*s.* and 24*s.* costs for the contravention of the Act, he having sold to the Assistant-Secretary vermin-killer, the cover of the packet of which did not bear his name and address, and other formalities required by the statute not having been complied with. The Solicitor prosecuted on behalf of the Association.

Death of Mr. John Abraham.—Your Committee regrets to announce the death of their late esteemed colleague, Mr. John Abraham, which took place at Grassendale, Liverpool, on February 20 last. He warmly advocated the objects of the Association in its early days, and the large number of members residing in Liverpool and the neighbourhood is in a great measure attributable to the hearty support he continually rendered it. Your Committee passed a resolution of condolence with Mrs. Abraham and family at their meeting held on February 25 last.

Strength of the Association.—The list of members and donors shows 4345 annual subscribers, and donations to the amount of £71 16*s.* 6*d.*, being a slight decrease in the number of members and in the amount of donations from the previous year. This may be accounted for in a measure by the continued depression in trade which is seriously affecting all societies dependent for support on voluntary contributions. The erasure from the Register of the names of all members whose subscriptions were more than two years in arrear, in accordance with a resolution passed by your Committee on February 28 last, has also reduced, for the time being, the numerical strength of the Society. This necessary act of expurgation has, however, placed it in a more healthy condition.

Financial Statement. April 17, 1880, *to April* 19, 1881.

Receipts.

	£	*s.*	*d.*	£	*s.*	*d.*
Balance brought forward from last Account, viz.:—						
Balance at Lloyds' Banking Company, Limited Current Account	60	7	0			
Ditto ditto Deposit Account	818	9	11			
Ditto in hands of Treasurer	25	4	0			
	904	0	11			
Deduct Law Costs, unpaid	73	7	3	830	13	8
4345 Annual Subscriptions at 5*s.*	1086	5	0			
Donations	71	16	6			
	1158	1	6			
Less—Outstanding Subscriptions and Donations, April 19, 1881	281	15	0	876	6	6
Interest allowed by Bankers on Deposit Account, less Interest and Commission charged on Current Account . .				19	12	6
				£1726	12	8

Payments.		£ s. d.	£ s. d.
Advertisements			4 10 6
Auditors' Charges			18 18 0
Canvassing Expenses			48 3 2
Hire of Rooms for Public Meetings			5 4 6
Law Costs, viz.:—			
Counsel's Fees		12 8 6	
Solicitor's Charges		85 14 1	
Ditto Travelling Expenses		25 15 0	
Witnesses' Charges and Expenses		62 19 0	
			186 16 7
Office Expenses, viz.:—			
Cleaning		2 4 1	
Gas		4 11 7	
Rates and Taxes		8 2 11	
Rent		26 0 0	
			40 18 7
Postages			109 9 0
Reporting			49 0 4
Salaries, viz.:—			
Secretary		172 10 6	
Assistant Secretary		137 10 0	
Clerks		73 6 0	
			383 6 6
Stationery and Printing			115 15 2
Sundries			11 8 10
Travelling Expenses, viz.:—			
Executive Committee		109 12 6	
Secretary		26 17 6	
			136 10 0
			1110 2 2
Balance at Lloyd's Banking Company, Limited, Deposit Account		838 17 2	
Ditto in hands of Treasurer		13 3 5	
		862 0 7	
Deduct Balance due to Bankers on Current Account	149 10 9		
Law Costs unpaid	85 19 4		
		285 10 1	
			616 10 6
			£1726 12 8

We have examined the foregoing Account, with the Books and Vouchers of the Association, and find it correct.

(Signed) LAUNDY AND CO., *Auditors.*

Birmingham, 20th April, 1881.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE ELECTION OF MEMBERS OF COUNCIL.

Sir,—A duty at once grave and responsible will fall upon our Society in the election of members to fill the seats left vacant by the retirement of Messrs. Sandford and Hills, and by the death of the Society's tried and trusty friend, John Mackay.

That we should lose the services of Messrs. Sandford and Hills, at once, was a severe blow; but to add to that the death of Mr. Mackay fills us with sorrow and anxiety. Such vacancies are difficult to fill. He who would succeed to the seat of our lost friend should be one who has followed the same worthy courses as his predecessor. There are few to be found who can show the same ability, energy and independence, who can command the same respect and can afford to make the same disinterested sacrifice of time. When we add to these high qualifications the further advantage that Mr. Mackay had had a quarter of a century's experience of the Society's working, we realize how few there are whom we could put in his place.

The nomination list contains the names of many men well known in pharmacy for their ability and the good work they have done, but others are not so well known, and it is the misfortune of the electors that they often have to judge between men whose modesty has kept them in the background till nomination by some personal friend has brought them to the front. When a man takes much interest in the progress of pharmacy, or the trade of the druggist, he generally finds some opportunity of giving by his deeds or his words evidence by which the electors may judge of his fitness to represent them. On the present occasion a careful examination of these evidences becomes imperative. Looking over the contributions to pharmaceutical science or politics, as found in the index to the *Pharmaceutical Journal*, we see the name of T. Wills contributing several scientific papers, but this is not the G. S. V. Wills who appears in the nomination sheet. I do not find any contribution from him either in the interests of pharmacy or of trade, nor do I even find that he is in the trade. He professes to be a teacher of students, preparing them for examination, and is best known in connection with "the postal system." I will not call it a system of education, for I cannot regard it as any better than a sham, and regarding it I will only quote the words of his advertisement, "Beware of imitations!"

Had it been desirable to put a teacher on the Council, such a veteran as Professor Redwood would have justified the appointment of one not having a tradesman's interest in our calling; but it has not been thought desirable to place in that position anyone deriving his income from the teaching of candidates for examination, much less, one whose aim is to "pass" the candidates, while the duty of the Council is to provide that every precaution be enforced to pass only the solidly educated students. It is unpleasant to me to introduce so much of what may be attributed to personal feeling in this matter. I do not know Mr. Wills, and should not have mentioned him nor have written anything but in general terms, had it not been that Mr. Wills has again placed himself on the list of candidates for office after Mr. Reynolds having last year pointed out the objection there would be to making the Council board open to heads of rival schools of pharmacy, where the elect would occupy a position of temptation from which most men pray to be saved. If Mr. Reynolds's reasoning had no weight with Mr. Wills, the fact that his words were supported by the voting which placed Mr. Wills the lowest of all candidates should have sufficed to convince him of their justice.

BARNARD S. PROCTOR.

Sir,—Allow me briefly to reply to your correspondents of last week.

So far as I can gather from the letter of a "Young Member," and others, the chief objection brought against me is that I prepare candidates for the examinations, and that, therefore, I would endeavour to influence the Council in the selection of the Board of Examiners. I have always expressed myself satisfied with the Examiners.

In my last inaugural address to my students, I stated as follows:—"Some students conceive that if they can only get before certain Examiners they are sure of success, but I do not think it matters which Examiner you get; if you are competent to pass you will do so, for although the Examiners are not perfection, yet upon the whole, I believe the arrangements are most fair and satisfactory."

I have no desire to alter matters in this direction, and should certainly scorn to take advantage of a position on the Council by endeavouring to make the examinations less stringent than they are.

The reason of my perseverance in this matter is my deepening interest in the welfare of our Society, and I believe that my experience as a teacher would be a material aid, and not a detriment, to the Board.

I have not put myself forward this year, nor shall I canvas, but as the objections to my candidature are of so trivial a nature and come from but a few young members whose judgment I have every right to question, I shall persevere and if elected shall take my seat with the conscientious endeavour to carry out my duties with impartiality and independence.

GEORGE S. V. WILLS.

E. Coleman.—*Gentiana campestris.*

"*Apprentice.*"—Several communications on pill-coating have appeared in this Journal; see vol. viii., p. 461 and other places that are referred to in the Index.

COMMUNICATIONS, LETTERS, etc. have been received from Dr. Reichardt, Professor Flückiger, Messrs. White, Conroy, Taylor, Jackson, Robinson, Hill, Down, Lyle, Greig, Carter, Buckley, Tick, Pater Æneas, Country Chemist, 374.

THE ADULTERATION OF OLIVE OIL.*

BY MICHAEL CONROY, F.C.S.

The subject of this communication suggested itself to me by the following paragraph which appeared in the *Pharmaceutical Journal* of March 26 last, under the heading of "The Month:"—

> "Buyers of olive oil will probably find it necessary ere long to carefully examine that imported from Italy. Cotton-seed oil is said by the United States Consul at Naples to have found its way into the remotest mountain villages in Italy, where the sole production is olive oil, not merely as a substitute for, but as an adulterant of, olive oil. It has also found its way into Russia, one of the chief outlets for Italian olive oil. As the cotton-seed oil can be sold in Italy at half the value of olive oil, the inducement to use it as an adulterant is very great. The Government of Italy is endeavouring to impose a heavy tax on cotton-seed oil, with the view of protecting the production of olive oil. It is obvious, however, that a good test to detect the presence of small quantities of cotton-seed oil would be a better preventive to adulteration. Cotton-seed oil is a drying oil, and if added in equal parts to olive oil its drying nature is still evidenced by its leaving sticky streaks near the mouth of the bottle when droppings become exposed to the air."

From inquiries which I have made, I learn that very large quantities of cotton-seed oil are shipped from this port (Liverpool) for Italy; but my informants say that most of it is used by the poorer Italians for cooking and other domestic purposes, instead of the more valuable production of the olive, and that it is also chiefly used for tinning sardines. That much of it is thus used there can be no reasonable doubt, but it is nevertheless well known that it is largely used for the adulteration of olive oil, and unfortunately the published tests for its detection are very defective. In reference to these tests we find the following in Flückiger and Hanbury's valuable 'Pharmacographia,' published in 1874:—

"So far as our experience goes, the processes hitherto recommended for testing olive oil are only available in cases where the adulteration is considerable, and are quite insufficient for discovering a small admixture of other oils. How little they are appreciated may be inferred from the fact that the Chamber of Commerce of Nice has recently offered a reward of 15,000 francs (£600) for a simple and easy process for making evident an admixture with olive oil of 5 per cent., at least, of any seed oil."

It is for the purpose of practically showing you a simple and an easy test that will detect the presence of ·5 per cent of cotton-seed, or any other seed oil, that I have the honour of bringing the matter under your notice this evening, but before doing so we will take a cursory glance at those tests most relied on at present.

M. Lefebvre's method consists in taking advantage of the densities of the various oils, and for that purpose he constructed an oleometer, on the stem of which were inscribed the densities of the various fat oils. It is obvious that this method cannot be either delicate or reliable, for the reason that there is not sufficient variation in the densities of fat oils to enable them to be detected in mixtures. Moreover it is even doubtful if the densities of oils from any given source are constant. But granting that they are constant, it would be a very easy matter to make mixtures to suit any required density; hence this method is of little or no use.

M. Maumené's plan consists in noting the amount of heat evolved on mixing concentrated sulphuric acid with the oils; the drying oils giving off a much greater amount of heat than olive oil under the same circumstances. This is a better method than the preceding one, but it is not sufficiently delicate.

M. Heydenreich and Penot also propose the use of sulphuric acid; but they distinguish the various oils by the colours produced by the action of the acid. Thus olive oil produces a deep yellow tint, becoming greenish by degrees; colza oil, a greenish blue; poppy oil, a pale yellow tint, with dirty grey outline; hempseed oil, a deep emerald tint, and linseed oil becomes brownish-red, changing to black brown. The test is applied by adding one drop of strong sulphuric acid to 8 or 10 drops of the oil, placed on a piece of white glass, resting on a sheet of white paper. My experience is that these reactions do not always occur, as stated, in the genuine oils, and that for the detection of adulteration the method is utterly useless.

The favourite method is, however, that proposed by M. Poutet. It consists in beating up the oil with one-twelfth of its weight of solution of nitrate of mercury. The nitrous acid or nitric peroxide evolved from this converts the oleine of olive oil into elaidin, causing the oil, if pure, to become solid in a couple of hours, while the drying oils remain liquid. It will be seen from this that olive oil adulterated with any of the drying oils will not set as hard, nor as quickly as genuine olive oil, and that the consistency to which the sample sets, and the time occupied in setting, somewhat roughly indicate the amount of adulteration. A modification of this process is to use nitric acid instead of the solution of nitrate of mercury, and I believe that this plan is practised by many oil merchants. The *modus operandi* is to mix ½ a fluid drachm of strong nitric acid with about 5 fluid drachms of the oil in a bottle of 1 fluid ounce capacity, and to shake up briskly, and put in a cool place for a few hours, when the colour and consistency are noted. The results are somewhat similar to those obtained by the nitrate of mercury test. These two tests are, in my opinion, the best published; but they are not satisfactory, inasmuch as it is extremely difficult to judge of the consistency of the results obtained, and, so far as my experience goes, they are useless for samples containing less than 10 or 15 per cent. of seed oils.

The plan which I recommend as more suitable for the purpose is based on an improved method of applying this last test; but instead of being guided by the consistency, I am guided by the colour produced. The test is applied as follows:—Mix thoroughly 1 part of strong nitric acid (sp. gr. 1·42) with 9 parts of the oil to be tested, and pour the mixture into a white porcelain dish capable of holding at least 10 times the quantity. Apply heat gently, until the action between the acid and the oil is fairly set up, then remove the source of heat and stir well with a glass rod until the action is over.

Pure olive oil thus treated and allowed to cool sets into a pale straw-coloured hard mass in an hou or two, while cotton-seed and other seed oils assume a deep orange-red colour, and do not set like olive oil.

In hot weather it is necessary to artificially cool the sample so as to promote the setting; but to a practised eye the setting is quite unnecessary, the colour being sufficiently distinct without.

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* Read at a meeting of the Liverpool Chemists' Association, April 28, 1881.

It will be seen that the delicacy of this test depends upon the great contrast in colour exhibited between genuine olive and seed oils, when operated on as described, so that an admixture of 5 per cent. of any seed oil with olive oil is readily detected. Another important feature in this, and possessed by no other test, is the accuracy with which the approximate amount of admixture may be ascertained; and to practically show this feature, I have on the table a sample of genuine olive, and one of cotton-seed, and seven other samples, containing respectively 5, 10, 15, 20, 30, 40 and 50 per cent. of cotton-seed oil, which have been treated by this method, and I venture to say that not one here will experience any difficulty in picking out the various samples, the gradation in colour being so uniform, and I may also add that it is constant. It therefore follows, that if an oil be found to set of a different colour to that of a sample of genuine olive, the approximate amount of adulteration can be found by making and operating on a few mixtures containing a known percentage of the adulterant. A little experience in working the test will wonderfully assist in determining the percentage of admixture in any sample, but in all cases I would recommend that the test be performed in conjunction with a sample of genuine olive. The quantities which I have been in the habit of using are, ½ a fluid drachm of nitric acid and 9½ fluid drachms of oil, and having used the test for about three years, I can confidently recommend it as thoroughly reliable and constant when carefully carried out. The heat should be removed as soon as the action has fairly started, and the mixture should be kept well stirred until the action is over. Should too much heat be applied, the action becomes violent and unmanageable, and some of the mixture will spurt out of the dish. This spurting, however, may be prevented by placing a plate or other flat body over the dish. The results obtained are never as good when the action is so violent as to cause spurting.

NOTES ON CANANGA OIL OR ILANG-ILANG OIL.[*]

BY F. A. FLÜCKIGER.

This oil, on account of its fragrance, which is described by most observers as extremely pleasant, has attained to some importance, so that it appears to me not superfluous to submit the following remarks upon it and the plant from which it is derived.

The tree, of which the flowers yield the oil known under the name "Ilang-ilang" or "Alanguilan," is the *Cananga odorata*, Hook. fil. et Thomp.,[†] of the order Unonaceæ, for which reason it is called also in many price lists "Oleum Anonæ" or "Oleum Unonæ." It is not known to me whether the tree can be identified in the old Indian and Chinese literature.[‡] In the west it was first named by Ray as "Arbor Saguisan," the name by which it was called at that time at Luçon.[*] Rumph[†] gave a detailed description of the "Bonga Cananga," as the Malays designate the tree ("Tsjampa" among the Javanese); Rumph's figure, however is defective. Further Lamarck[‡] has short notices of it under "Canang odorant, *Uvaria odorata*." According to Roxburgh,[§] the plant was in 1797 brought from Sumatra to the Botanical Gardens in Calcutta. Dunal devoted to the *Uvaria odorata*, or, properly, *Unona odorata*, as he himself corrected it, a somewhat more thorough description in his 'Monographie de la Famille des Anonacées,[‖] which principally repeats Rumph's statements.

Lastly, we owe a very handsome figure of the *Cananga odorata* to the magnificent 'Flora Javæ,' of Blume;[¶] a copy of this, which in the original is beautifully coloured, is appended to the present notice. That this figure is correct I venture to assume after having seen numerous specimens in Geneva, with De Candolle, as well as in the Delessert herbarium. The unjustifiable name *Unona odoratissima*, which incorrectly enough has passed into many writings, originated with Blanco,[**] who in his description of the powerful fragrance of the flowers, which in a closed sleeping room produces headache, was induced to use the superlative "odoratissima." Baillon[††] designated as Canangium the section of the genus *Uvaria*, from which he would not separate the Ilang-ilang tree.

The notice of Maximowicz,[‡‡] "Ueber den Ursprung des Parfüms Ylang-Ylang" contains only a confirmation of the derivation of the perfume from Cananga.

Cananga odorata is a tree attaining to a height of 60 feet, with few but abundantly ramified branches. The shortly petioled long acuminate leaves, arranged in two rows, attain a length of 18 centimetres and a breadth of 7 centimetres; the leaf is rather coriaceous, and slightly downy only along the nerves on the under side. The handsome and imposing looking flowers of the *Cananga odorata* occur to the number of four on short peduncles. The lobes of the tripartite leathery calyx are finally bent back. The six lanceolate petals spread out very nearly flat, and grow to a length of 7 centimetres and a breadth of about 12 millimetres; they are longitudinally veined, of a greenish colour, and dark brown when dried. The somewhat bell-shaped elegantly drooping flowers impart quite a handsome appearance, although the floral beauty of other closely allied plants is far more striking. The filaments of the Cananga are very numerous; the somewhat elevated receptacle has a shallow depression at the summit. The green berry-like fruit is formed of from fifteen to twenty tolerably long-stalked separate carpels which enclose three to eight seeds arranged in two rows. The umbel-like peduncles

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[*] From the *Archiv der Pharmacie*, to the Editor of which Journal we are indebted for a *cliché* of the woodcut illustrating this paper.

[†] 'Flora Indica,' i. (1855), 130.

[‡] "No mention of any plant or flowers, which might be identified with Cananga, can be traced in any Sanskrit works."—Dr. Charles Rice, *New Remedies*, April, 1881, page 98.

[*] Ray, 'Historia Plantarum, Supplementum,' tomi i. et ii. 'Hist. Stirpium Insulæ Luzonensis et Philippinarum' a Georgio Josepho Canello: London, 1704, 83.

[†] 'Herbarium Amboinense, Amboinsch Kruidboek,' ii. (Amsterdam, 1750), cap. xix., fol. 195 and tab. 65.

[‡] 'Encyclopédie méthodique. Botanique,' i. (1783), 595.

[§] 'Flora Indica,' ii. (Serampore, 1832), 661.

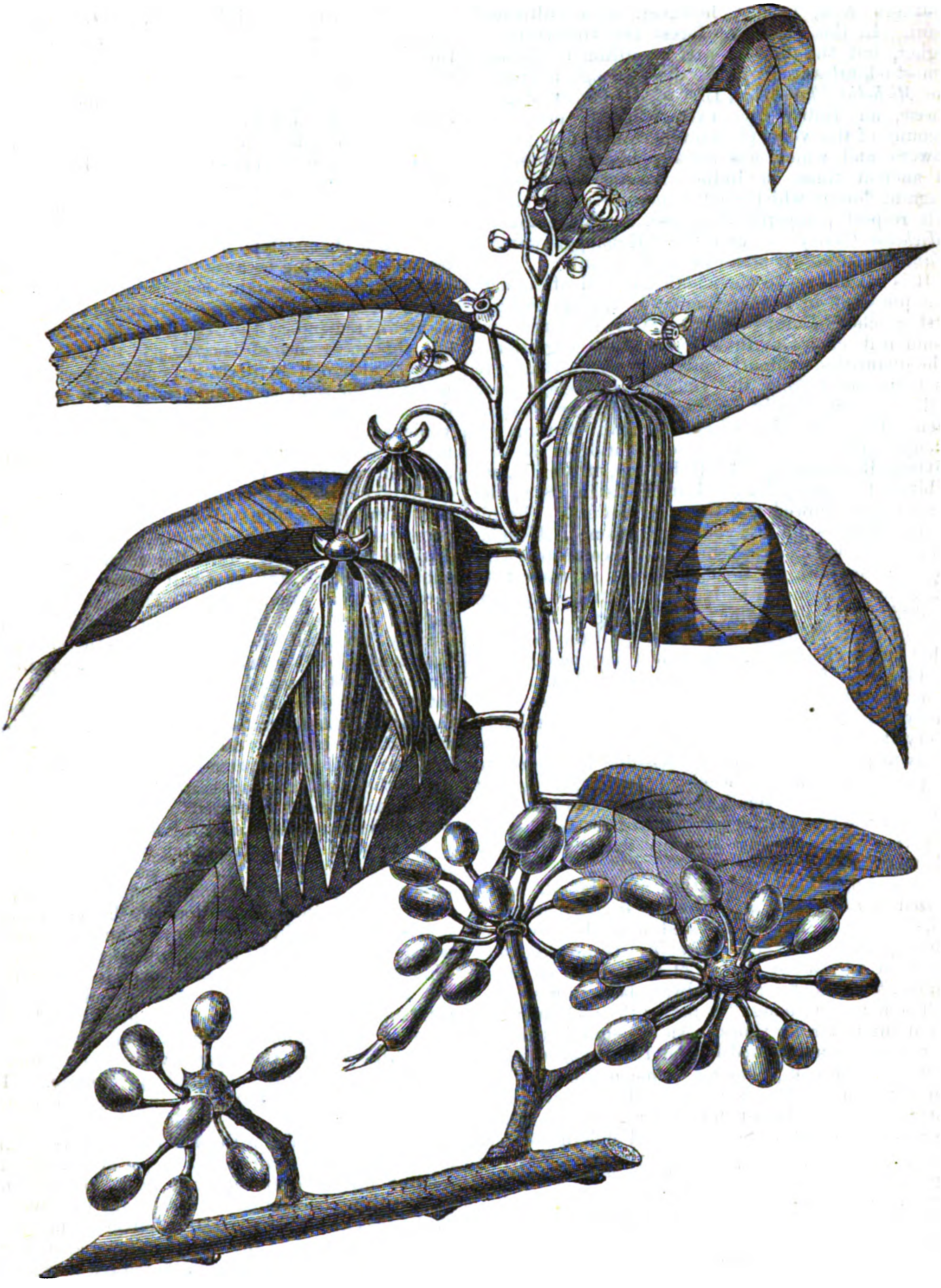
[‖] Paris, 1817, p. 108, 105.

[¶] Vol. i. (Brussels, 1829), fol. 29, tab. ix. et xiv. B.

[**] 'Flora de Filipinas,' Manila, 1845, 325. *Unona odoratissima*, Alangilan. The latter name, according to Sonnerat, is stated by Lamarck to be of Chinese origin; Herr Reymann derives it from the Tagal language.

[††] 'Dictionnaire de Botanique.'

[‡‡] Just's 'Botanischer Jahresbericht,' 1878, 973.



Cananga odorata.

are situated in the axils of the leaves or spring from the nodes of leafless branches. The flesh of the fruit is sweetish and aromatic. The flowers possess a most exquisite perfume, frequently compared with hyacinth, narcissus and cloves.

Cananga odorata, according to Hooker and Thomson or Bentham and Hooker,* is the only species of this genus; the plants formerly classed together with it under the names *Unona* or *Uvaria*, among which some equally possess odorous flowers, are now distributed between those two genera, which are tolerably rich in species. From *Uvaria* the *Cananga* differs in its valvate petals, and from *Unona* in the arrangement of the seeds in two rows.

Cananga odorata is distributed throughout all

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* 'Genera Plantarum,' i. (1864), 24.

Southern Asia, mostly, however, as a cultivated plant. In the primitive forest the tree is much higher, but the flowers are, according to Blume, almost odourless. In habit the Cananga resembles the *Michelia Champaca*, L.,[*] of the family Magnoliaceæ, an Indian tree extraordinarily prized on account of the very pleasant perfume of its yellow flowers, and which was already highly celebrated in ancient times in India. Among the admired fragrant flowers which are the most prized by the in this respect pampered Javanese, the "Tjempaka" (*Michelia Champaca*) and the "Kenangga wangi" (*Cananga odorata*)[†] stand in the first rank.

It is not known to me whether the oil of cananga was prepared in former times. It appears to have first reached Europe about 1864; in Paris and London its choice perfume found full recognition.[‡] The quantities, evidently only very small, that were first imported from the Indian Archipelago were followed immediately by somewhat larger consignments from Manila, where German pharmacists occupied themselves with the distillation of the oil.[§]

Oscar Reymann and Adolf Rönsch, of Manila, exhibited the ilang-ilang oil in Paris in 1878; the former also showed the Cananga flowers. The oil of the flowers of the before-mentioned *Michelia Champaca*, which stood next to it, competes with the cananga oil, or ilang-ilang oil, in respect to fragrance.[||] How far the latter has found acceptance is difficult to determine; a lowering of the price which it has undergone indicates probably a somewhat larger demand. At present it may be obtained in Germany for about 600 marks (£30) the kilogram.[¶] Since the Cananga tree can be so very easily cultivated in all warm countries, and probably everywhere bears flowers endowed with the same pleasant perfume, it must be possible for the oil to be produced far more cheaply, notwithstanding that the yield is always small.[**] It may be questioned whether the tree might not, for instance, succeed in Algeria, where already so many exotic perfumery plants are found.

According to Guibourt,[††] the "macassar oil," much prized in Europe for at least some decades as a hair oil, is a cocoa nut oil digested with the flowers of *Cananga odorata* and *Michelia Champaca*, and coloured yellow by means of turmeric. In India unguents of this kind have always been in use.

The name "Cananga" is met with in Germany as occurring in former times. An "Oleum destillatum Canangæ" is mentioned by the Leipzig apothecary, Joh. Heinr. Linck,[‡‡] among "some new exotics" in the "Sammlung von Natur- und Medicin- wie, auch hierzu gehörigen Kunst- und Literatur-Geschichten, so sich Anno 1719 in Schlesien und andern Ländern begeben" (Leipzig und Budissin, 1719). As, however, the fruit of the same tree sent together with this cananga oil is described by Linck as uncommonly bitter, he cannot probably here refer to the present *Cananga odorata*, the fruit-pulp of which is expressly described by Rumph and by Blume as sweetish. Further an "Oleum Canangæ, Camel-straw oil," occurs in 1765 in the tax of Bremen and Verden.[*] It may remain undetermined whether this oil actually came from "camel-straw," the beautiful grass *Andropogon laniger*.

From a chemical point of view cananga oil has become interesting because of the information given by Gal,[†] that it contains benzoic acid, no doubt in the form of a compound ether. So far as I, at the moment, remember the literature of the essential oils, this occurrence of benzoic acid in plants stands alone,[‡] although in itself it is not surprising, and probably the same compound will yet be frequently detected in the vegetable kingdom. As it was convenient to test the above statement by an examination I induced Herr Adolf Convert, a pharmaceutical student from Frankfort-on-Maine, to undertake an investigation of ilang-ilang oil in that direction. The oil did not change litmus paper moistened with alcohol. A small portion distilled at 170° C.; but the thermometer rose gradually to 290°, and at a still higher temperature decomposition commenced. That the portions passing over below 290° had a strong acid reaction already indicated the presence of ethers. Herr Convert boiled 10 grams of the oil with 20 grams of alcohol and 1 gram of potash during one day in a retort provided with a return condenser. Finally the alcohol was separated by distillation, the residue supersaturated with dilute sulphuric acid, and together with much water submitted to distillation until the distillate had scarcely an acid reaction. The liquid that had passed over was neutralized with barium carbonate, and the filtrate concentrated, when it yielded crystals, which were recognized as nearly pure acetate. The acid residue, which contained the potassium sulphate, was shaken with ether; after the evaporation of the ether there remained a crystalline mass having an acid reaction which was coloured violet with ferric chloride. This reaction, which probably may be ascribed to the account of a phenol, was absent after the recrystallization of the crystalline mass from boiling water. The aqueous solution of the purified crystalline scales then gave with ferric chloride only a small flesh-coloured precipitate. The crystals melted at 120° C. In order to demonstrate the presence of benzoic acid Herr Convert boiled the crystals with water and silver oxide and dried the scales that separated from the cooling filtrate over sulphuric acid. 0·0312 gram gave upon combustion 0·0147 gram of silver, or 47·1 per cent. The benzoate of silver contains 46·6 per cent. of metal; the crystals prepared from the acid of ilang-ilang oil were, therefore, benzoate of silver. For the separation of the alcoholic constituent, which is present in the form of an, apparently, not very considerable quantity of benzoic ether, far more ilang-ilang oil would be required than was at command.

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[*] A beautiful figure of this also is given in Blume's 'Flora Javæ,' iii., Magnoliaceæ, tab. I.

[†] Junghuhn, Java, Leipzig, 1852, 166.

[‡] *Jahresbericht d. Pharmacie*, by Wiggers and Husemann, 1867, 422.

[§] *Jahresbericht*, 1868, 166.

[||] *Archiv der Pharmacie*, ccxiv. (1879), 18.

[¶] According to information kindly supplied by Herr Reymann, in Paris, Nice and Grasse, annually about 200 kilograms are used; in London about 50 kilograms and equally as much in Germany (Leipzig, Berlin, Frankfort).

[**] 25 grams of oil from 5 kilograms of flowers, according to Reymann.

[††] *Histoire Naturelle des Drogues Simples*, iii. (1850), 675.

[‡‡] Compare Flückiger, 'Pharmakognosie,' 2nd edit., 1881, p. 152.

[*] Flückiger, 'Documente zur Geschichte der Pharmacie,' Halle (1876), p. 93.

[†] *Comptes Rendus*, lxxvi. (1873), 1428, and abstracted in the *Pharmaceutical Journal*, [3], iv., p. 28; also in *Jahresbericht*, 1873, p. 431.

[‡] Overlooking Peru balsam and Tolu balsam.

Besides the benzoic ether and, probably, a phenol, mentioned above, there may be recognized in ilang-ilang oil an aldehyde or ketone, inasmuch as upon shaking it with bisulphite of sodium I observed the formation of a very small quantity of crystals. That Gal did not obtain the like result must at present remain unexplained. Like the benzoic acid the acetic acid is, no doubt, present in cananga oil in the form of ether.

BENZOATE OF CALCIUM.*

BY JAMES T. SHINN.

Having been requested by Dr. Albert H. Smith to prepare some benzoate of calcium for a patient, we at first made it extemporaneously by rubbing together the benzoic acid and carbonate of calcium with a little water until effervescence ceased, making a pill mass of the benzoate thus formed and dispensing it in gelatin capsules. As time was not always allowed for thorough combination, the formation of carbonic acid gas in the capsules sometimes caused them to swell and become distorted, and it was thought best to have the salt already prepared. The proportions of benzoic acid and calcium in the benzoate are 113 to 20, or of the crystallized acid and carbonate of calcium, 122 to 50. Hence the following formula for its manufacture:—

Take of—

Benzoic acid . . .	℥iv. gr. xxxii (1952 grains).
Calcium carbonate .	℥i. ʒv. ℈i (800 grains).
Boiling water . .	Oiv. or q.s.

Mix the acid and precipitated chalk thoroughly in a large mortar and add water gradually to allow most of the carbonic acid gas to escape and prevent frothing over of the liquid. When the combination has taken place, or nearly so, the mass is transferred to a porcelain dish and dissolved in the remainder of the boiling water, with the exception of a slight excess of carbonate of calcium. Filter, while hot, into a shallow dish, when crystals will form on cooling. The mother-liquors may be evaporated twice more and yield more crystals, the whole product being about ℥iv. ʒv.

The salt is in feathery crystals, of a silky lustre, odourless, with but slight, rather alkaline taste, and is soluble in about 24 parts of water. It may be dispensed either in capsules or solution, a very good form of the latter being:—

℞	Calcii benzoat.	gr. cxxviii.
	Aquæ destillat.	f℥vi.
	Syr. aurantii.	f℥ii.
M.	Ft. mist.	

This makes a solution, by the aid of heat, containing 8 grains to half a fluid ounce, which is the usual dose.

At a meeting of the County Medical Society, Drs. Smith and O'Hara spoke of the great benefit this preparation had been in cases of albuminuria during pregnancy, and, as the salt may be called for and is not on the price lists of the chemists, a formula for its preparation may be useful. The first crop of crystals can be taken out and dried on bibulous paper within an hour of the receipt of the prescription by the apothecary.

SALICYLIC ACID FOR BEE STINGS.

First remove the sting as quickly as possible with a forceps or by scratching with a finger, but never with the thumb and forefinger, becauses this squeezes more of the poison into the wound. Next squeeze the wound until a drop of blood comes out, and rub the place as large as a dollar with an aqueous or dilute alcoholic solution of salicylic acid. The effect is still better by injecting the salicylic acid into the wound with the hypodermic syringe. After this the spot is painted with collodion, to keep out the air.—*Oil and Drug News.*

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* *American Journal of Pharmacy*, April, 1881.

CATALOGUE OF THE EXHIBITION

To be held in the Rooms of the Pharmaceutical Society on Tuesday, Wednesday and Thursday, May 17th, 18th and 19th.

ROOM No. 1. GROUND FLOOR.

(*Materia Medica Museum.*)

SCIENTIFIC APPARATUS.

BAKER, C., AND CO., 244, *High Holborn, London, W.C.*

- Microscopes, for medical and pharmaceutical students and others, with appliances used by brewers.
- Magnifiers, Dissecting Microscopes, Dissecting Instruments used in Botany.
- Collection of Botanical and Chemical Specimens.
- Lamps used in Microscopy.

CASELLA, LOUIS P., 147, *Holborn Bars.*

- Gimingham's Sprengel Air-Pump, with five fall tubes.
- Gimingham's Patent Blow-Pipe.
- Casella's Patent Clinical Thermometer.
- Casella's Benzol Thermometer, for use in retorts.

DAVIS, JOSEPH, AND CO., *Fitzroy Works, Kennington Park Road, S.E.*

- New Barometers, in Ionic, Gothic, Mediæval and Irish black oak frames, suitable for use in pharmacies, as a permanent attraction.
- Insulated, Clinical and Bath Thermometers.
- The A. B. C. Water Testing Apparatus, containing sufficient solution for 1000 separate and distinct tests, in case, with instructions.

DE GRAVE, SHORT AND CO., 59, *St. Martins le Grand*

- A Chemical Balance, in glass case, with 12-inch beam, and steel knife edges, working on agate planes, and sensitive to $\frac{1}{100}$th grain.
- A smaller Balance, with 8-inch beam, sensitive to $\frac{1}{50}$th grain.
- Fine Dispensing Scales, in black polished glass case, with slide motion pillar, sight hole, nickel plated beam, and two shifting glass pans.
- Similar Scales, in mahogany glass case, and shifting plating copper pan.
- Pillar Dispensing Scales, on mahogany box, with shifting glass pan.
- Pillar Dispensing Scales, on mahogany box, with shifting glass pan, all nickel plated.
- Pillar Dispensing Scales, on mahogany box, with shifting glass pan, all silver plated.
- Pillar Dispensing Scales, on mahogany box, with shifting glass pan and slide motion pillar.
- Counter Drug Scales, on mahogany box, with brass pillar and box end beam.
- Counter Drug Scales, on mahogany box, with brass pillar and hook end beam.
- Veterinary Scales, with brass pans, in oak box, and weights, 4 ounces to ¼ ounce.
- Veterinary Deep Copper Hand Scales and Weights, 4 ounces to ¼ ounce.
- Box-end Beam Grain Scales, brass pans, in mahogany box.
- Box-end Beam Grain Scales, glass pans, in mahogany box.
- Box-end Beam Grain Scales, glass pans, in mahogany box, with nickel plated beam.
- Box-end Beam Grain Scales, brass pans, in mahogany box, the whole nickel plated.
- Hook-end Beam Grain Scales, brass pans, in mahogany box.
- Hook-end Beam Grain Scales, glass pans, in mahogany box.
- Medicine Chest Scales.
- Poison Scales, in mahogany box, with glass pans and weights, 6 grains to ⅛th grain.
- Counter Weighing Machine, on japanned stand, with brass pan for 14 lb.

Pedestal Weighing Machine, on mahogany box, with brass pan for 14 lb.

Chemical Balance, on mahogany box, with specific gravity pan and weights, 500 grains to $\frac{1}{16}$th grain.

A set stamped brass weights, 1 lb. to ¼ ounce. Avoirdupois.

A set stamped iron weights, 7 lb. to ¼ lb. Avoirdupois.

A set stamped apothecaries' brass cup weights, 10 ounces to ½ ounce.

A set apothecaries' stamped brass cup weights, 4 ounces to ½ ounce.

A set apothecaries' stamped brass flat weights, 2 ounces to ½ ounce.

Half dozen sets, drachm and grain weights (three sets accurately adjusted and stamped, and three ordinary stamped sets).

Half dozen sets, drachm and grain weights, in German silver (three sets accurately adjusted and stamped, and three ordinary stamped sets).

Half dozen sets, aluminium grains (three sets accurately adjusted and stamped, and three ordinary stamped sets).

Three sets ordinary stamped round grain weights, with turned up edge.

A set of ordinary stamped grain weights, 1000 to 10.

A set of ordinary stamped grain weights, (short series, 100 to 10).

GORHAM, J., M.R.C.S., *Bordyke Lodge, Tunbridge.*

Patent New Tubular Balance, used without tangible weights, these being supplanted by a long arm, which is lengthened or shortened at pleasure.

LEJEUNE AND PERKEN, 24, *Hatton Garden, London.*

Ophthalmoscopes, by Drs. De Wecher, Landolt, Liebrich and others.

Laryngoscopes, Clinical Thermometers, Portable Medical Electric Batteries, Botanical Lenses, Microscopic Objects and Cabinets, etc.

SYMONS, W. H., 2, *Queen's Terrace, St. John's Wood.*

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Scales in ditto.

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Achromatic Microscopes, Objectives and Supplements suitable for Educational Purposes and Chemical and Analytical Investigations.

Microscopic Objects and Preparations, chiefly in reference to Botany, Pharmacy and Pathology.

Cabinets for Microscopic Objects.

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(*Chemical Museum.*)

PHARMACEUTICAL APPARATUS.

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Patent Sifting and Mixing Machines.

New Patent "Hopper" Mixer.

Morton's Patent Liquid Mixer.

American Drug Mills.

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Ditto, with side outlet.

BOURNE AND TAYLOR, *Castle Street, High Holborn.*

The "Simple" Pill Coater for hand use.

The "Rotary" " "

Stopper Loosener. See also Room No. 4.

BURTON, GEO., 232, *St. John Street, E.C.*

American Drug Mill.

BURROUGHS, WELLCOME AND CO., 7, *Snow Hill, E.C.*

Improved Enterprise Tincture Press.

" American Drug Mill. See also Room 5.

DIGNE AND CO., 35, *Place St. Michel, Coin du Boulevard Chave, Marseilles.*

Apparatus for enclosing Powders, etc., in Wafer Envelopes, etc.

HARVEY, SHEPHERD AND CO., 33, 34, 35, *Charterhouse Square, E.C.*

Cartner's Pill Coaters.

Corties' ditto.

New Glass Label Dampers. See also Room No. 4.

HUTCHINGS, J., 11, *New Cross Road, S.E.*

Champion Label Gummer.

Spile Drawer.

MAWS, SON AND THOMPSON, 7 *to* 12, *Aldersgate Street, E.C.*

Pill Machines; Powder Folders; Pill Coaters; Root Cutters.

Moulds for Pessaries, Suppositories and Bougies.

Bronchitis Kettles and Inhalers.

Infant's Food Warmers.

Beef Tea Apparatus.

See Room No. 5 for New Revolving Show Counter.

REYNOLDS, R., 13, *Briggate, Leeds.*

Model of Stirring Apparatus.

SANITARY AND DOMESTIC APPLIANCES CO., 10, *Exchange Arcade, Deansgate, Manchester.*

Fielding's Patent "Indispensable" Double-acting, High-pressure, Rapid Water Filter.

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Patent Clinical Thermometer, with Coloured Scale to render the reading more easy, and constriction to prevent the index from descending into bulb.

- Patent Vaporizer or Bronchitis Kettle, Inhaler and Vapour Bath Combined, in which possibility of burning or getting out of order is prevented.
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- Lister's Carbolic Spray Producer, with three metallic flexible tubes adapted to diffuse or concentrate the spray as required.
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- Portable Medical Battery, English manufacture.
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  [This counter is placed here on account of being the only room large enough to exhibit it in.]

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- Hazeline.
- Wyeth's Compressed Soda Mint Tablets.

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- Granulated Preparations.
- Harmless Vegetable Colours and Carmine for Lozenges.
- New Artificial Essential Oils, for perfuming oils and soap:—Lilac, Tonquin, Pelargonium.
- Oil of Sandal Wood, prepared from the Cochin-China tree, stated to possess more powerful medicinal properties than any other kind.

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Alkaloids prepared by A. Petit:—
Sulphate of Eserine; Pilocarpine, pure, Nitrate, and Hydrochlorate; Tannate of Pelletierine; Duboisine Sulphate, and Active Pepsine.
Alkaloids prepared by E. Merck and Co.:—
Aspidospermine, crystalline and amorphous, Citrate, Sulphate.
Sweet Cayenne.
Seaweed.
Erythrophlœine, for making jelly, etc.
Chaulmoogra Oil and Seeds, Menthol, Spogel Seeds, Kurchi Seeds, Ajowan Seeds.
Coca Extract and Elixirs (from the green leaves).
Curari in Gourds.
Papaw Leaves, Juice and Papayine.
Duboisia Leaves and Preparations:—Pituri, Guaco, Damiana, Boldo, Paraguay tea, *Atherosperma moschata*, Caroba Leaves, *Rhinacanthus communis*, Goa Powder, Hoang-nan Root, Kava-kava Root, Sassy or Casca Bark, Mudar Bark, Alstonia Bark, White Quebracho Bark, and a variety of Japanese Drugs, Termite Earth, Odika Bread and Fat.

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Pure Benzol, Toluol and Xylol.
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Essence of Mirbane for perfumery.
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New Drugs:—*Adonis vernalis*, White Quebracho Bark, Kava-kava Root, Stigmata of Maize, Euonymin, Gynocardic Acid, Papayine, Oil of *Erigeron canadensis*, Chaulmoogra Oil.
New Preparations:—Liquid Extracts of Coca, Damiana, Eriodictyon, Guarana, Quebracho, and *Vinca major*; Liquor Opii Dialysati, Liquor Phosphori, Liquor Piper methystici, Chaulmoogra Oil in Perles and Ointment.

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Chloricalcium.
„ in solution.

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EVANS, LESCHER AND WEBB, 60, *Bartholomew Close.*

New Pharmaceutical Preparations and Chemicals.
Pharmacopœia Ointments with "Fossilene" basis.
Fucus vesiculosus and Preparations.
Coated Pills.
Plasters made with New Basis, and Spread on New Material.
Membranous Capsules containing Nauseous Medicines.
Cabinets of Materia Medica.

MACKEY, MACKEY AND CO., 1 *and* 2, *Bouverie Street, E.C.*

Quinquinine; Mist. Bismuthi Co., Mist. Cerii Co.; Olei Morrhuæ Co.; Theobromolline or Chocolated Cod Liver Oil.
Saxcere; Phosphorated Saline; Liq. Santal. c. Cubeb. et Buchu; Quinine Salicylate; Citrate of Iron and Quinquinine.

MORSON AND SON, *Southampton Row.*

New Cholagogues.—Ammonium Benzoate; Euonymin; Iridin; Leptandrin.
Salicylates of Ammonium, Potassium, Calcium, Zinc, Iron, Lithium, Cinchonidine and Eserine.
New Anæsthetics.—Ethidene Dichloride, Methyl Chloroform, Monochlor-ethylin-chlorid, Solution of Glonoine, Ethylate of Sodium, Santonate of Sodium, Citrate of Caffeine, Tannate of Quinine, Ol. Pini Sylvestris, ver., Pepsine Lozenges.

HOPKIN AND WILLIAMS, 16, *Cross Street, Hatton Garden, E.C.*

Pure Natural Salicylic Acid from Wintergreen Oil; Salicylates of Cinchonidine and Quinine, made with the natural acid and quite neutral; Pure Natural Salicylate of Sodium and Zinc; Sclerotic Acid; Crystallized Acetate of Ammonium; Pure Aldehyde; Beberine; Berberine, pure, Hydrochlorate and Sulphate; Cerium Citrate and Ammonio-citrate in scales; Redistilled Chloral Hydrate; Daturine; Diastase; Eserine Sulphate; Eugenol; Fuchsine for medicinal use, free from arsenic; Homatropine, pure, and Hydrobromate; Hydroquinone; Pure Oxide of Manganese for use in medicine: Methyl-strychnia; Muscarine; Monobromonaphthalene; Tannate of Pelletierine; Pure Picrotoxin; Pilocarpine Hydrochlorate and Nitrate; Potassium Chrysophanate; Resorcin; Terebene; Pure Urea; Solution of Trimethylamine; Xylol; Permanganate of Zinc.

YOUNG AND POSTANS, 35, *Baker St., Portman Sq.*

Resorcin; Eugenol.
Pure Natural Salicylic Acid from Oil of Gaultheria;
Clinical Temperature Charts in portfolio, as used in London Hospital.

ROOM No. 6. FIRST FLOOR.

CHEMISTS' AERATED WATER CO., 45, *Gifford Street, Caledonian Road, N.*, and *Montpelier Gardens, Harrogate.*

Sparkling Rubine.
Sparkling Limine.
Harrogate Kissengen Water.
Harrogate Sulphur Water, strong.
Harrogate Sulphur Water, mild.
Mineral Acid Water.

EVANS, LESCHER AND WEBB, *Bartholomew Close, E.C.*

Non-Alcoholic Beverages.
Montserrat Lime Juice and Cordial.
Vin-Santé, sweet and dry.

IDRIS AND CO., *Agincourt Works, Mansfield Road, Haverstock Hill.*

Mineral Water, in syphon bottles.
Aerated Lime Water, in syphon bottles.
Aerated Fluid Magnesia, in syphon bottles.
Aerated Citrate of Caffeine.
Aerated Salicylate of Lithia.
Sparkling Phosphade.
Sparkling Peptade.
Sparkling Lupulade.
Non-Alcoholic Beverages, including—
Sparkling Apple Wine.
Sparkling Orange Wine.
Sparkling Orange Quinine Wine.
Sparkling Peruvian Wine.
Ginger Ale.
Quinine Tonic Water.
Sikkan, a beverage containing all the nutritive constituents of oatmeal.

PACKHAM AND CO., *Croydon.*

Hedozone.
Soda, Potash and Lithia Water, in electro-silvered syphons.
Aerated Distilled Water, in electro-silvered syphons

The Pharmaceutical Journal.

SATURDAY, MAY 14, 1881.

THE PROPOSED EXAMINATION REGULATIONS.

When referring some weeks ago to the suggestions offered by Dr. Greenhow in regard to the possible improvement of the conditions under which the Society's examinations are conducted, we had no expectation that there would be so soon another official expression of opinion upon this subject, nor had we any special reason for supposing that the conclusions arrived at by the Committee appointed at the instance of Mr. Schacht, to inquire into and consider the relation of pharmaceutical education and pharmaceutical examinations, would be so closely in accord with the measures recommended by Dr. Greenhow. From a comparison of the Report presented to the Privy Council, last March, and the statement made to the Council at its last meeting of the recommendations which the above-mentioned Committee offers as the result of its labours during the past year, it will, however, be seen that there is such an agreement between the views of the Government Visitor of Examinations and the Committee as will go far to demonstrate the desirability of the proposed new regulations.

In both cases the very large number of failures among the candidates who present themselves for examination is the fact which has led to the expression of opinion that amended regulations are required. The frequency of such failure naturally affords evidence of the existence of defects in the mode in which some of the candidates are, in early life, trained for their calling, and though the practical working of the examination system may be, as Dr. Greenhow indicates, sufficient to secure the accomplishment of the objects of the Pharmacy Act, as regarded from a public point of view, it still remains evident that as regards the advancement of pharmacy, which is one of the chief objects of the Pharmaceutical Society, there is a want of such a uniform system of education as would be sufficient to confer competent knowledge and skill upon those who intend to practise pharmacy.

The work undertaken by Mr. Schacht's Committee may therefore be regarded as having in view this primary object of the Society's Charter, and the recommendations that have been presented to the Council may be construed as an avowal that it is now time some steps were taken to promote the establishment of a proper system of pharmaceutical education. From the account given of the proceedings of the Committee we are at present only able to gather that it has consulted the Professors attached to the School at Bloomsbury Square, as well as other experienced scientific teachers, and has taken into consideration their experience of teaching and of examinations. The material thus collected is to be presented to the members of the Council in the form of a printed report, and the discussion of the subject is to occupy the Council at an early future meeting. Until this report has been presented and published we shall not be in possession of the grounds upon which the Committee has arrived at its conclusions. Any discussion or criticism of the several recommendations would therefore be premature and out of place at present. They were, indeed, only received by the Council as the result of the Committee's labours, and, as Mr. Schacht pointed out, requiring the same serious consideration by the Council that had been given to the whole subject by the Committee.

In referring to the recommendations of the Committee we must, therefore, confine ourselves to showing the concurrence between them and the suggestions offered by Dr. Greenhow with the object of providing a remedy for some of the defects rendered manifest by the results of the Society's examinations. As regards the period for passing the Preliminary examination being properly fixed before the admission of youths as apprentices, there is a complete agreement between the Committee and the Government Visitor of Examinations, and both concur in thinking that there should be a sufficient interval between the passing of that examination and admission for the Minor examination to admit of practical training and experience being obtained.

According to this arrangement the candidates for the Minor examination would require to produce certificates of having passed the Preliminary examination at least three years previously, and also certificates of having been engaged for not less than three years as apprentice or pupil with a duly registered chemist and druggist. As regards the evidence to be furnished by candidates that they have had due opportunities of acquiring knowledge of the scientific subjects that a pharmacist requires to be conversant with, the Committee goes further than Dr. Greenhow, and while the latter views the Minor examination as, from his point of view, not necessitating attendance at a school of pharmacy or a special curriculum, the Committee recommends that candidates should be called upon to show that since the time of passing the Preliminary examination they have attended courses of lectures on chemistry, botany and materia medica, as well as a course of instruction in practical chemistry.

Looking at these proposed regulations merely as means of protecting candidates against failure in the Minor examinations it must, we think, be evident that they are conceived in a spirit of regard for the interests of those who desire to obtain legal qualification to carry on the business of pharmacy. That their adoption would conduce materially to lessening the number of failures is, we think, certain, and that this would be a step towards the achievement of the object of the Society's charter is as little open to doubt. How far that course may be expedient, and under what limitations in respect to those who have already passed some part or the whole of their apprenticeship is a matter for further consideration by the Council, but as the question is one of great interest in its bearing upon the future of pharmacy in this country, we may at least commend it to the careful consideration of every member of the trade.

BRITISH ASSOCIATION OF INSPECTORS OF WEIGHTS AND MEASURES.

Although the new Weights and Measures Act has occasioned some trouble and inconvenience to chemists and druggists, it cannot be denied that the principle it involves is sound, and that when the machinery for carrying out its provisions shall have been properly adjusted it will be on the whole beneficial. As a step promising to be conducive to such a result we have to record the formation of an Association of Inspectors of Weights and Measures, having for its object the securing of uniformity of action among them and the exchange of information and ideas. The inaugural meeting of this Association has just been held at Manchester in the Mayor's Parlour, Town Hall, Mr. W. S. Brown (Chairman of the Weights and Measures Committee of the City Council) presiding on the first occasion.

Mr. Brown, in opening the proceedings of the meeting on Monday, expressed gratification that the Association was being formed and that it would be a means of removing the difficulties and uncertainty attending the administration of the Act. He referred to the enlargement of the duties of inspectors and to the delicate care they would require to exercise in dealing with troy bullion weights and the glass measures used by chemists and druggists, expressing his conviction that their object in carrying out the Act was not to oppress tradesmen or to ask them to comply with requirements that would be attended with difficulty, but simply to secure the public against wilful fraud and gross carelessness.

Rules and Regulations for the guidance of the Association were then adopted, and after lunch a paper was read by Mr. Wimhurst (the Inspector of Weights and Measures for Manchester) on his experience of the Weights and Measures Acts. Considerable discussion followed, and it was resolved to print and circulate Mr. Wimhurst's paper.

In the appointment of officers for the ensuing year, Mr. W. S. Brown was chosen as President, Mr. Alderman Chandley, Vice-President, and Mr. Winhurst, Secretary. In the evening, some thirty gentlemen dined together at the Albion Hotel, the Mayor of Manchester presiding and the Mayor of Salford occupying the vice-chair.

On the following day Mr. Alderman T. Hidderley (Chairman of the Weights and Measures Committee of the Stockport Town Council) presided, and Mr. Hare, of Birmingham, read a paper on the Counter Weighing Machine. In the discussion that followed it was stated that a large number of defective machines were made and used. A suggestion being made that scales and weighing machines should be stamped as well as weights, it was urged that a petition should be presented to the President of the Board of Trade, but the Chairman thought the matter would be better left to Town Councils as one more fit to be dealt with by them than by manufacturers or inspectors.

THE BENEVOLENT FUND.

The decision of the Council to place prominently on record in the Society's premises the names of donors of moderately large sums to the Benevolent Fund will, it may be hoped, prove advantageous as a stimulant to liberality in that direction. According to the resolution passed last week the first list of names will include those of all individuals who before the 1st of July next have given twenty guineas or upwards, and of all firms which have given forty guineas or upwards, in the aggregate, in sums of not less than five guineas at any one time. It will probably be the case that some who have already contributed sums above five guineas, but not equal to the minimum of twenty guineas in the case of individuals or forty guineas in the case of firms, will be desirous of making up their donations to the necessary amount, and we therefore take the liberty of pointing out that in order to be included in the first list the donations will have to be received by the Secretary by the *end of next month.*

THE ANNUAL DINNER.

The Annual Dinner of the Members of the Pharmaceutical Society and their Friends, as most of our readers are aware, will be held in Willis's Rooms on Tuesday next, and there is a fair prospect that it will prove as pleasant and successful a *réunion* as any in previous years. The comfort of the visitors to such gatherings, however, is always dependent upon the adequacy of the previous arrangements and therefore it is desirable, in order to facilitate the work of the Committee, that gentlemen who intend to be present and have not yet obtained tickets should do so *at once.* As there are no Stewards this year, all applications for tickets should be made direct to the the Honorary Secretary, Mr. Richard Bremridge, 17, Bloomsbury Square.

THE EXHIBITION.

On another page will be found a Catalogue of the Drugs, Chemicals, Apparatus, and other articles of interest to pharmacists, which will be exhibited in the rooms of the Pharmaceutical Society, on Tuesday, Wednesday and Thursday of next week. It may be convenient to point out that on the evenings of Tuesday, when the Annual Dinner takes place at Willis's Rooms, and Wednesday, when the Annual Conversazione will be held in the South Kensington Museum, the Exhibition will not be open later than 5 p.m., but on Thursday it will remain open till 10 p.m. On Tuesday and Thursday all chemists and druggists, whether connected with the Society or not, are invited to view the display; but on Wednesday, the day of the Annual Meeting, only Members and Associates in Business of the Society will be admitted.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

May 4, 1881.

Present—Professor Tichborne, President; Dr. Aquilla Smith, Vice-President; Sir G. B. Owens, Messrs. Allen, Brunker, Collins, Hayes, Hodgson and Simpson.

The minutes having been read,

Mr. Allen asked why the Law Committee had not been summoned since last Council meeting, a case having been referred back to it.

Mr. Fennell (Registrar) said he had not been directed to summon it.

Mr. Brunker said Mr. Hayes and himself had considered the matter. The gentleman who had reported the case had written to say that his witness would not come forward, and that he understood that the Council, when a case was reported, would undertake to obtain evidence, and having a difficulty in procuring an informer, they considered it was useless to call the Committee until some person had been obtained to act as informer.

Mr. Allen objected to the work of the Committee being carried on by two or three members in an informal manner.

The minutes were then confirmed.

The following letter from the Pharmaceutical Society of Great Britain was then read, and ordered to be inscribed upon the minutes:—

"Dear Sir,—I have to inform you that your letter of January 12, with proposed amendments of the Pharmacy Act (Ireland), was under the consideration of the Council of this Society at its meeting yesterday.

"I am requested to say that the Council desires to express its sympathy with the efforts of the Pharmaceutical Society of Ireland to obtain amended legislation, but that, in the absence of any special knowledge of the requirements of pharmacy in Ireland, the Council is unable to properly discuss the particular amendments now suggested.

"I am, dear Sir,
"Yours faithfully,
"Elias Bremridge,
"*Secretary.*

"To J. E. Brunker, Esq., M.A.,
"68, Grafton Street, Dublin."

Dr. Aquilla Smith called attention to the returns of the examiners, which he considered defective in one respect: that the results of the written portion of the examination were not, except in one of the subjects, given separately, so that the Council could not properly judge the results. He also considered that in one of the subjects the standard of the questions was too low. At the same time he did not like interfering with examiners; but he thought it proper to call the attention of the Council to the returns, which he thought might in future have an additional return of the marks awarded for the written portion, so as to separate them from those obtained at the *vivâ voce* examination.

The President deprecated dictating to the examiners.

Sir G. B. Owens agreed, and considered that when they had appointed examiners they ought to have every confidence in them, and suggested that the method of awarding marks might be improved.

Dr. Collins thought that the present method was not good.

Mr. Hodgson announced that the balance in bank to the credit of the Society was sufficiently large to admit of the withdrawal of £100 for investment, and gave notice of a motion to that effect for next Council meeting.

The meeting then adjourned.

Provincial Transactions.

LIVERPOOL CHEMIST'S ASSOCIATION.

The thirteenth and concluding ordinary meeting was held at the Royal Institution, on Thursday evening, April 28, the President, Dr. Symes, in the chair.

The minutes of the previous meeting were read and confirmed, and the following donations to the library were announced:—The current numbers of the *Pharmaceutical Journal*, from the Society; the *Canadian Pharmaceutical Journal*, from the Editor; and the *Chemists' Journal*, from the President.

Mr. W. Le Couteur was elected a member.

The President exhibited a very fine specimen of Persian opium, also a tincture prepared from same, and explained that this class of opium is now sent over of very superior quality and much freer from oil than formerly. The sample exhibited contained 12 per cent of morphia.

The Honorary Secretary, Mr. Michael Conroy, read a paper on "The Adulteration of Olive Oil," which is printed on page 933.

A lengthy discussion followed, joined in by the President, Messrs. Davies, Farmer, Haddock, Mason, Parkinson, Watt, Williams and others.

Mr. Conroy replied at length to the points raised in the discussion, and at the conclusion was awarded a hearty vote of thanks.

The President then delivered his Valedictory Address as follows:—

Valedictory Address.

This evening we hold the concluding general meeting of the present session, and it becomes, my duty to say a few words of a retrospective nature. In due course you will have the annual report of the Association, and it is not my wish to anticipate the work of the Council in this respect other than to say that the session has been a fairly successful one.

On looking around on the world of physical science, outside the special province of this Association, at the work that has been done since I addressed you in April last, we do not find that the year has been marked by any of those startling discoveries which characterized the two or three previous years. No new means of conveying, or rather of reproducing sound hundreds of miles distant, or of magnifying sounds of the faintest into those of considerable force; no new machine for the mechanical preservation and reproduction of speech has been invented; no new element of importance discovered, or gas previously known only as gaseous has been liquefied. No process for the artificial production of real diamonds or other gems has been evolved, neither has the world been startled by any announcement of extraordinary discoveries by Mr. Edison concerning the electric light. Yet science has not been retrograde or even stationary; it has been progressive. The telephone and microphone have been perfected, and arrangements for working them on a large and important scale have been consolidated. The electric light has been making steady progress, and for public purposes bids fair to be the light of the future.

The Chemical Society has been abundantly supplied with papers, many of which have treated of important subjects, and have indicated marked progress in the science we profess and are assumed to have a special knowledge of. Amongst those papers, etc., the following attracted my special attention:—"The Comparative Value of Different Methods of Fractional Distillation," by Mr. Brown; "On the Relation between the Molecular Weight of Substances and their Specific Gravity when in a Liquid State," by Professor Thorpe; "On River Water," by Professor Tidy, and "On the Action of Air on Peaty Water," by Professor Frankland; "On the Analysis of Organic Bodies containing Nitrogen," by Mr. Perkin; "On the Relation between the Molecular Structure of the Carbon Compounds and their Absorption Spectra," by Professor Hartley.

A discovery in technical chemistry which will probably prove of importance is that of a method of artificially preparing indigo, the starting point being toluene, which associates it with coal tar colours.

Pharmacy, unfortunately, has not advanced as much as we could have wished. About two and a-half years since I read a paper before the members of this Association entitled "Suggestions for a New Edition of the British Pharmacopœia." It was then and subsequently admitted on all sides amongst pharmacists (and by many medical men) that a new edition was desirable, but the work of revision has not even yet commenced; indeed, the Medical Council, "with a large stock of the present edition on hand," does not seem to see the necessity for a new edition. This points clearly to the desirability of the pharmacist having an improved position with regard to the work he is called on to obey in the preparation of medicines, a position which is regarded as his right in all other countries. Not only has the pharmacist been ignored, but his legal position has been assailed in another direction; the loss of an important trial in the House of Lords has justly caused some anxiety on the part of those who have to depend on pharmacy for a livelihood. I am not an advocate of general protection; free trade has become one of the institutions of British commerce; but under all rule and all parties this so-called "free trade" has to be conducted according to certain conditions and much of it under certain restraint. The position which the Government takes is most anomalous, and its action inexplicable with regard to a certain portion of the trading community of this country, and particularly so with regard to pharmacy; for whilst there is a constant demand for new restrictions and new regulations on the sale of certain poisons, the great bulk of drugs, including many deleterious substances and potent poisons, may be sold indiscriminately by ignorant hucksters.

Again, whilst those who desire to practise and advance pharmacy as individuals have very properly to be educated and pass certain examinations before they can do so, and even then have to conduct their business under certain restrictions; a number of individuals, as a corporate body, without any knowledge of the business, and whose only object is avarice, may, without restriction or restraint scatter poisons broadcast if they so please.

In May last the Council of the Pharmaceutical Society held an exhibition of chemical and pharmaceutical apparatus and other matters of interest to chemists and pharmacists at Bloomsbury Square. This not only improved the dull and routine character of the annual meeting, but it afforded an opportunity for the interchange of opinion and a centre of discussion on subjects in which all present could enter with deep interest. This was a decided success, in fact the only success worth recording in the Society's report for the year. Great credit is due to Mr. Holmes, the Curator of the Society's Museum, for the energetic manner in which he dealt with the undertaking and for the careful and systematic manner in which the arrangements were carried out.

The National Trade Association still perseveres in the good work it has in hand, commending itself to the support of all those who have the trade interest of pharmacy at heart. Coming now to our own Association, I have of late been looking into its history, and have been much interested in these records of the past. The Association appears to have been founded in 1849, but the first copy of proceedings and annual report in our possession is for the session 1850 to 1851. We still have some few of the founders amongst us, and a gentleman (Mr. R. Sumner) whose name appears early in the history of the Association as its treasurer holds that office at the present time. One or two have gone abroad, whilst many have passed away to their final rest, the present session having experienced the loss of one who for many years took a deep interest in the proceedings and who for some years occupied this chair as president.

There has recently been resuscitated a question as to whether the Association should discuss matters which do not come strictly within the objects as defined in its present laws, viz., chemical and pharmaceutical science.

It is not my wish that you should answer this question to-night, but simply that we should gather from these records before us the objects for which it was founded; the periods of its history at which it was most successful and the usages at those periods down to the present time. [Extracts were read from the early laws and from the reports of different years' proceedings.] I think you will gather from these facts that the Association was originally one of chemists and druggists, that its proceedings have embraced many subjects which have been neither chemical nor pharmaceutical, that it has been most successful when a fair proportion of subjects having a trade or commercial interest have been discussed, and that the object of its founders has been best attained when its greatest general success has been achieved.

I admit that now we have both local and national trade associations we ought to direct our attention chiefly to the furtherance of chemical and pharmaceutical science; but I must enter my protest against any attempt to unduly narrow the scope of our operations, to stultify its growth, to minimize its usefulness and so render it a thing with a name but without life, a mere existence without usefulness.

In conclusion I wish to tender my best thanks to all who have helped to make the past session successful, and to ask them to accord the same support to my successor, whom I will now ask you to elect.

Mr. R. M. Sumner, in a graceful and complimentary speech, moved that a vote of thanks be given to the President. This was seconded by Mr. A. H. Mason, F.C.S., and carried with acclamation.

ELECTION OF PRESIDENT FOR THE NEXT SESSION.

Mr. A. H. Mason, F.C.S., Vice-President, said it would be a difficult matter to give the President notice to quit, had he not already informed them that his lease had expired, and told the speaker that he did not see his way to renew the lease. It had been generally understood that the chair should pass on to the Vice-President, but he did not see it was at all expedient that that course should be adopted at the present time; he, therefore trusted that the members would not think it intrusive, in the circumstances, if he undertook to nominate a President. The gentleman he intended to name had already worked three years actively for the benefit of the Association, and, as their Honorary Secretary, had, by his ability, courteous manner and tact, so successfully provided for the meetings, that there had always been a good supply of papers. He begged to name Mr. Michael Conroy, F.C.S., as President elect.

Mr. A. Abraham in complimentary terms seconded the nomination, which was supported by Mr. Edward Davies, F.C.S., F.I.C.

The ballot was then taken, and the President declared Mr. Conroy unanimously elected.

Mr. Conroy, in acknowledging the honour conferred upon him, said that he felt the responsibility to be very great, and that this feeling was intensified when he considered the qualifications of the able practical chemists and eminent pharmacists over whom he had been elected to preside. The choice, however, was theirs and not his, and therefore he hoped they would overlook his shortcomings and render him their valuable assistance. With this kindly help he promised that no effort would be wanting on his part to carry out the duties of the chair to the honour and advancement of the Association.

GLASGOW CHEMISTS AND DRUGGISTS' ASSOCIATION.

The annual general meeting was held in Anderson's College, 204, George Street, on Wednesday, May 4, the Vice-President, Mr. Robert Brodie, in the chair.

After the adoption of the minutes of the previous meeting the Secretary, Mr. J. C. Hunter, read a report of the transactions of the society for the session 1880–81. This stated that in the course of the session papers had been read before the Association by Messrs. Kinninmont, Walker, Gilmour, Paterson, Clarke and Hunter. The meetings had not been so well attended as in some former sessions, although the membership was about as large. There had been no educational business in connection with the society this session, but a general meeting of the trade, called by public advertisement in the newspapers, was held in Anderson's College, 204, George Street, on January 25, to discuss what steps were required with reference to the proposed Pharmacy Act Amendment Bill. At that meeting the Bill was discussed, and a number of resolutions were drawn up and transmitted to the President of the Pharmaceutical Society to be read at the Council meeting, on the day that the proposed Bill was to be debated upon by them. The London Council, in deference to the wishes of the Scotch members, had agreed that the appointment of Scotch examiners should remain as formerly.

Mr. Maltman, Treasurer, then submitted his financial statement, which showed a balance in favour of the Society of £14 16*s.*; this includes a balance of £3 8*s.* 9*d.* from the Library Fund.

Mr. J. A. Clarke, Librarian, gave in his statement of the books perused by the members during the session, and as convener of the price list committee he intimated that he had a balance of cash on hand from sale of price lists during the session, after deducting expenses, of £4 13*s.*

Mr. Illingworth, Secretary Assistant Section, also read his report of work done during the session, which has already appeared in the pages of the Journal.

Mr. Clarke moved the adoption of the reports. This was seconded by Mr. John Currie, who said that although the attendance had not been satisfactory this session, still the subscriptions had come in well, and through that, the financial condition of the Society was sound, and he hoped that next winter there would be a larger attendance of members at the usual meetings.

Mr. Currie moved a hearty vote of thanks to President, Vice-President, Secretary and other office-bearers for their exertions during the past session. This was duly awarded by the members.

Mr. Brodie, Vice-President, in his closing remarks, alluded to the loss the Pharmaceutical Society in Scotland has sustained in the death of Mr. John Mackay, who so long and ably filled the position of Honorary Secretary to the North British Branch of the Society in Edinburgh. Mr. Kinninmont endorsed in a few words what Mr. Brodie had said with reference to his late friend and colleague.

Owing to the lateness of the hour, Mr. J. A. Clarke moved the adjournment of the meeting and the postponement of the election of President and office bearers for the ensuing session. This was seconded by Mr. Simpson and approved of by the members.

The meeting was adjourned accordingly *sine die.*

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The usual monthly meeting in connection with the above Association was held at Britannia Chambers, Pelham Street, on Tuesday last, April 26, the President, Mr. R. FitzHugh, F.C.S., occupied the chair.

There was a good attendance of members and associates, and after the usual formal business had been transacted,

Mr. C. L. Rothera, B.A., gave a very interesting lecture upon "Some Interesting Relationships existing between Plants and Animals." It was really an answer to two questions which have recently been asked in connection with the science examinations, viz., "What advantage is it to plants to have irregular flowers?" and "What contrivances are found amongst flowers for preventing access of insects?" In answering the former question, the lecturer first described a perfect flower, then several kinds of irregular ones. He then based his remarks chiefly on Darwin's researches, proving that fertilization was chiefly carried on by certain insects in search of honey carrying with them the pollen from one flower to another, and not so much by the generating organs of one flower fertilizing itself. He then showed that the irregular forms of flowers were such as to facilitate not only the entrance of the insects into the flowers, but also that the pollen should be so deposited on these insects in a proper and convenient form as to be transmitted to the ovaries of others, thus causing cross fertilization. In answering the second question, the lecturer showed that whilst it was advantageous to the flower that certain insects should have access to it, it was also advantageous that others should not have such access; nature, therefore, provided certain contrivances, such as hairs, viscid secretions, or receptacles for water, etc., to prevent such insects as ants, slugs, etc., gaining admission to them.

The lecture, which was fully illustrated by diagrams, was listened to with intense interest. At the conclusion, a unanimous vote of thanks was accorded to Mr. Rothera.

EDINBURGH CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

ANNUAL SUPPER.

The fourth annual supper of the Association was held on the evening of Thursday, April 14, in the Waterloo Hotel. There were about seventy gentlemen present. Mr. J. D. Robertson occupied the chair, and Messrs. Hatton and Hill officiated as croupiers.

Supper being served, the Chairman gave the usual loyal and patriotic toasts, that of the "Army, Navy, and Reserve Forces," being acknowledged by Mr. D. M. Brown.

In proposing "Success to the Association," the Chairman made reference to the encouragement the Association had received during the past session, especially in regard to increased membership and greater interest in the meetings. He had frequently heard doubts expressed as to whether there were any advantages to be derived from joining the Association, but the experience of three sessions seemed to show that there were advantages. These advantages were chiefly educational, and those derived from members of the same calling meeting one another, and he pointed to the fact that the membership was larger during the past session than during any previous one as a proof that these advantages were being increasingly appreciated. He was confident that few, if any, of those who had attended the meetings last session had not learned something, and if members would consider it both their duty and privilege to add to the interest of the meetings the Association would go on and prosper.

The toast was warmly responded to.

Mr. P. Boa, in proposing "The University and Royal Colleges of Physicians and Surgeons," said that this was a toast which, however imperfectly he might introduce it, was sure, of its own inherent merits, to command acceptance. If universities were to be judged by their fruits they need have no fear for the honour of the university of Edinburgh. Pharmacists as a class, did not, he feared, sufficiently avail themselves of its privileges. This was to be regretted because, apart from the thorough instruction imparted within its walls, there were the noble associations connected with it, which were calculated to kindle in sensitive minds an enthusiasm which might produce good fruit in after years. Although attendance at any of its classes was not compulsory for the examinations of the Pharmaceutical Society, yet the opinion that such should be the case was gaining ground, and he hoped in a few years to see the triumph of that idea. The Royal Colleges of Physicians and Surgeons fulfilled important duties and did good work. The illustrious names on their respective rolls of fellows were sufficient indication of their worthiness of the positions they occupied as licensing bodies. Much had been said and written of late regarding the relations existing between medical men and pharmacists. These relations, he believed, were as a rule of a friendly kind. There was one thing in which he would like to see the co-operation of a medical man and a pharmacist and that was in the production of a manual of materia medica, which, while giving the usual outline of the therapeutic properties and doses of drugs, should at the same time give a fair representation of the most recent improvements in their pharmaceutical manipulation.

The toast was acknowledged by Dr. William Craig, who strongly advised the members to devote themselves to the development and elucidation of the pharmacy of the various drugs which they met with, and which offered a wide field of usefulness in the department in which it was their special function as pharmacists to work. By so doing they would not only confer dignity on their own profession but bring blessings to suffering humanity.

The "North British Branch of the Pharmaceutical Society," was proposed by Mr. J. R. Hill. He regretted that the duty of proposing this toast had not been put in abler hands. He was still so young that the history of the Pharmaceutical Society in Edinburgh came down to him only as a tradition; yet it was a tradition which formed a bright page in the history of pharmacy, and one which it was their duty and privilege to maintain. Referring to the founders of the North British Branch, he said that one of them was so inseparably linked with the Society which he had so long and ably served, that the name of Mackay had become synonymous with the Pharmaceutical Society all over Scotland and beyond it. In speaking of the North British Branch they were naturally led to turn their thoughts to those subjects which interested British pharmacists generally, and foremost amongst these they might put the appeal which had been decided against them in the House of Lords, and the action to which that result had led. Referring to the Pharmacy Act Amendment Bill he said that the Council in London went completely out of its way in making an attempt, in the first clause of that Bill to denationalize the Scotch board of examiners. While their English friends had been kind enough to suggest that the opposition of Scotch chemists to this clause proceeded from stupid clannishness, he thought there were at least three good reasons why the change should not have been attempted. Firstly, it was entirely uncalled for; secondly, it was repugnant to those feelings of sturdy independence which form a prominent characteristic of Scotchmen; and thirdly, they feared a revival of that spirit of centralization which threatened, at one time, to deprive them of a council and board of examiners altogether. In these and other things to which he referred, they looked to the North British Branch to guard their interests, and they believed it would not disappoint them. He deeply regretted that owing to the serious illness of Mr. Mackay, Mr. Stenhouse could not be present that night, and he was denied the expected pleasure of coupling this toast with his name.

The toast was briefly acknowledged by Mr. D. Maclaren.

The other toasts were "The Office Bearers," by Dr. Craig; "Pharmaceutists," by Mr. Hutton; "The Ladies," by Mr. Thomson; "The Chairman and Croupiers," by Mr. Edington.

The evening's proceedings were enlivened by numerous songs and recitations by members of the Association and friends.

OLDHAM CHEMISTS' ASSISTANTS AND APPRENTICES' ASSOCIATION.

A meeting of this Association was held in the Church Institute, Oldham, on Monday evening, May 2, Mr. Bambridge, President, in the chair. After the minutes of the preceding meeting had been read and accepted, the President called upon Mr. Blanche to deliver his second lecture on "The Teeth."

In commencing, Mr. Blanche briefly recapitulated the substance of his preceding lecture, afterwards entering more fully into the description of the minute structure of the tooth, the diseases to which it is liable, and the conservative and radical treatment of the same. Mr. Blanche also gave a short account of the various amalgams and tooth-stoppings used by dentists, showing their composition and virtues, and the drawbacks attending the use of some of them.

Mr. Watts proposed a vote of thanks to Mr. Blanche for his interesting lecture, the motion being seconded by Mr. Heathcote and unanimously adopted.

NORTHAMPTON PHARMACEUTICAL ASSOCIATION.

The closing meeting of the session was held at the School of Pharmacy, College Street, on Tuesday, May 10, 1881, the President, Mr. G. C. Osborne in the chair.

The accounts having been audited and found correct,

The Vice-President, Mr. J. Hayllar, read an exceedingly interesting and instructive paper on "Dialysed Iron." A short discussion followed, after which a cordial vote of thanks was passed for the paper. This paper was the second of a series commenced a month ago, when the President read a very instructive one on "The Microscope," describing its construction and optical principles, and illustrating it by diagrams and figures.

The Chairman next gave a short *résumé* of the session, stating that fair progress had been made in all subjects. He said he should be very pleased to meet the members occasionally during the summer for botany classes. He also said that the society was much indebted to Messrs. Southall, Brothers, and Barclay for kindly presenting one of their materia medica cabinets, which would be very useful.

A vote of thanks to the officers brought the meeting to a close.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, May 5, Dr. Roscoe, President, in the chair.

The following certificates were read for the first time —G. H. Bostock, W. Bedford, J. M. Collett, A. E. Davies, J. E. Doyle, C. W. Marsh, A. Philip.

During the evening a ballot was held and the following gentlemen were declared by the scrutators, Dr. Hugo Müller and Professor McLeod, to be duly elected Fellows of the Society:—A. J. Anderson, F. J. O. Farroll, T. R. Ord, G. E. Robinson, A. J. Shilton, W. R. Smith, F. P. Venable, G. H. With.

The following papers were read—

On the Action of Humic Acid on Atmospheric Nitrogen. By E. W. Prevost.—The author has repeated the three following experiments of E. Simon (*Landw. Vers. Stats.*, xviii.):—(1) Humic acid and water were sealed up in a tube containing nitrogen. (2) Nitrogen was passed for twelve hours through a Liebig's potash bulb containing water and humic acid. (3) Humic acid and water were placed in an ordinary flask whose mouth was closed by a caoutchouc stopper. In all these experiments, Simon states that perceptible quantities of ammonia were formed. The author was unable to confirm this statement; in only one case was any formation of ammonia observed. In this experiment 3 grams of humic acid were hermetically sealed in a glass tube with 20 c.c. of water and 76·6 c.c. of air, and exposed to the light for eighteen months; at the end of that time the water contained ammonia equal to 0·19 c.c. of nitrogen. The author used two samples of humic acid, one purchased from Hopkin and Williams, the other prepared by himself from peat. The humic acid was not soluble in water.

Dr. Gilbert said that he was disposed to agree with the conclusions of Dr. Prevost that there was at present no proof of the absorption of nitrogen from the air by ordinary soils. With cereal crops 20 lbs. of nitrogen could be taken out of a soil per acre, and then a distinct decrease in the nitrogen in the soil could be noticed by analysis; but in the case of the leguminosæ the case was not so clear. For instance, 200 lbs. of nitrogen could be removed per acre with a clover crop, and yet not only was there no decrease in the nitrogen of the soil, but in the surface soil an increase could be proved, after the removal of the crop. Where this increase came from had not yet been satisfactorily settled. One theory was that it came from the nitrogen in the air; another that the wide-spreading clover roots abstracted the nitrogen from a considerable depth of soil; and from the falling leaves, etc., the nitrogen in the surface soil increased. It must also be considered that there was some difficulty in getting a fair sample of the soil, and that the quantity of combined nitrogen in an acre of ordinary soil 4 feet 6 inches deep was enormous (about 10,000 lbs), as compared to the above quantities; again, although clover crops are to a certain extent indifferent to nitrogen they do not get on in a soil where there is no nitrogen.

On the Active and Inactive Amylamines corresponding to the Active and Inactive Alcohols of Fermentation. By R. T. Plimpton.—The author has studied these bodies in order to see whether any difference similar to those which distinguish active from inactive amyl alcohol can be detected in their corresponding derivatives. The inactive amylamines were obtained by treating the mixed alcohols with gaseous hydrochloric acid (*Compt. Rend.*, lxxvii., 1021), which first attacks the inactive alcohol; a quantity of inactive amyl chloride was thus procured. The chloride was heated with its own volume of saturated alcoholic solution of ammonia, and the resulting hydrochlorides distilled with potash. The amylamines so obtained were separated by fractionation, etc. Monamylamine, b.p. 96°-97°, had no action on polarized light. Diamylamine, b.p. 185°-186°; the hydrochloride is insoluble in ether. Triamylamine, b.p. 237°; the hydrochloride is soluble in ether. In each case the platinochloride, aurochloride, and the hydrochloride were prepared and examined. Active amylamines.—About 3 litres of the mixed alcohols were distilled in a current of hydrochloric acid for five weeks until the quantity was reduced to 760 grams in a 10 centimetre tube, rotation = 4°. The monamylamine was obtained partly by converting the alcohol into cyanate and cyanurate of amyl and boiling with potash, and partly by heating the bromide to 100° with alcoholic ammonia. A length of 10 centimetres rotated 3° 5′ to 3° 30′ to the left; b.p., 96°-97°; its hydrochloride is deliquescent and its solution rotates feebly to the right. The diamylamine was obtained by heating the active amyl bromide to 130° with its own weight of alcoholic ammonia, b.p. 182°-184°; 10 centimetres rotated 5° 15′ to the right. The hydrochloride is easily soluble in water, alcohol and ether; it is optically more active than the free amine. The triamylamine was obtained by treating the active diamylamine with amyl bromide, b.p. 230°-237°; 10 centimetres rotated 44° 15′ to the right; the auro- and platinochlorides were prepared. The salts of the active amylamines differ from their inactive isomers in being deliquescent and difficult to crystallize; they are also more soluble, The inactive salts on the other hand crystallize well. The boiling points and specific gravities also differ slightly. A Cornu polariscope was used, and the rotation is given for the yellow-ray.

On the Action of Sodium Alcoholates on Fumaric Ethers. By T. Purdie.—Wislicenus long since investigated the action of the alkali metals on ethyl fumarate. Sodium had no action at ordinary temperatures, but potassium acted vigorously, producing, however, such a complicated reaction as to offer but little prospect of elucidation. More recently, by the action of sodium ethylate in alcoholic solution and subsequent addition of methyl iodide, a dibasic acid was obtained, which had the formula $C_8H_{10}O_5$. The author has undertaken this research to determine the constitution and mode of formation of this acid. The fumaric acid was prepared in the usual manner from malic acid. The ethylic ether was prepared in three different ways:—By leading hydrochloric acid gas into a mixture of alcohol and acid; by treating the acid with sulphuric acid and alcohol; by the action of silver fumarate on ethyl iodide. The first method is attended with certain disadvantages. The action of sodium ethylate and methyl iodide on ethyl fumarate was conducted according to the well-known method used at Würzburg in the preparation of the organic disubstituted aceto-acetic ethers. At first two molecules of methyl iodide were used to two atoms of sodium and one molecule of ethyl fumarate; finally half the quantity of sodium and methyl iodide was used in order to secure a better yield. The mixture was heated for twenty minutes, when it had a neutral reaction. On the addition of water an oil separated, boiling at 225°; it proved to be the acid $C_8H_{10}O_5$; it was converted into a lead salt which was decomposed by sulphuretted hydrogen. The pure acid, crystallized *in vacuo*, melted at 86°. When ethyl iodide was substituted for methyl iodide, in the above reaction the same acid was obtained. Finally the action of sodium ethylate alone on ethyl fumarate was studied; the same acid was produced. Subsequent investigation confirmed the view that it was an ethyl ether malic acid $\left\{\begin{array}{l}CH(C_2H_5)COOH\\CH_2COOH\end{array}\right.$ isomeric with Desmondesir's monethyl malate. The author has studied its properties and formed its calcium, barium and silver salts. The action of sodium isobutylate on isobutyl fumarate was investigated in a similar way. Isobutyl malic acid $\left\{\begin{array}{l}CH(OC_4H_9)COOH\\CH_2COOH\end{array}\right.$ was obtained and its salts studied. When sodium ethylate free from alcohol is added to ethyl fumarate an addition product is apparently formed, from which possibly by the addition of alcohol iodide the synthesis of homologous acids might be effected. The author promises further research on this subject.

On the Products of the Action of Alkalies on Ethylic β Ethylaceto Succinate. By L. T. Thorne.—By the action of strong potash, an ethyl succinic acid was obtained identical with that prepared from α ethylacetosuccinic ether. When, however, weak (5 per cent.) potash solution was used α ethyl-β-aceto propionic acid was formed, which on attempted distillation gave off water, a new substance $C_7H_{10}O_2$ being at the same time formed. This substance is a colourless oily liquid, with neutral reaction and pleasant smell, boiling at 219°, vapour density 5·014. The author hopes to be able to resume the investigation and settle the constitution of this substance, which he therefore leaves unnamed.

On some Carbazol Compounds. By E. H. Rennie and W. R. Hodgkinson.—The authors have studied the action of potassium carbazol (obtained by dropping potassium into melted carbazol) on ethylchlorocarbonate; white crystals were obtained having the formula $(C_6H_4)_2NCOOC_2H_5$. The substance may be looked upon as a new urethane.

The Society then adjourned to May 19, when the following papers will be read:—"On the Reaction between Hydrogen and Nitric Oxide in the Presence of Spongy Platinum," by Lewis T. Wright; "A Method for the Ready Estimation of a Soluble Sulphide and Free Sulphurous or Free Sulphuric Acid even in the Presence of Sulphates," by O. V. Pisani.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, May 5, Mr. R. H. Parker, Vice-President, in the chair.

A paper was read by Mr. T. Lewis on "Ozone," in which he stated that as far back as the year 1785 a peculiar phosphorus-like odour was observed by Van Marum, during the electric discharge through air, no investigation, however, of the odour having taken place until the year 1840, when Schonbein's attention was attracted to it. He found that the odoriferous principle thus obtained could be preserved in well-stoppered bottles for a lengthened period. To this odour he soon after gave the name of ozone. Some time during the following year, Schonbein obtained ozone by the action of phosphorus on moist air; besides which, Marignac and certain other French chemists obtained it by passing silent electrical discharges into perfectly pure and dry oxygen. The researches into its constitution were then treated of, and the different theories concerning its composition, some of the latter being at various times that it was a compound of H and O, others that it was a body analogous to chlorine, and, again, that it was oxygen in an electrified condition. The constitution of ozone, however, was shown to have been finally determined by Andrews in 1856, who proved that "ozone from whatever source produced was one and the same body, having identical properties, and is not a compound body, but oxygen in an altered or allotropic condition." The relation between oxygen and ozone was then referred to, which was shown to be, that in the formation of ozone three volumes of oxygen condense to form two volumes of ozone, thus:—$3O_2=2O_3$, this result being obtained from the experiments of Andrews, Tait, Soret and Brodie. "Atmospheric ozone" was then treated of, it being found, on the evidence of Houseau, that ozone is a constituent of the atmosphere. Attention was then drawn to the controversy which had been proceeding for some years, as to what are the compounds which are produced by the action of phosphorus on moist air, some chemists having held the opinion that ozone was alone formed; others that peroxide of hydrogen was alone produced; Leeds having now, however, found that not only is ozone formed, but also H_2O_2 and NH_4NO_2. Besides this, Leeds had determined that the white cloud which is perceived when phosphorus acts on moist air, and which was the antozone of Schonbein, consisted of H_2O_2 in a vesicular condition, and in that state insoluble in water. Reference was also made to the recent work of Hautefeuille and Chappuis in connection with this body, these chemists having condensed ozonized oxygen at a pressure of thirty-seven atmospheres and a cold of −23° C., finding on removing the pressure that signs of liquefaction appeared; besides this, they observed that, in a condensed state, ozone is an indigo-blue gas, from which it has been inferred that the blue colour of the atmosphere is due to ozone. Confirmatory evidence has been obtained by Hartley, founded on the fact that the ultra-violet rays of the spectrum were absorbed by ozone.

A discussion followed the reading of the paper, in which the Chairman, Secretary, Messrs. Branson, James and Thompson took part.

A vote of thanks was passed to Mr. Lewis for his paper.

Mr. David Hooper then gave his Report on Botany, taking for his subject, "The Coffee Leaf Disease." The author commenced by giving some interesting facts connected with the history of the disease since it first appeared in Ceylon in 1869, and referred to statistics showing the yield and export of coffee, and the pecuniary loss to enterprizers owing to the pest. The general character of the disease was noticed. It was effected by a parasitic fungus—the *Hemileia vastatrix* (B. and Br.); its different appearance at certain seasons of the year was explained. In "the botanical examination of the fungus," the *Hemileia*, with its sporanges, cells, conidia and mycelium, both in its ordinary and "filamentous stage," was described, according to the investigations of Messrs. Abbay and Morris. The report concluded with a review of the remedial measures that have been adopted, either for the purpose of destroying the disease or preventing its spread. The application of sulphur and lime and the extended cultivation of other plants, as tea and cinchona, in the coffee estates, seem to have been the most successful.

The paper was illustrated by diagrams, representing a diseased leaf, portion of cuticle, and the fungus in different periods of germination.

After a discussion upon this paper, the meeting adjourned.

Parliamentary and Law Proceedings.

THE THEFT OF MEDICAL STORES FROM THE ROYAL MARINE BARRACKS.

At the Devon and Cornwall Assizes, held before Mr. Justice Manisty, at Exeter, on Tuesday last, George Prout, 38, private Royal Marines, and Samuel Sprague, marine store dealer, on bail, were indicted for stealing one drum of cod liver oil, one drum of castor oil, one jar of phosphorized oil, and eight rolls of plaster, the goods and chattels of the Crown, at the Royal Marine Barracks, Stonehouse, on April 6. Mr. Mackonochie prosecuted; Mr. Clark defended Sprague. Prout pleaded guilty. The case against Sprague, who was suffering from a painful obstruction in his throat, and breathed with difficulty through a tube, was then proceeded with. The particulars have already appeared in this Journal.

Fleet-Surgeon Loney, attached to the Royal Marines, Plymouth Division, and in charge of the Royal Marine Infirmary; Corporal Denby, dispenser at the Infirmary; and Mr. P. C. Maitland, chemist, of Chapel Street, Stonehouse, were called.

Mr. Maitland said when Sprague asked him to buy some cod liver and castor oil he asked him where he got it from, and he said he bought it with other things from a large passenger ship in the docks. He then asked Sprague whether the man he bought it from had a right to sell it, and he said "Yes." Sprague, however, came three times before he bought these things, and on the third time Prout came with him. He agreed to buy the castor oil at 4*d.* per pound.

Mr. Clark, cross-examining: Before the magistrates did you not say you gave him 3*d.* per pound?

Witness: Oh, yes, I recollect now; he asked 4*d.*

Re-examined: When I came to buy the lot I gave 37*s.* for it.

To the Judge: I got the phosphorized oil and the plaster into the bargain.

Police Constable Michael Egan deposed that when he was removing the prisoners to the prison, Sprague told Prout that he must say he told him he got the goods from a ship in the docks; and afterwards, when the question of what they should get came up, Sprague said "five years at least," but Prout guessed "six months."

Cross-examined by Mr. Clark: Did not Sprague say anything about his innocence?

Witness: Not a word.

Mr. Clark: Did he not say if he was punished he would be punished innocently?

Witness: No.

Mr. Mackonochie, in summing up for the prosecution, called attention to the fact that the prisoner had made a statement with reference to his possession of the goods, which he had not attempted to substantiate; which, therefore, they might take to be a false account, and which, further, they might conclude was evidence of guilty knowledge.

His Lordship, in reply to Mr. Clark, said he did not think there was any evidence of stealing against the prisoner, and he might confine himself to the charge of feloniously receiving.

Mr. Clark, addressing the jury for the defence, said it was almost an outrage on common sense that Government officials should come there and say "We have a large amount of property in our possession, but we cannot identify it." If there had been any Government mark upon it, Sprague might more reasonably have been assumed to have known the goods were stolen. Mr. Clark proceeded to allude to Mr. Maitland's evidence, which, he said, differed in the number of times the prisoner visited him and the sum per pound he gave him for the goods from the evidence he gave before the magistrates, and on that account, Mr. Clark said, if Sprague were guilty of receiving, Maitland was more guilty of receiving.

His Lordship, in summing up, said observations had been made, and he was not surprised at it, which went to suggest that Maitland was mixed up in this affair, and really guilty of receiving these goods under circumstances which ought to have led him to believe the persons he dealt with had not come honestly by the goods. But, of course, he need not say that the fact of Maitland being guilty of that misconduct, if it were a fact, did not make the case any better as regarded Sprague. The jury must remember they had evidence that Sprague was going to divide the proceeds, and the goods were sold at a price far below their value, which was always a suspicious circumstance. The jury must feel sympathy for a man who was in the grievous bodily condition of the prisoner; but they must leave that matter to his (the judge's) consideration. That must not affect their minds. They must simply try the case according to the evidence, and whatever be the consequences, if they should be constrained to come to the conclusion that the prisoner took part in this matter knowing the goods to have been stolen, their duty would be to convict him. If Maitland had a suspicion that the goods were not honestly come by, the same observation exactly would apply to Sprague.

The jury, after a few minutes' consultation, found a verdict of guilty, but recommended the prisoner to mercy on account of his bodily infirmity.

His Lordship said he was inclined not to pass sentence, provided the prisoner's sureties would become bail for his appearing when called upon.

Mr. T. C. Brian, the prisoner's solicitor, said that he would become bail temporarily for the prisoner.

The recognizances were then entered into and the prisoner discharged. Sentence upon Prout was deferred. —*Western Morning News.*

Poisoning by Arsenic.

At the Plymouth Police Court on Friday, May 6, before Mr. J. F. Fortescue, borough magistrate, Henry Hillman, a cooper, was brought up in custody and charged with having attempted to commit suicide by taking a quantity of arsenic.

Prisoner admitted the offence, but pleaded, as an excuse, that he had been drinking heavily of late. In answer to the magistrates' clerk, prisoner said that he went to Mr. Greenhill's arsenic works, Calstock, a few days ago to seek work, and whilst there put a quantity of arsenic, which was lying about on the floor, in his pocket. Prisoner was remanded.

Poisoning by Cyanide of Potassium.

On Wednesday, an inquest was held at Margate on the body of William Saunders, a pensioner, formerly sergeant in a hussar regiment. He had been unfortunate in trade since he had left the army, and had given a bill of sale, under which his furniture had been sold. A deficit remained, however, for which he was pressed. He became depressed, and killed himself on Tuesday with cyanide of potassium, obtained from a chemist who did not enter the sale in the poison book. A verdict of suicide whilst of unsound mind was returned, the chemist being informed that he had infringed the Act of Parliament.—*Daily Telegraph.*

Obituary.

Notice has been received of the death of the following:—

On the 5th of March, 1881, Mr. John Knight, Chemist and Druggist, Market Place, Cambridge. Aged 78 years.

On the 23rd of April, 1881, Mr. Martin Penning Colk, Chemist and Druggist, Bishop's Road, Paddington. Aged 69 years.

BOOKS, PAMPHLETS, ETC., RECEIVED.

Inorganic Chemistry: adapted for Students in the Elementary Classes of the Science and Art Department. By Dr. W. B. Kemshead, F.R.A.S., F.G.S., etc. Enlarged edition. London and Glasgow: W. Collins and Co. 1881. From the Publishers.

Proceedings of the American Pharmaceutical Association at the Twenty-Eighth Meeting, held in Saratoga Springs, N.Y., September, 1880; also the Constitution, Bye-laws, and Roll of Members. Philadelphia. 1881.

The History of Salt; with Observations on its Geographical Distribution, Geological Formation, and Medicinal and Dietetic Properties. By Evan Marlett Boddy, F.R.C.S., F.S.S., etc. London: Baillière, Tindall and Cox. 1881. From the Publishers.

Maladies Cancereuses. Observations par le Dr. Gérard Von Schmitt. Paris: Leclerc. 1881. From the Author.

The Study of Botany, with a Sketch of the History of the Science. By William Southall, F.L.S. Birmingham. 1881.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[529]. Tinct. Iodi Decolorat.—The mention of the German Pharmacopœia formula which contains hyposulphite of soda may induce some dispenser to attempt the extemporaneous preparation of this application by the use of hyposulphite alone.

Tincture of iodine treated with about 5 per cent. of this salt will be decolorized almost immediately, to the satisfaction of the operator; but, in the course of a day or two the compound will develop into an abominable mess, of which precipitated sulphur and sulphuretted hydrogen will be the most evident constituents.

The patient's anxiety to know what this means will scarcely be dispelled by the most bland and lucid explanation of the chemical action which has taken place, even if illustrated by equations and diagrams. To prevent such a *contretemps* (it is not an imaginary one) I write this caution.

It is not generally known how small a proportion of ammonia is necessary to produce a colourless solution of iodine, if sufficient time be allowed for the combination to be effected. I have found that about 2 fluid drachms of liq. ammon. fort. sufficed for 4 fluid ounces of tinct. iodi, B.P., and that 2 drachms of iodine dissolved in 3 fluid ounces of spirit were decolorized by the same quantity. These preparations have but a faint smell of free ammonia, and are unchangeable. As there is but little demand for them we find no difficulty in keeping a sufficiency ready for use.

Clifton. JAS. W. WHITE.

[540]. "Country Chemist" was quite right in what he did, as probably the intention of the prescriber was "emulsio ol. morrhuæ," but on account of the various ingredients he called it more correctly emuls. ol. morrhuæ co.

"374."

[541]. I shall feel obliged if anyone will inform me how to dispense the following mixture so as to make a nice looking mixture or emulsion that will not separate:—

℞	Potass. Bicarb.	ʒij.
	Ol. Olivæ	℥j.
	Gum. Acac.	ʒij.
	Aquæ	ad ℥viij.

M. Ft. mist. ℥j. pro dosis.

W. C. W.

[542]. The following is a copy of a prescription received yesterday:—

℞	Bismuth. Carb.	ʒj.
	Ammon. Carb.	ʒj.
	P. Tragac.	ʒss.
	Aq.	ad ℥vj.

It was dispensed as written. It had been prepared elsewhere, and was then much thinner. I should be glad of your opinion as to whether p. tragac. co. or p. tragac. should be used.

TICK.

[543]. Will any reader tell "Country Chemist" the best mode of dispensing the following prescription, as the ingredients when combined deliquesce:—

℞	Acid. Carbolic.	gr. j.
	Acid. Salicylic.	gr. j.
	Codeiæ	gr. ½.
	Ext. Rhei	gr. ij.

M. Ft. pil. sec. art. Mitte xviij. One pill twice a day.

[544].

℞	Acid. Nitro-Mur.	ʒj.
	Mur. Ammon.	ʒij.
	Tinct. Nucis Vom.	ʒij.
	Liq. Taraxaci	ad ℥iij.

Sig. coch. min. j. ex aqua ante cibo ter die.

Would the dispenser be justified in dispensing acid. nitro-mur. dil. or aqua regia, as is written?

W. LYLE.

[545]. Would any reader acquaint me whether the annexed prescription is a consistent one, and would an assistant be authorized to refuse to dispense it? viz.:—

℞	Acid. Sulph. Dil.	ʒiv.
	Potassæ Chloratis	ʒij.
	Aquæ	ad ℥x.

Ft. gargar. Mix.

INQUIRER.

[546]. Could any of your readers give me any information as to the best way of making the pill mass for the following pills?—

℞	Ferri Iodidi	ʒij.
	Strychniæ Sulphatis	gr. j.
	Pil. Phosphori	ʒj.
	Acid. Carbolici	ʒss.
	Ceræ Albæ	q.s.

M. In pil. lx. dividenda. Capiat unam ter in die post cibum. (In phiala vitria servenda).

[547].

℞	Stychniæ Sulphatis	gr. j.
	Acidi Carbolici	ʒss.
	Extracti Aloes Aquosi	ʒj.

M. In pil. xx. dividenda. Capiat unam hora somni pro re natâ. (In phiala vitria servenda). Sign. The aperient pills.

INQUIRER.

[548]. Is vaseline a suitable basis for the so-called hypochlorite of sulphur ointment? That such a preparation keeps well to all outward appearance I know, but is any substitution paraffin product formed, and if so, is such product prejudicial therapeutically?

VASELINE.

[549]. Is the following prescription intended for a ℥vj mixture, and should it be dispensed as such?—

℞	Inf. Rhei,	
	Inf. Calumb.	āā ℥iij.
	Vin. Ipecac.	♏x.
	Sp. Ammon. Ar.	ʒiss.
	Tr. Calumb.	ʒij.
	Tr. Gent. Co.	ʒij.
	Pot. Bicarb.	ʒj.

M. Capt. ℥j ex aq. post prand.

CYMRO.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE BENEVOLENT FUND.

Sir,—Like your correspondent Mr. Bevan, I was the subject of a reminder accompanied by the appeal on behalf of the Benevolent Fund, to which I have been a subscriber for many years. The facts contained in the appeal led me to conclude that there must be something wrong in the rules governing the work of the Fund to account for such a manifest failure; I, therefore, withheld my usual contribution. It is quite clear that the scheme, as worked, has not commended itself to chemists generally. When first established, both the subscriptions and the proposed aid were, I presume, confined to pharmaceutical chemists, except what was given by wholesale houses, and I think that the throwing open the Fund to the larger body should not have been done without such alterations in the rules as would have ensured a corresponding increase in the amount of support. But I fail to see how the suggestions of you correspondents would meet the difficulty. I have great faith in personal effort, and if all the Local Secretaries felt that they could give the scheme their earnest support, no doubt but much might be done; such, however, does not appear to be the case. About a hundred of the Secretaries are not themselves subscribers to the Fund, while nearly half that number of towns having secretaries contribute nothing whatever.

Standing pretty much alone, I have continued my subscription without thinking, but I could not with a knowledge of the facts have solicited contributions from others. Mr. Bevan's first suggestion has nothing "benevolent" in it and must be dismissed as beside the mark; the second is a joke; the third looks splendid, but it is too splendid for continuous working.

The question then is, what is to be done?

In the first place I would say, let the "benevolent" character of the Fund be fully maintained; but I have always felt that the best service rendered is that which assists others to help themselves. It appears that there are more than thirteen thousand chemists on the Register, any one of whom would be entitled to aid if needed, and the Fund would admit of it; and yet only about two thousand contribute anything at all, the average contributions of these being nearly 9*s*. 6*d*. per annum, but for the total number on the Register it is less than 1*s*. 6*d*. This is manifestly absurd, and is, I am persuaded, only to be remedied by a very simple alteration in the rules. Let it be decided, and made known, that no person now in business, or entering into business who did not within the first year become a subscriber to the Fund of at least 5*s*. per annum, should hereafter be allowed to receive any assistance, and there would be no need to solicit subscriptions, but there would be a steady influx of cash, not to the extent of £20,000 per annum, and not perhaps £10,000, but the income would be raised to £4000 or £5000 per annum; this would warrant the number of annuitants being very nearly doubled from the list of those who have been receiving grants, and do a great many other things which I cannot enumerate now. But I must not lengthen my epistle except to say that I do not propose to give to subscribers any greater *rights* than they have now, but simply to shut out such as failed to contribute.

Torpoint, Cornwall. R. H. Down.

Education and Examination.

Sir,—The report of the Committee on the examinations has given me great satisfaction. The bulwark of the Pharmaceutical Society is the examination room.

That a change was imperative, a convincing argument, if one more were required, is supplied by Mr. Wills's letter; he has no desire to alter matters in this direction.

Dr. Greenhow goes to the other extreme, which though right enough in principle would, in my opinion, be a serious drawback to every young man passing his examination without having made the very gratifying acquaintance of the learned Professors of our, and similar schools. A really good course of lectures leaves its mark on a young man for life. It does for his mind very much what those useful divisions do to a writing table; it enables him to pigeonhole his facts, and establish a mental order.

He will come across in his every-day life a good many scientific waste paper baskets, and he will find his mental order of incalculable benefit. After all that is the real protection, a something that protects itself. Registration is merely a secondary matter, and those who are so anxious to draw the line are very near it.

Given an array of skirmishers throughout the country, well versed in the routine of our business, really practical men, with a good knowledge of natural laws, and of the correlation of forces, and they will require very little protection, either from the Pharmaceutical Society or the State. State recognition must follow, but it will be an evil day for all of us if it anticipates.

79, Grosvenor Road, Highbury, N. George Mee.

Pharmaceutical Titles.

Sir,—Whilst the subject of pharmaceutical titles is being considered, I should like to ask whether it would not be possible to secure that of "pharmaceutical apothecary." The word "apothecary" signifies "a compounder of medicine," and is therefore a most appropriate, as well as an ancient and an honourable appellation, whilst the prefix "pharmaceutical" would distinguish "Major" men from licentiates of the Society, who might be called "medical apothecaries." But there would be little danger of misleading the public, because few are aware that any qualification to practise medicine is indicated by the title in question. I hope that the matter will not be allowed to drop, but that those in authority will introduce some change for the better, even if they pass by the humble suggestion of

Pater Æneas.

Microscopes for Use of Students.

Sir,—I notice with much pleasure that the suggestion of a member has been acted upon, and that a couple of microscopes have been placed by the Council in the Library for the use of students. Might I venture to suggest that members and others interested in microscopy be invited to send slides of objects of pharmaceutical interest for use with these microscopes? Sections of drugs would, I should think, be especially appreciated, particularly those illustrative of papers read before the Society.

St. John's Wood. Wm. Hy. Symons.

Note on the so-called "Allotropic" Gum Arabic.

Sir,—There is a variety of gum arabic at present in the market which is imported from the port of Alexandria, and most probably collected in the Soudan. As there is some difficulty experienced in preparing a mucilage for pharmacopœial purposes with this gum, on account of it forming a ropy or semi-gelatinoid mass when placed in water, it has by some been attributed to an allotropic condition of the gum, which I am inclined to believe is a mistake; this conclusion is arrived at from the following series of experiments which were carried out with a sample of this gum.

Eight ounces of the gum were placed in a vessel with 12 fluid ounces of distilled water; this was frequently stirred, and after the lapse of two days it had assumed a jelly-like consistency. This gelatinous mass was placed in an evaporating dish, and heated to a temperature approaching 220° F., for ten minutes, without effecting the fluidity of the mass, which adhered firmly to the stirring rod. To a portion of the mass a small quantity of liquor potassæ, diluted with distilled water, was added, and after a short time this became in appearance and consistency like ordinary B.P. mucilage. Placing this aside, a second quantity was commenced with afresh, but the vessel was placed near a fire with the temperature averaging 90° for twelve hours, the result being a liquid, nearly resembling the mucilage of the Pharmacopœia, but containing numerous nodular masses still remaining undissolved; a quantity of liquor potassæ was added, which soon effected complete solution. Believing this gelatinous consistency was caused by a deficiency of mineral constituents in the gum, a third batch was commenced, but instead of using all distilled water, one-half was substituted by liquor calcis, and after twelve hours' standing and repeated stirring, there remained a liquid having all the appearance and characters of pharmacopœial mucilage.

From the above it will be seen that solution was easily effected by the addition of an alkali or alkaline earth without the agency of heat; therefore, this leads me to believe that the peculiarity of this variety of gum is due, not to a state of allotropism, but to a difference in its chemical constitution, and that it contains a larger amount of arabin or arabic acid than ordinary gum, which is the cause of it assuming a jelly-like consistency when placed in water, and that the partial solution of this gum after remaining for some time at a temperature of 90° is caused by the formation of a higher acid salt of calcium. Is it not probable that this gum, although yielded by a species of *Acacia*, is altered in constitution by some climatic circumstance?

W. Watson Will.

Chemical Food.

Sir,—In your "Parliamentary and Law Proceedings" columns of a recent issue, I notice the case of conviction for sale of indifferent "chemical food," and although not desirous of being accredited with the defence of the manufacture and sale of inferior preparations, yet I cannot but express a hope that the standard of this article may not be fixed on the limits stated by the analyst in the case, viz., 2½ grains phosphate lime, and 1 grain phosphate iron (please observe I reverse the figures, which in your notice stand 2½ grains phosphate iron, and 1 grain phosphate lime).

In order to support this argument with more tangible evidence, let us refer to the original formula of Professor Parrish, published in Parrish's 'Practical Pharmacy,' where we find the following:—

Take of—

Protosulphate Iron	ʒx.
Phosphate Sodium	ʒxij.
Phosphate Calcium	ʒxij.
Phosphoric Acid Glacial	ʒxx.
Carbonate of Sodium	℈ij.
Carbonate of Potassium	ʒj.
Muriatic Acid,	
Water of Ammonia	āā q.s.
Powdered Cochineal	ʒij.
Water	q.s.
Sugar	2½ lbs. Troy.
Orange Flower Water	℥j.

"Dissolve the sulphate of iron in ℥ij of boiling water, and the phosphate sodium in ℥iv of boiling water. Mix the solutions and wash the precipitated phosphate of iron till washings are tasteless. Dissolve the phosphate calcium in 4 fluid ounces of boiling water and q.s. HCl. to make a clear solution when cool; precipitate with liq. ammon., and wash the precipitate. To the freshly precipitated phosphate as thus prepared add the phosphoric acid previously dissolved in water; when clear add the carbonates soda and potash previously dissolved in water and HCl q.s. to dissolve any precipitate. Now dilute with water till it measures 22 fluid ounces; add the sugar, and towards the last the cochineal. Dissolve by the aid of heat, strain, and when cold add the aq. aurantii.

"As thus made each teaspoonful contains about 2½ grains of phosphate of calcium, 1 grain of phosphate of iron, with fractions of a grain of phosphates of sodium and potassium."

Now on calculating the phosphate of iron yielded by the said amount of sulphate of iron, we find it to be 257½ grains, which in the total syrup would equal 0·71 grain in a fluid drachm, supposing all the sulphate to have been converted into insoluble phosphate of protoxide iron, which, however, is by no means the case, for owing to the solubility of the phosphate in the sulphuric acid produced in the reaction, actually in practice only 180 grains are obtained, which calculated to syrup gives 0·5 grain per fluid drachm! So much for the strength in iron.

Again, as regards the lime element, we find it to be on calculation to syrup, only 2 grains in a drachm; this error, coupled with the discrepancy arising from the varying amounts of moisture present in the calcium phosphate of commerce, probably brings the proportion of this ingredient to a maximum of 1½ grain in a drachm.

So really we see the standard has been accepted (for the case in point at any rate) without the examination in detail which certainly should have preceded such acceptance; for although Parrish himself states that chemical food contains the above stated proportions, yet I think this statement is unquestionably founded on miscalculation of results, and as such ought to be discarded for the formula he gives us for the preparation of the speciality which bears his name.

Not only *so*, but such a high strength of phosphates in a syrup, requiring as it does a large excess of acid phosphoric to keep these in solution, renders it disagreeably acid to taste, which, I think, is a decided inconvenience and disadvantage.

In conclusion, I ask permission to recommend that the standard be fixed at ½ grain ferrous phosphate and 2 grains calcium phosphate per fluid drachm, and in this opinion I venture to think I am not isolated.

Birmingham. ALFRED E. ROBINSON.

BALANCES.

Sir,—I am glad to see that the subject of pharmaceutical balances is occupying some attention just now.

I have often been surprised to find so much care bestowed on other matters in the pharmacy and the balance altogether overlooked; at any rate if it would turn at ¼ grain it was considered pretty accurate.

The balances now used are liable to atmospheric action to such an extent that frequent cleaning is necessary, which soon puts them out of order by twisting the centres and clogging them with dust; possibly this might be prevented by boxing in the centres, and the atmospheric action by nickel plating.

I trust that a practical result will follow the discussion of the question, and that some maker will produce a reliable balance for dispensing and general pharmaceutical purposes, at a moderate cost.

591, Old Kent Road, S.E. W. GREIS.

THE BUOTT FUND.

Sir,—May I again request a little space to acknowledge the result of my last appeal on behalf of old Mr. Buott, and to express my sincere thanks, and his also, for the generous help afforded him? The seven first items on the annexed list are parts of the sum received before I pleaded in my last letter for nineteen promises of one shilling a week to add to my own weekly dole. To this latter appeal I have received about twelve most willing responses, and also several sums which have enabled me to pay weekly to Mr. Buott's daughter—who is constant in her attendance on her father—twelve shillings, and sometimes fifteen shillings. It has been necessary to give the larger sum several times, as the poor old gentleman has been seriously ill. He is still confined to his bed, and is extremely feeble, and I am afraid he will not "get about" again.

I trust that his friends will enable me to continue the grateful help thus afforded him, so that the few days, or weeks, that remain to him may be blessed with the dew of Heaven-sent kindness.

295, St. John Street Road, E.C. ROBERT HAMPSON.

	£	s.	d.
George Harvie, Helensburg	0	5	0
Jonathan Jessop, Halifax	0	5	0
E. N. Butt, London	1	1	0
Warrick Brothers, London	2	2	0
Thos. Hyde Hills, London	2	0	0
A Friend. S. C. B.	0	5	0
J. C. A. Kester, Hull	0	2	0
John Ottley, Sheffield	0	13	0
Elizabeth Leech, Fulham	0	15	6
R. H. Foster, Dover	0	2	6
J. Hinds, Coventry	0	18	0
"Bolton" per Wm. Blain, Bolton	0	13	0
William Blain, Bolton	0	13	0
Four Bolton Chemists, subscribed by them at a dinner	1	3	6
Dr. Kernot, Hastings	0	5	0
J. Edisbury, Liverpool	1	0	0
John Woodland, London	1	6	0
L. Tompsett, Manchester	0	15	0
H. D. Anderson, Guernsey	0	15	0
A Friend	0	1	0
C. B. Miller, Blackheath	0	15	0
R. M., London	0	13	0
Benjamin Whitlow, Exmouth	0	13	0
A. W. Gerrard, London	0	5	0
Robert Hampson, London	0	13	0

Errata.—In the list of elections on page 919, Journal 567, "Naysmith, Andrew, Arbroath," should have appeared in the list of Associates in Business instead of Associates. P. 929, col. i., line 21 from top, *for* Thomas, John, Crosswell, *read* Thomas, John, Aberystwith.

Inquirer.—The sections of the Pharmacy Act, 1868, relating to registration of the seller do not apply to the business of wholesale dealers in supplying poisons in the ordinary course of wholesale dealing.

H. H.—Yes. See, for full information on the subject, vol. ix., p. 309 of the present series of this Journal.

F. Carter.—There appears to be a mistake in your statement as to the synonymy given in Attfield's 'Manual.'

J. G. Preston.—The preparation is one, we believe, sent out by Messrs. Corbyn.

G. C.—Use Holmes's 'Botanical Note-Book' until you are familiar with the natural orders, and then Bentham's 'Hand-Book.'

One who has been sold.—We have found it expedient not to publish communications of this kind unless the writer takes the responsibility by adding his name and address. The best protection is to put into practice the old adage, *Caveat emptor.*

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Richards, Hammett, Robardt, Reckless, Vines, Oliver, Haydon, Cutliff, Martin, Brady, Langbeck, Child, Newsholme, Provincial, John, Isca, Desideratum, Quærist, F. H. D.

THE EXHIBITION.

An Exhibition of Chemical and Pharmaceutical Apparatus, Medical Appliances and Drugs and Chemicals of recent introduction, was held in the rooms of the Pharmaceutical Society, on Tuesday, Wednesday and Thursday, the 17th, 18th and 19th of May. Although it was scarcely to be expected that many new objects of interest could be shown after the lapse of only one year, the Exhibition may on the whole be said to have given great satisfaction to the numerous visitors. The display of apparatus was smaller than that of last year, but the rare or new chemicals and drugs were present in much larger number.

Weights and measures have attracted considerable attention of late, and it is, therefore, not surprising to find that balances and dispensing scales formed quite a feature in the Exhibition.

Among the fine series of balances exhibited by Messrs. De Grave, Short and Co., two for dispensing purposes were remarkable for their finish and accuracy, the scales turning to one-tenth of a grain, having an easy slide-pillar motion, a nickel-plated beam and a sight hole for observing the movement of the index with greater facility.

Mr. Stone exhibited some dispensing balances and cheap weights similar to those described by Professor Redwood at a recent Evening Meeting of the Society. The weights being lacquered while hot are described as not liable to be affected by the atmosphere, while the lacquered surface is too hard to be injured by ordinary usage. An assay balance exhibited by the same firm and which carries 100 grains in each pan was stated to have been in use for two years and to be still capable of turning to $\frac{1}{1000}$th of a grain. The improvement in cases for dispensing balances exhibited by Mr. W. H. Symons consisted in the right-hand side of the case being made to open and shut by means of lateral hinges, so as to allow of easier access to the scale pan.

A small, very simple and compact balance, patented by Mr. Gorham, a surgeon at Tunbridge, attracted considerable attention in this department. This instrument somewhat resembles the steelyard in its construction, but differs in having no movable separate weight, the equipoise being furnished by the movable weight of a graduated rod which slides inside the long tubular arm of the balance (see fig. 1). It occupies less space than an ordinary pair of scales, is easily kept in order, there are no weights to lose, and the balance is said to be used with greater facility than the ordinary kind, while it will turn accurately to 1 grain. Each balance is set by a standard analytical hundred grain balance made by Oertling. It might, however, be an improvement for dispensing purposes if the scale pan were made of glass instead of brass, and the scale made to turn to $\frac{1}{10}$th or at least to $\frac{1}{4}$th of a grain.

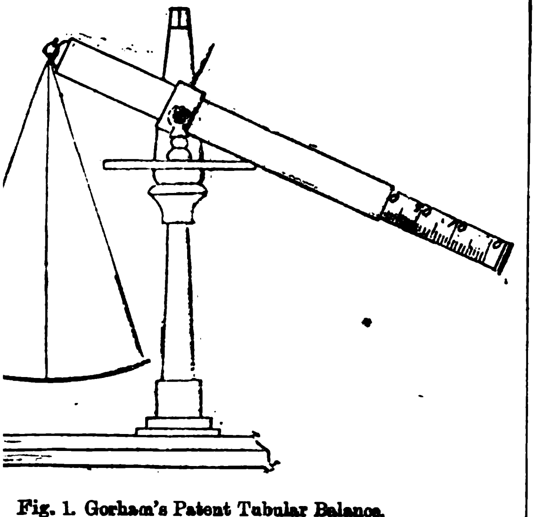

Fig. 1. Gorham's Patent Tubular Balance.

Messrs. Joseph Davis and Co.'s A. B. C. water-testing apparatus consists of a portable set of tests by means of which any person, without special chemical knowledge, can ascertain if water contains any impurities and their nature. It is intended for the use of sanitary inspectors or private gentlemen and farmers who may wish to test the freedom of their drinking water from sewage or other impurities. The handsome shop barometers exhibited by the same firm, by means of a very simple contrivance, consisting of an elongated index arm, are made to point out at the same time the pressure of the atmosphere and the character of the weather in winter and summer on the tables which the index touches, these tables being based upon a series of authentic meteorological observations. As the index is altered when required by a movable key the instrument cannot be tampered with.

Mr. Casella exhibited a handsome Gimingham Sprengel pump, such as is used in making the vacuum tubes used by Crookes in his beautiful experiments. The instrument exhibited, having five fall tubes, naturally produces a vacuum more quickly than one with a less number. The Gimingham blowpipe, used in making the glasswork of the same apparatus, appeared also to excite considerable interest (fig. 2). The extreme ease with which a small or a large blowpipe flame, or a Bunsen flame, can be exchanged the one for the other before the glass has time to cool, the changes being effected in less than a second, render it extremely valuable for laboratory use, in working difficult joints in glass apparatus. This firm also exhibited some clinical thermometers in which a constriction, barely perceptible on the outside of the tube, prevents the mercury index from returning to

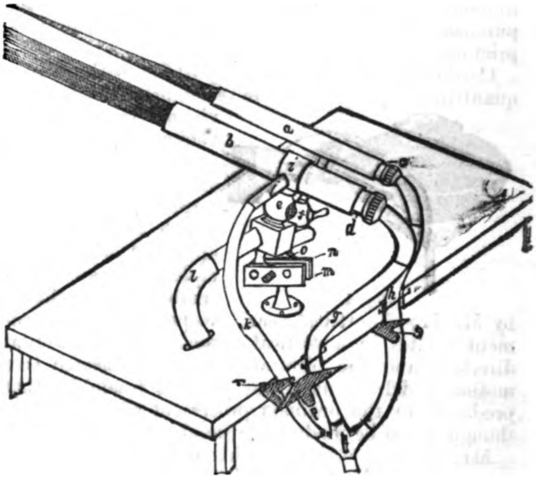

Fig. 2.—The Gimingham Blowpipe.

that in the bulb. Their benzole thermometers for use in retorts for fractional distillation in aniline works, etc., are formed with a somewhat squat bulb so as to be immersed in as small a quantity of liquid as possible.

Messrs. Rae, of Anerley, exhibited some cheap pocket magnifiers suitable for examining "pond life" in botanical excursions, the presence of desmids, diatoms, or infusoria being easily detected by its means.

Messrs. Lejeune and Perken's exhibit contained, besides many other objects of interest, lenses whose curve formed part of a cylinder instead of a sphere, so as to correct astigmatism, *i.e.*, a vision faulty in one direction only. It included, also, Gaiffe's portable medical batteries. In one of these blotting paper moistened with chloride of zinc is placed between a plate of chloride of silver and another of amalgamated zinc; in another, bisulphate of mercury, made into a paste and placed in a zinc box, forms the cell of the battery: so that in either case there is no fluid that can be spilt.

C. Baker and Co., of Holborn, showed Parke's patent microscope lamp, with cooling chamber for the lamp chimney, and a new travelling microscope occupying only a space of 6 by 3 inches by 2 inches deep, as well as a fine series of microscopic slides of urinary deposits.

Mr. E. Wheeler, of Holloway, exhibited a very interesting series of microscopes, together with microscopic apparatus and mounted slides, which proved very interesting to the visitors with microscopical proclivities.

In the Room No. 2, devoted to pharmaceutical apparatus, pill coating machines formed a prominent feature and seemed to indicate that this method of rendering medicines palatable is increasing in favour with the public. Cartner's pill coater was exhibited by Messrs. Bourne and Taylor and Messrs. Harvey, Shepherd and Co. The latter firm, having recently purchased the patent, claim to be the sole proprietors.

Cortie's handy pill coater (fig. 3) for coating small quantities of pills seemed to recommend itself to the visitors from its convenience and moderate price. Messrs. Maw and Son showed a new form of pill coater which seemed much approved of; in principle it somewhat resembles that shown by Mr. Hoddinott last year, except that the instrument rotates in a vertical instead of a horizontal direction and the pills are thereby subjected to a motion which as nearly as possible resembles that produced in the ordinary process of silvering pills, though it can be made more rapid.

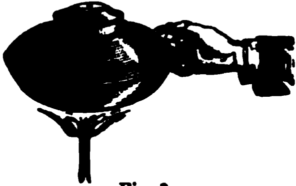

Fig. 3.

Mr. Cocking exhibited his pill piper and pill machine, which evidently interested many of the visitors who had not seen the apparatus before.

Messrs. Burroughs, Wellcome and Co., and Mr. George Burton, both exhibited American drug mills, in which an improvement has been made since the last Exhibition, the stand being made heavier so as to stand firmly and not to require to be fastened to the counter, while the fineness of the teeth which grind the powder has been increased and greater facility has been given of regulating the supply of material and the fineness of the powder. The enterprize screw press showed an improvement over those of last year, in being of stronger make so as to fit it for pressing tinctures.

Messrs. J. Baker's exhibit, besides comprising some of the apparatus shown last year, included the "Hopper" mixing machine, of which only a model was exhibited last year. In this apparatus the powders are first thoroughly mixed in the hopper and then supplied as required by adjusting the apparatus to the sifting instrument beneath, any grit or foreign matter separated by the sieve being easily emptied out by a simple contrivance without disturbing either the powder that is being mixed or the powder that has been sifted. Mr. B. Bracher's "Desideratum" mixers showed several improvements over those of last year, the strength of the larger apparatus having been increased and a fly wheel added, and a side outlet for the powder having been placed in the smaller ones.

Messrs. Maw, Son and Thompson's exhibit included among other objects of interest a nickel plated pill machine, a new form of powder folder which possesses the advantage of not being easily overturned, and palette knives with handles of xylonite. This beautiful material, while whiter than ivory and very hard, is said to have the advantage of not being stained by grease or oil. A small apparatus, somewhat resembling a Papin's digester in miniature, for making small quantities of beef tea for invalids, seemed to present some advantages over the ordinary saucepan, as the liquid is heated by hot water instead of the naked fire.

Filtering apparatus was represented in the exhibits of the Silicated Carbon Filter Co., the Sanitary and Domestic Appliances Co., and Messrs. Symes and Co. In the filter exhibited by the first-named company, the water is made to ascend through the filter so that there is less liability of the impurities choking the filtering medium. These are known as "ascension filters," and the process has been applied even to the ordinary table filter (see figs. 4 and 5). The Boyle's self-filling filter, exhibited by Symes and Co., is furnished with an indiarubber collar, which enables it fit accurately to the tap to which it is applied; the pressure of the water between the tap and the t

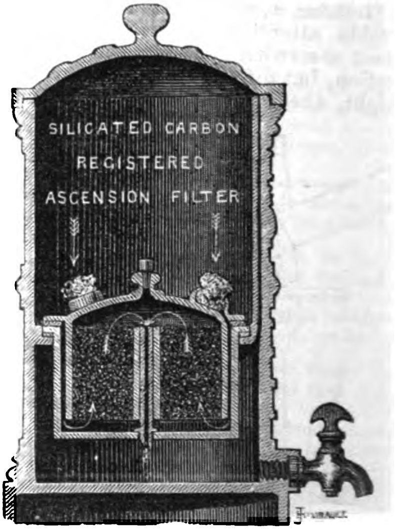

Fig. 4. Silicated Carbon Company's Ascension Filter.

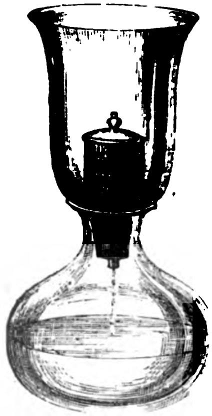

Fig. 5.

of the filter keeping it water-tight, somewhat after the principle of the leather collar around the piston-rod of the ordinary hydraulic press.

Fielding's patent Indispensable double-acting high-pressure rapid water filter, exhibited by the Sanitary and Domestic Appliances Co., differs from the last-named chiefly in requiring to be soldered to the tap to which it is applied, and in permitting the use of a supply of unfiltered water, simply by placing the filter in a horizontal position. The filtering medium is a combination of charcoal and prepared felt.

Hutchings label gummer (fig. 6) attracted quite a little crowd of visitors throughout the Exhibition.

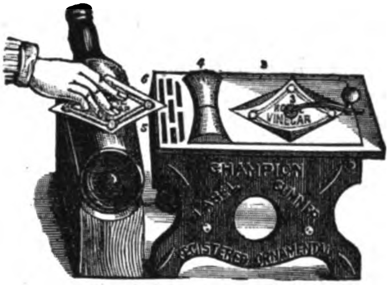

Fig. 6.—Hutchings' Label Gummer.

In this ingenious apparatus, which, except the frame, is made of brass to prevent rust, the labels are placed in a well, on a brass-plate, with a coiled spring beneath it, the labels being kept in place by a small roller, attached to a pressure bar. The concave roller over which the labels are passed is half immersed in a well containing water or mucilage, and any surplus moisture is removed as the label passes over a grating on its way to the bottle; the grating covering a portion of the same well in which the wet roller is placed. The inventor states that after a little practice one hundred dozen bottles can be labelled in an hour by this machine.

The model of a stirring apparatus, lent by Mr. Reynolds, of Leeds, for the Exhibition, has been already described in this Journal.* After the Exhibition it is promised to the Society as a donation to the Museum.

In Room No. 3, Mr. Cowan again exhibited his vaccination shields, which should be popular now that small-pox is so prevalent.

Pond's Extract Co. showed an improvement in enemas, the female syringe being furnished with a vaginal dilator for more complete irrigation than by the ordinary form.

Several varieties of improved feeding bottles were shown. In Mr. Day's "Ne plus ultra" bottle the stopper and tube of the bottle are made of a single piece of india-rubber, the advantage claimed being that there are no chinks in which the milk can collect and turn sour. As the india-rubber stopper fits air-tight into the neck of the bottle there is a small aperture in the top side of the bottle for the admission of air. The glass tube inside the bottle is arranged to press constantly on the under side of the bottle. The feeding bottle exhibited by Mr. George Wells is best explained by reference to the figure (see fig. 7), which represents a section of the neck of the bottle with the metal cap. By screwing down the plug A, the valve B is acted upon, and the aperture for the passage of the food can be reduced so as to regulate the flow of food with the greatest ease. This is considered to meet a long-felt want, and was first made by the inventor for the benefit of his own children.

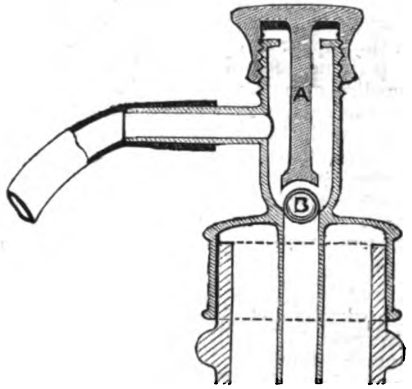

Fig. 7.—Wells' Feeding Bottle.

Mr. Corsan exhibited in this room bottles engraved by the sand-blast process, and glass advertising tablets with the letters cut by the same method, which were much admired.

In Room No. 4, Messrs. Arnold and Sons exhibited a large series of medical appliances. Among those which did not appear last year, were an instantaneous vaccinator, which is in fact an adaptation of a scarificator to the purposes of vaccination; a knife and fork combined to obviate as far as possible the awkwardness and inconvenience attendant on eating their meals by persons deprived of the use of either arm; and a human hair-clipping instrument used in treatment of diseases of the scalp.

Messrs. Bourne and Taylor's exhibits included seamless enemas without any metal mounts, a new adhesive plaster which is said not to harden and to adhere to bleeding wounds, and some medical batteries which seemed to meet with general approbation.

Messrs. Harvey, Shepherd and Co. exhibited Ryland's patent stopper, which is, by the aid of a clip, screwed down on the top of the bottle, and made water-tight and air-tight by the intervention of an india-rubber ring.

Mr. Jahncke's round-cornered metal boxes for cachous, lozenges, etc., formed a pretty exhibit, and these, as well as some very handsome specie jars, shown by Messrs. Maw, Son and Thompson, might be considered to illustrate ornamental art as applied to pharmacy.

Messrs. Poths and Co.'s shop bottles with burnt-in labels, and especially a new form with the letters of a ruby colour showing through a white label, attracted much notice.

Mr. Martindale's portable inhaler claims to possess the merits of simplicity of construction, as it requires the minimum of exertion on the part of the patient in inhaling the medicated air. Being furnished with a woollen covering, it can be handled without burning the patient's fingers, and the temperature of the liquid becomes lowered very slowly. The poor man's inhaler is made on the same principle, but is sold at one-third of the price.

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* See *Pharm. Journ.*, 2nd series vol. viii, p. 221.

Page's patent vaporizer, shown by Messrs. Allen and Hanburys, for filling the atmosphere of the sick room with the vapour of cresolene or other medicaments or perfume, seemed to meet with approval from the medical men who observed it. Cresolene is used more particularly in whooping cough, and is said to represent the beneficial vapours of gas works in the treatment of that disease.

The urethral irrigator, exhibited by Symes and Co., is furnished with a hollow flexible tube made of indiarubber in the form of a bougie or catheter, and the edges of the hole near the extremity are perfectly rounded, so as not to cause any irritation.

A case containing very handsome specimens of crystallized palmitic and other fatty acids was exhibited in this room by Price's Patent Candle Co., and attracted much attention.

In the room devoted to chemicals and new drugs, one of the most interesting exhibits was a large flask of phosphoric acid crystallized in long prisms, prepared by Mr. H. O. Huskisson, and which is, it is believed, the first time that it has been prepared in that state. A bottle of the acid in large but less perfect crystals, close by, was exhibited to show that it can be prepared in quantity, for commercial purposes.

A very interesting series of specimens, exhibited by Mr. A. W. Gerrard, illustrating the manufacture of atropine, duboisine and hyoscyamine and the appearance of the alkaloids in different stages of the process, was evidently an object of interest to the visitors. In Messrs. Hopkin and Williams's exhibit, a beautifully white specimen of resorcin in well-formed crystals was specially worthy of notice. It must have cost considerable trouble and time to prepare it. Crystallized acetate of ammonium and ammonio-citrate of cerium in golden scales, and salicylic acid and salicylates prepared from the natural acid obtained from the oil of wintergreen, were also objects of interest to many of the visitors. Monobromonaphthaline, recently introduced as a fluid for mounting diatoms, and which shows their markings better than any other known fluid on account of its great refractive power, was exhibited both by this firm and by Messrs. Burgoyne, Burbidges, Cyriax and Farries. The last-named firm exhibited some splendid crystals of vanillin; also coumarin and a fluid resembling hawthorn in odour, and called cratægin (the latter, as well as heliotropin and coumarin being employed, it is said, to flavour snuffs, etc.); a new substitute for cod liver oil, called oolachan oil, and a series of preparations made from new American drugs, and prepared by Parke, Davis and Co., and also the drugs from which they are prepared. These drugs were presented to the Museum of the Society by the last-mentioned firm at the close of the Exhibition.

The perfumes and oils exhibited by Messrs. W. J. Bush and Co., appeared to be of excellent quality, the oils of cinnamon, bergamot and sandal-wood being extremely fine, the last being prepared from the Cochin China tree. The oil of pelargonium, although an artificial preparation, was at least equal, if not superior, to the genuine oil; the essence of pineapple also was of a particularly natural flavour.

Camphor in tablets was exhibited by Messrs. May and Baker and Messrs. Geo. Atkinson, of Aldersgate Street. Camphor, sublimed, in flat cakes, and then cut or sawn into tablets, was first introduced from America; an entire cake of this kind was exhibited by Messrs. Evans and Co., of Liverpool. The American variety has, however, a somewhat different and less pleasant odour than that prepared in England. The English tablets are also said to be sublimed direct into tablet moulds, containing the name of the retailer, by Messrs. May and Baker.

New drugs were well represented in the Exhibition by Messrs. Christy and Co. Some of the most interesting articles in their exhibit were a series of preparations of papaw juice, papayine, a fine specimen of chaulmoogra oil, pure pilocarpine, aspidospermine, hoang-nan root—the Chinese remedy for hydrophobia—pituri, and the fat obtained from odika bread (*Irvingia Barteri*). In this exhibit, by one of those singular and unfortunate typographical errors which sometimes occur, and which was due in this case to the misplacement of a line, erythrophlœine, the alkaloid of the poisonous sassy bark, is said in the Catalogue of the Exhibition to be used for making jelly!

Messrs. Corbyn, Stacey and Co. also exhibited a series of new drugs and preparations, of which *Adonis vernalis* and the stigmata of maize, the latter now in some repute as a diuretic, were not shown by any other exhibitor.

Messrs. Mackey, Mackey and Co.'s preparations of cod liver oil appeared to possess more of the character of a paste than of an emulsion; but the taste of the oil seemed fairly concealed, while the odour was only slightly perceptible.

Messrs. Morson and Son's exhibit included several of the new anæsthetics, solution of glonoine, and a number of new chemicals; among those especially noticeable for their beauty being fine crystals of caffeine and erythrite, and salicylate of zinc.

Messrs. Young and Postans exhibited a fine specimen of resorcin, the new antiseptic, and a specimen of eugenol. The glass vases exhibited by this firm for Messrs Hamilton, Long and Co., of Dublin, coated inside and outside with sulphide of lead by Professor J. Emerson Reynolds's new process, were exceedingly handsome, the sulphide giving them a metallic lustre like that of galena. The articles are coated by immersing them in a bath containing sulphocarbamide or sulpho-urea, CSN_2H_4, and a soluble lead compound, when the lead is deposited after some time on the article in the form of a specular and firmly adherent layer which is identical in general character with natural galena. The articles are then washed and polished with leather. The urea is now chiefly prepared from its metamer ammonium sulphocyanate for use in galena plating. A fine specimen of the crystallized salt accompanied this exhibit.

The Clayton Aniline Company's exhibit formed a unique and interesting set of chemicals, one of these, xylol, possessing some interest from having been recommended in the treatment of small pox.

Mr. J. Burrough again exhibited his spirit of wine which he states to be specially free from fusel oil.

McKesson and Robbins's oval capsuled pills, exhibited by Burroughs, Wellcome and Co., seemed generally approved of. The thin coat of gelatine (?) with which they are covered is easily soluble and keeps the substance of the pill soft inside, while

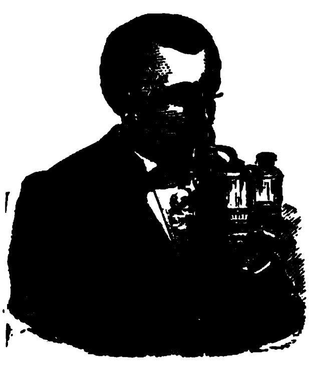

Fig. 8

their oval form enables them to be more easily swallowed than those of a spherical shape. An ingenious inhaler for applying ammonium chloride in the gaseous state to the throat and post-nasal cavity was shown by the same firm (see fig. 8).

Cortis's chlori-calcium is an application of the fact that chloride of calcium is one of the cheapest disinfectants in proportion to its power. It might well be used for drying damp rooms, or where objects liable to become mouldy are kept.

This year the show of aërated waters and non-alcoholic beverages was a large one. The Sparkling Limine, prepared by the Chemists' Aërated Water Co., was generally liked, the musty flavour of the lime juice being completely masked.

Messrs. Idris and Co.'s Phosphade, and their Sparkling Apple Wine, prepared with the real juice imported from America, were much approved of, whilst their lemonade speedily disappeared.

The aërated distilled water prepared also by Messrs. Packham and Co., of Croydon, if it could be sold at a moderate price, like aërated water, as in Paris, should command an immense sale. At present it is said to be used by the nobility to mix with champagne, claret or other wines. Hedozone, prepared by the same firm found many to praise its delicate flavour. Zoedone, quinada, a pleasant beverage prepared by Messrs. Pollock and Co., as well as several of Messrs. Evans and Co.'s non-alcoholic drinks, particularly the raspberry cordial, found their respective admirers.

THE ANNUAL DINNER.

The Annual Dinner of the members and friends of the Pharmaceutical Society took place on Tuesday, the 17th inst., at Willis's Rooms, Mr. Thomas Greenish, President, in the chair.

Amongst the visitors were Professor Abel, C.B., F.R.S., President of the Institute of Chemistry; Dr. Broadbent, President of the Medical Society of London; the Master of the Society of Apothecaries; Mr. Chaney; Mr. Wyndham Cottle; Mr. Anderson Critchett; Dr. Dowse; Mr. Thiselton Dyer, F.R.S.; Dr. Bedford Fenwick; Professor Frankland, D.C.L., F.R.S.; Dr. Douglas Powell; Dr. Richardson, F.R.S.; Dr. Gilbert Smith; and Mr. Sowerby.

The musical arrangements were as usual under the direction of Mr. Winn, and the efforts of Miss Clara Samuell, Miss Heath, Mr. Hanson and Mr. Winn gave very general satisfaction. Mr. Turle Lee presided at the pianoforte.

Grace having been sung—

The President proposed "The Health of the Queen." He said that whilst other thrones were agitated by Nihilism and Socialism, and whilst the modern appliances of science were employed to keep their occupants in a state of abject terror, that of Her Majesty was fixed firmly in the affections of her subjects.

The toast having been received with the usual enthusiasm, and the National Anthem having been sung,

The President proposed "The Prince and Princess of Wales, and the rest of the Royal Family." This was also warmly received.

The Vice-President (Mr. Schacht) proposed the next toast. He said there was a character well known to readers of modern fiction, the creation of an authoress, alas! now no more with us, who, striving to find an explanation for some of the difficulties that occurred in her comparatively uneventful life, fell back on the consolation: "Well, I suppose them as made us knows best." He always thought that old soul was possessed of a very fine philosophy, and more or less he had striven to realize it for his own guidance and consolation, and he never required it more than when he was informed of the important duty which had been entrusted to him of proposing the toast of "Science," coupled with the Royal Society and the name of Dr. Richardson. If he had been allowed to speak in his own individual name, he should have liked to have said something of the office of science in drawing forth continually fresh fragments of truth from those recesses of nature in which it was hidden; but he had to speak as Vice-President of the Pharmaceutical Society, and he might be allowed to say, speaking on behalf of the great community of pharmacists, that they all revered science. It was, in point of fact, very nearly the air they breathed; science was as much necessary to pharmacy as to any other practical art. Pharmacy was a practical art, depending on scientific pursuits and scientific knowledge as much as engineering depended on a knowledge of physics, or navigation on astronomy, or medicine on physiology and therapeutics. One thing more he might be allowed to say, and that was that he knew the band of high-minded men with whom he had laboured so long had been possessed with this one idea, the same which pervaded the whole body of those engaged in pharmacy and its recognised exponents, whether they belonged to the Society or not—they all had this one great notion, that they would raise not an unalterable ideal modern pharmacist, but an alterable one, one who should grow purer and higher as time went on. He would conclude by proposing "Homage to Science."

Dr. Richardson, F.R.S., in responding, said in one of his rambles in the country, he saw over an old gateway the Roman motto, *Illæso lumine solem*, of which, "look at the sun without being injured," would be something lik a translation. He had been called upon, on a minute's notice, to look at the sun, and they must not wonder, therefore, if he were dazed in his reply. Lord Bacon said that science was like a dragon, that with her claws she clutched the earth, that she shook it to its centre whilst she sat calm and watched all the changes of this eventful world. That was a grand simile, but he should rather say that science was like the sun, and in his young and imaginative days he used to think that the souls of men of science must return to the sun from whence they came. Science was all pervading; she spoke through every sense, in every sound, and in every language; she assisted everything; she gave the printer his metal; she gave the writer his ink; she gave the mathematician his learning of form and symbol; she made everything and unmade everything; she was, in fact, the sun, and to propose her health was like proposing the health itself, the life itself of the universe. He shrunk from replying to that part of the toast; but when he came to the Royal Society, although he occupied so humble a position as compared with the learned President of that body, whose absence they so much regretted, there was something there which he could, with some kind of sympathy, approach. The Royal Society sprang up at an eventful time. The words Whig and Tory came in about the same period, and freemasonry also received a new development. It also sprang, some said, from Hoxton, and one of his literary friends had a joke that, as extremes meet, so Hoxton gave birth to the Royal Society and Miles's boy. It came with a definite mission, to interpret science to the world. It was said that Alexander upbraided Aristotle for selling his books, but the philosopher replied that although he had sold his books he had filled them with such obscurity that none but the learned could read them. That was the state of science teaching up to the time of the Royal Society, which was established largely by the great men who founded it in order that science might be made known to the unlearned. The Royal Society had gained its greatness in this way, following largely the greatest of its representatives, the memorable Newton himself, who was ever anxious to tear away all extraneous difficulties from science, that she might stand forth in the completeness of her beauty. The Society deserved much commendation for the admirable style in which its transactions were recorded, especially in early times, but he must say that of late years the style of its literature had considerably gone back, and there were papers now published which, in another century, would hardly be readable. He would thank them again in the name of the learned societies, amongst which he must include the Pharmaceutical Society itself, and therefore in thanking them for the toast wishing health, strength and long life to all the learned societies, he was really wishing it to themselves.

The **President** said he had next to propose a toast which was always received on such occasions with great enthusiasm—"The Medical Profession." Perhaps there was no profession which commanded their sympathy, admiration and gratitude to so great a degree as the medical profession. Forgetful of self, and regardless of danger, the members of that profession passed from one bedside to another, constantly in the presence of and engaged in relieving suffering humanity. Such was their daily practice. But we also heard of them in battle fields adverse to the British arms. There the surgeon fell by the side of the wounded soldier, refusing to leave his patient, recognizing one principle only, that of duty. Again, those noble institutions, the hospitals of the country, so valuable in advancing medical and surgical science, and such a boon to the suffering poor, owed the position they occupied in public estimation to the exertions and self-sacrifice of the medical profession. Every pharmacist present must feel it an honour to be allied, however remotely, to such a noble profession, and must also feel grateful at being honoured with the presence of several of its representatives, amongst whom was the President of the Medical Society of London, Dr. Broadbent, whose name he begged to couple with the toast.

Dr. **Broadbent** begged to thank the company most heartily for the kind way in which the toast had been received. It was a very great satisfaction to himself and to those members of the profession whom he saw present to note the cordiality of feeling with which their profession was regarded by that great Society. It was true one might expect this cordiality, seeing that they were, in a way, simple members of the great profession which had for its object the relief of suffering. But it did not always follow that kindred pursuits and community of interests would bind people together in regard, and it was a great satisfaction to find that no petty jealousies for the present separated the two great branches of the art of healing. One remark which fell from the President reminded him that of the School of Medicine with which he was connected, they had had some distinguished representatives at the seat of war. A young medical man from there, whom he saw the other day, sat on the field of Islandula amongst the living and dead on the night after the battle, owing his life to the fact that he was on some other duty at the time of the massacre; and again he saw that in connection with the affair at Majuba Hill another of his old students was the one that took charge of Captain Romilly and looked after him. It was a great profession, though he was afraid they were yet in some respects to come short of what they might be. Medicine, as a science, had relations with every science; but as an art it was concerned with matters of detail, and those details were sometimes not sufficiently attended to, and in their comparative neglect of societies like that, whose duties consisted in the preparation of remedies which they had to rely upon for the relief of the sick, and in their failure to take advantage of all that was placed before them, they opened the door to many of the nostrums which were placed before the public. The neglect of duty led to unforeseen consequences. Within a few days he had received a very clever lithograph informing him that a certain nostrum was an infallible remedy for the late stages of bronchitis and he did not know what else. It struck him that they actually invited what was little less than an insult by neglecting the work of members of that Society. He hoped that medical men would always act in harmony with that Society, and he was quite sure that in relying on the work that was done on truly scientific principles, they would be doing the best for themselves, for the profession to which they belonged, and for the public.

Professor **Abel** said he found himself something in the position of the youngest bachelor at a dinner, who was called upon to propose the most important toast of the evening, "The Ladies," for he was selected, as the representative of the youngest scientific professional institution, to propose the most important toast, that of "The Pharmaceutical Society." However, he was glad he was so selected, because it gave him an opportunity of saying how thoroughly the Institute of Chemistry recognized the cordial manner in which, after some natural reticence, the Pharmaceutical Society of Great Britain met it in the first days of its existence. It was not unnatural that the Institute of Chemistry and the appliances and schemes proposed by it should be narrowly scrutinized by the Pharmaceutical Society, and proud indeed must the Institute feel that they might count amongst those who most zealously worked for its advancement many eminent men connected with the Pharmaceutical Society. Young as the Institute of Chemistry was he ventured to think it might be almost in the position of reading some of its older brethren a lesson or two, though far be it from him to say that that applied to the Pharmaceutical Society. The founders of the Institute, who were carefully selected amongst men of experience in the government of kindred scientific institutions, considered it one of their highest duties to determine on the standard which should be adopted for the admission of young members, and it appeared to him that in this matter they had followed a course which might perhaps be of some little utility as an example to other and much older institutions. They were met with this difficulty, that the only known means of admission into a society, scientific or professional, was by examination, and yet that this method of examination, however carefully and elaborately it might be conducted, failed in many instances in thoroughly sifting the qualification of those who desired admission. He thought that the founders of the Institute had exercised a wise discretion when they decided that they would adopt not merely a system of examination, but would also insist on certain preliminary conditions of training or study, and that, perhaps, was one of the greatest elements of success in the Institute of Chemistry. He mentioned this because he had seen that this very subject of examination with reference to qualification had been seriously considered by the Pharmaceutical Society. He had noticed in the *Pharmaceutical Journal* certain extracts from a most important report presented to the Council by certain of its body, in which increased stringency was suggested in the examinations. This was a subject which required the most serious consideration of every society the success of which depended on the establishment of a certain status. He had had a good deal of experience in the good and bad results of examination, having been for many years connected with the examinations in another branch of knowledge where he had seen the facility with which men with brains could pass an examination, the short space of time in which they could pick up an apparently sound knowledge of science, mathematics and various branches of knowledge, and he could also speak, from subsequent experience in working with the men who had so passed, of the evanescent character of these acquirements. Therefore, they endeavoured to make the examinations as practical and as searching as possible; but after all examination was to a very great extent simply a test of memory, and he thought this subject, which was engaging the attention of the Society seriously just now, was one which ought not lightly to be dismissed, and he was perfectly sure that if they could succeed in coupling with those examinations a satisfactory previous curriculum of practical study they would have accomplished a very great benefit. The Pharmaceutical Society had existed only about forty years, and he did not think there were many other bodies which could be shown to have done more work for the public in the time. They had succeeded in bringing about legislation of the most important character, and in advancing their own particular profession in every way. They found members of that Society connected with the Royal Society, with the Chemical Society, with the Institute of Chemistry, and in fact with almost every learned society, and it was only with diffidence that on the present occasion he stood there as a representative of those who desired on all occasions to honour and respect the Pharmaceutical Society of Great Britain. He would couple with the toast the name of the President, Mr. Greenish, who had been by no means the least in advancing the interests of the Society. But in speaking of the Society other names crowded upon his memory, such as Pereira, Thompson and Fownes, and they had now equally illustrious names in Redwood, Bentley and Attfield. He was perfectly sure the time would come when with complete and compulsory examinations they would see their laboratories as crowded as that of the school which once did so much good to counteract the evils that resulted from indiscriminate examination.

The **President**, in responding, said that after twelve months of Presidential work it was gratifying to hear the toast of the Pharmaceutical Society so warmly responded to. He was situated just as pharmacy should be, with medicine on the one side and science on the other. The Pharmaceutical Society was established forty years ago, and one of its main objects was the promotion of the education of the pharmacist. How well it had accomplished that purpose might be seen by comparing the pharmacy of that period with the pharmacy of the present day. At that time it scarcely existed; whilst at the present time it compared favourably with the pharmacy of other and more favoured nations, and an opportunity of comparison would be offered at the meeting of the International Pharmaceutical Congress, to be held in August next, when they would meet with men distinguished by scientific attainments and a knowledge obtained under conditions very different from any which existed in this country until quite recently. One of the greatest successes of the Society was that its value was recognized by the medical profession, and if the practice of medicine were ever to become a great science, it would be much assisted by the educated intelligence brought to bear upon the preparation of remedial agents by the pharmacist. It was stated by a learned judge not long ago, that pharmacy was a fourth branch of the medical profession. They were happy to accept the position, as it in some measure defined their relations to the profession. A branch bore leaves, and leaves played an important part in the economy of vegetation; they elaborated the sap, or in other words, laboratory operations were carried on in the leaf, and it was only after the new sap had been elaborated in the leaf, that it was in a fit state to be used by the plant in healing one part or building up another. So necessary were the leaves to the well-being of the plant that no plant could thrive unless the leaves were healthy, and protected in the discharge of their proper functions. It was for the pharmacist to prepare the remedial agents and for the medical man to prescribe their use. Truly, therefore, the pharmacist was the physician's cook, not to serve up the ready-made dishes of French, German, or American manufacture, but dishes made in strict accordance with the pharmacists' book of cookery, the British Pharmacopœia. He begged to thank them all for the honour they had done to the Pharmaceutical Society in the person of its President.

Mr. **Sandford** next proposed "The Health of our Guests." He said, although he had read in the *Times* the other day a rather amusing and sarcastic account of a public dinner, he confessed he always looked forward to these annual gatherings with great pleasure, because they tended to strengthen the bond amongst themselves in carrying on the work they had commenced, and formed also a link in the chain that bound them; but beyond that, they had present many friends whom they highly valued, many distinguished members of the medical profession, and other gentlemen who were in a high position in the world of science, all men qualified to judge of the work the Pharmaceutical Society had undertaken, and by their presence he inferred that they approved of what had been done. He would ask them to give the heartiest greeting to those visitors, and even if it were true that they suffered the agonies which had been depicted in the *Times*, which he did not believe was the case, they should only be more thankful to them for coming. He should couple with the toast the name of Mr. Thiselton Dyer, who was connected with the Royal Gardens, at Kew, who often had the opportunity and always had the good will to promote the interests of the Pharmaceutical Society.

Mr. **Thiselton Dyer** in responding said it gave him great pleasure to be present on that occasion, as it always did to work with the Society in every possible way in which its purely distinctive objects could be promoted. At the Royal Gardens at Kew they took botany to be their province, and they made a kind of pretence to deal in the same kind of way with the pharmaceutical botany, but they must confess that they could not compete with a great Society like that, and it was a great pleasure to him to bear testimony to the great assistance the Society had rendered to botanists like himself. Indeed, he must express his personal sense of gratitude for the assistance he had often received from that Society; he constantly had the Journal and corresponded with the officers, and he felt that the quiet work done in the Museum was not sufficiently appreciated. He was constantly amazed at the excellent way in which the Journal was conducted, for the editors seemed to keep their eyes open to all that was going on in all parts of the world, and to give a *resumé* of what was new in pharmacology such as he did not see in any other European publication. The Curator of the Museum was a constant visitor at Kew and never lost sight of any information bearing on pharmacology. Only the other day they received at Kew, as was often the case, a sample of bark, with a request to know what it was, and he was not ashamed to own that they could not answer; but on applying to Mr. Holmes they were enabled to explain all about it. It was a peculiar gratification to him to find himself seated next Professor Bentley, his first instructor in botany, and to find on the other side his excellent friend Dr. Richardson, with whom he had been conversing about a paper which he read, some twenty-five years ago, on the use of peroxide of hydrogen, which he believed led, in the hands of a Frenchman, to a very prosperous business in what was called "auricomous fluid."

The Pharmaceutical Journal.

SATURDAY, MAY 21, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE ANNIVERSARY PROCEEDINGS.

THE proceedings connected with the Society's anniversary this year have not been marked by any incident of unusual interest, and as the detailed reports of them occupy a very considerable portion of our available space, it will be convenient to defer until future occasions any further reference to the subjects brought forward by the speakers at the Annual Meeting, and to confine our present remarks to the most important results of the week's work.

The election of new members of Council for the ensuing year naturally takes the first place among these results, and though the regret we have already expressed as to the small number of candidates for a seat upon the Council was repeated by some of the speakers at the Annual Meeting, it is satisfactory to find that such a marked preference has been given to the most eligible among that number. The Scrutineers' report furnishes unmistakable evidence of the fact that there is a very general recognition of the principle that a person engaged in the business of teaching candidates for the Society's examinations is thereby disqualified from holding the position of a member of Council. On the present occasion Mr. WILLS has polled only 282 votes out of 1540, showing not only the very slender support accorded to his candidature, but also that it has been received with much less favour than on the two former occasions when he failed to be elected.

Of the other unsuccessful candidate for election it is unnecessary to say anything in addition to what is indicated by the small number of votes in his favour. This we venture to regard as evidence of a marked decline in the desire to prolong the contest with co-operative stores and similar trading associations in the way that was formerly believed to be desirable. The number of votes polled by Mr. SPINK this year is very considerably smaller than it was last year when the anti-store fever was at its height, and is indeed, very little above what it was when he first offered himself for election. In this circumstance there is, we think, no little reason for congratulation, not because we underestimate the injury which has been done to chemists by store trading, but because we believe it shows that a more rational opinion prevails as to the kind of measures by which the future interests of pharmacy are to be protected. The Council of the Society has, in response to the demand of what may be termed the belligerent members of the trade, tried to the uttermost the store question, and has done so at great expense, and though the result has been to support the opinion that it was undesirable to take that course, it cannot be said that the attempt was altogether useless, since it has in some degree given satisfaction to a large section of the trade, and has made clear the position in which chemists and druggists stand.

While expressing our satisfaction at the result of the election, and the influences by which we believe it has been determined, it is impossible to overlook the fact first recorded in the Scrutineers' report, that not one-half of the number of persons entitled to vote did exercise their power of influencing the constitution of the body by which affairs concerning their interests are to be regulated during the ensuing year. This is unfortunately no novel experience; but it is every year more strange to find that the same state of things continues when so much is heard about the Council failing to represent the trade throughout the country. Is it not rather evidence that there is failure on the part of many members of the trade to seek for representation and to confer upon the executive body such vigour as would enable it to exercise the strongest possible influence in dealing with matters affecting the interests of the trade?

At the present time, when projects of reform and amended legislation are being mooted, it cannot be otherwise than as a circumstance tending to weaken the influence of the Council, that the Legislature or the public will look upon the facts that out of some thirteen thousand registered chemists and druggists in business there are less than four thousand who have the right to vote for representatives, and out of that number only fifteen hundred and forty who take the trouble to do so. If anything is to be done for the promotion of pharmacy in this country the removal of this grave defect must be one of the first steps, and whether it be merely the trade interest of its followers or their semi-professional status that is to be protected and advanced, a successful result can only be expected when more general support is given to the body acting on their behalf.

The usual social gatherings incidental to the Society's anniversary have this year been quite as successful as on former occasions. The number of visitors at the Conversazione was 2456, notwithstanding the unfavourable state of the weather. At the Annual Dinner, at WILLIS's Rooms, there was some disappointment caused by the absence of the President of the Royal Society and the President of the Institute of Civil Engineers, who were at the last moment prevented from carrying out their intention of being among the guests of the Society, but otherwise there was every reason for satisfaction.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday May 18, 1881.

MR. THOMAS GREENISH, PRESIDENT.

MR. GEORGE FREDERICK SCHACHT, VICE-PRESIDENT.

Present — Messrs. Andrews, Atkins, Butt, Bottle, Churchill, Frazer, Gostling, Hampson, Hills, Radley, Richardson, Robbins, Sandford, Savage, Symes and Williams.

The **President** read a letter which had been received from the editor of *The Chemists' Journal*, asking permission for a reporter to attend the Annual Meeting. He presumed there would be no objection. No objection was raised by any member.

Restorations to Membership.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

Pharmaceutical Legislation in Jamaica.

The **Secretary** read a communication which had been received from the Colonial Office, enclosing copy of a law passed in the Island of Jamaica, with regard to the sale of drugs and poisons in that island, and asking for the opinion of the Council upon it before it received the Royal Assent. It was decided that the matter should be considered at the next ordinary meeting of the Council.

The Ballot Papers.

Some discussion took place as to the mode in which the ballot papers should be received at the Annual Meeting. The bye-law bearing on the subject having been referred to,

Mr. **Bottle** contended that each ballot paper ought to be presented in the envelope, with the name of the voter on the outside, whether presented personally or sent by post.

The **Vice-President** thought this regulation did not necessarily apply to voting papers personally delivered.

Mr. **Sandford** said it had never been the practice, and many persons would no doubt have destroyed the envelopes.

The **President** thought it would be sufficient if an officer of the Registrar were placed by the side of the ballot box, and instructed to see that no one placed any voting paper in it except his own.

Mr. **Hampson** said the voting ought to be made as easy as possible.

The Council then adjourned to the Annual Meeting.

FORTIETH ANNUAL GENERAL MEETING.

The Fortieth Annual General Meeting of the Members and Associates in Business of the Society was held on Wednesday, May 18, at 12 o'clock.

The **Secretary** having read the notice convening the meeting,

The **President** delivered the following address:—

The President's Address.

It is a time-honoured custom for the President to address a few words to the members and associates in business on this, the occasion of the Annual Meeting, and it is a relief for him to find that on such an occasion he can speak without involving the Council in the responsibility of his utterance.

It must be obvious that in the presence of a vigilant press little is likely to be gleaned that can claim the character of novelty, but some remarks may properly be made on, and in addition to, the plain statement of facts which annually characterizes the Council report.

The smaller number of candidates for the Preliminary examination, although resulting in a loss of revenue, and probably only an accident of the year, cannot be considered an unmixed evil; the overcrowding of the trade seems to imply that the present conditions of entrance to the trade of chemist and druggist are not properly understood, either by the pupil or by the parent. In observing the condition of unpreparedness for the Preliminary examination nothing strikes one more forcibly than the deficiency of the middle class education of this country. Questions that a lad from one of the national or board schools would answer without difficulty appear to be to some of the candidates perfectly incomprehensible.

The question often occurs to me, can the parents of a youth be aware that, although he may enter the calling of a chemist and druggist as an apprentice, he will not be able to conduct a business for himself until after he has passed certain examinations? Are the young men aware of it themselves? Very great responsibility as regards this early education, and further as to the opportunities afforded for learning that business, rests on those chemists who take apprentices. Is pharmacy ever to be raised whilst the present condition of things prevails?

The question whether the word "person" in the Pharmacy Acts included a corporate body was one which it was absolutely necessary to set at rest. The case was ably argued, but the decision of the House of Lords was adverse to this Society.

The Bill for amending the Pharmacy Acts has been submitted to the Lord President, and it is hoped that the interview promised will result in his lordship considering the clauses of the Bill from the point of view of the promoters of that measure.

The relation of medicine to pharmacy is a subject which has of late received much attention. That the dispensing of medical prescriptions should be done by pharmacists, and that at no distant period it will be done by them exclusively, there cannot be a doubt; but this end will be best accomplished by the pharmacist educating public opinion on the subject. If the trained pharmacist with a personal qualification be not the best adapted, by his special education, to dispense the prescriptions of the medical profession, it must be his own fault. The usual charges for dispensing done in pharmacies are by no means higher than an adequate remuneration demands for the skilled labour employed, and the intelligence required. They cannot be estimated solely by the cost of the drugs employed.

The Evening Meetings have experienced a dearth of suitable papers for reading and discussion; but it must be recognized that there exists in this metropolis a Students' Association and a Chemists' Assistants' Association, both of which have shown more or less activity. There seems, however, wanting the stimulus to that kind of investigation which results in papers bearing the stamp of originality. In most of the American colleges of pharmacy the student must produce an essay embodying the results of original research in some branch of pharmacy to obtain the title of Graduate in Pharmacy, indicated by the letters Ph.G. after his name, and practically the same rule prevails throughout the Continent.

The Benevolent Fund appeals forcibly to those who are in a position to contribute to its funds. Subscriptions are urgently needed to meet those distressing cases of privation brought monthly under the notice of the Committee.

I will digress here to read an extract from a letter received this morning from one of the Society's Local Secretaries. He says:—

"I send you herewith a list of the new subscribers which I have been fortunate enough to procure for the Benevolent Fund. There are fifteen new ones this year, and although it has been some trouble and work to get the small amounts, yet it is worth doing, and you may possibly be able to persuade some other secretaries to do the same, so as to add to your yearly income."

These cursory remarks on pasing events cannot be brought to a close without a word in reference to the retirement of Mr. Sandford and Mr. Hills from the Council. They need rest. When the time comes for a continuation of the 'Historical Sketch of the Progress of Pharmacy' it cannot be written without the name of Sandford being interwoven in its every page, and the great influence possessed by Mr. Hills has ever been exercised in the best interests of this Society.

I am sure that you will with myself indulge a hope that theirs is only a temporary retirement and that after a little repose they will again lend their personal assistance in the struggles for the future of pharmacy.

Death also has been amongst us. Mr. Abraham, of Liverpool, is gone to his rest. In a long life of usefulness he had earned for himself a character for more than ordinary intelligence and was consulted by his fellow-citizens on many important public questions.

But the greatest losses have been sustained by our brethren in the north. Mr. William Aitken and Mr. Henry Craven Baildon, former Presidents of the North British Branch, have also passed away during this year. Both were representative men whose places are not easily supplied. The best interests of pharmacy have, however, sustained the heaviest blow in the death of Mr. Mackay. Standing by his grave whilst his mortal remains were committed to earth I felt that pharmacy in Great Britain had lost one of its ablest supporters in John Mackay.

One of our honorary members, well known in the paths of science, Dr. Stenhouse, has been removed from us, and I may here also mention another name, probably unknown in this room, Dr. Philip Phœbus, Professor of Pharmacy in Giessen University. He it was that originated the idea of a Universal Pharmacopœia, as distinguished from an International Pharmacopœia, and devoted the best efforts of his life to its accomplishment. In the near approach of an International Pharmaceutical Congress, this mention of his name and the reference to his labours may possess a passing interest.

In the present depression of trade interests, the question may be asked, What is the future of pharmacy? The wave of co-operation in its various phases is passing over the land and the ancient landmarks of trade are being swept away. It found the pharmacist, with his very mixed business, unprepared for the changes which naturally followed. Time may modify its effects, but the principle of co-operation has taken a fast hold in the community. The medical profession is advancing in education and intelligence, and the time cannot be very remote when the dispensing of medicines will be felt by them to be incompatible with the time required for the study of disease. The voice of public opinion will then be heard requiring educated and trained pharmacists to fill the vacant position. Pharmacists, by a natural law, slow but certain, will then occupy their true place in the economy of medicine for which their education and training so eminently fit them.

At the conclusion of the address,—

On the motion of Mr. Richardson, seconded by Mr. Gostling, the report and statements of accounts were taken as read.

The following is the text of the Report:—

The Annual Report.

In the Financial Report now submitted it will be observed with regret that there is a decrease of revenue in 1880, as compared with 1879, owing to a falling off in the number of candidates for examination, especially the Preliminary. The receipts from examination fees amounted to nearly £500 less in 1880 than in the previous year. The income from subscriptions has increased, although there has been a slight diminution in the number of members; this, however, is more than compensated by an increased number of associates and apprentices. The expenditure has been unusually heavy, owing to there being several items of quite an exceptional nature, namely, the cost of publication of the Library Catalogue and the 'Progress of Pharmacy,' and an unusually large amount for law costs. There has also been the expense of publication of an Index to the Journal from 1868 to 1878, amounting to £147 6s. 8*d.* This amount has been charged to the Journal account, and it will be observed that although in addition to this there is a charge on the Journal of £690 4s. 3*d.* for postage to Members and others entitled to receive it, the total expense of the publication amounts only to £680 19*s.* 7*d.* The Journal account, therefore, if relieved from the expense incurred for postage, would show a profit of £9 4*s.* 8*d.*

During 1880 there were fewer candidates than in the previous year for each of the examinations. The decrease was as follows:—Preliminary, 247; Modified, 19; Minor, 3; Major, 9.

The Library has been increased by between 300 and 400 books and pamphlets, many of which have been presented, and at the monthly meetings of the Committee such books have been selected as it was considered desirable the Library should possess. About 4000 copies of the Catalogue of the Library have been issued to members and associates of the Society. An increase in the number of books borrowed has been coincident with the issue of the catalogue, but there has at the same time been a considerable decrease in the number of visitors to the Library. Two microscopes have recently been placed in the Library for the use of the students, who will, it is hoped, avail themseves of the facilities thus afforded of becoming familiar with an instrument of such value in pharmacy.

Only about 1000 copies of the Index of the Journal from 1868 to 1878 have been applied for and distributed. The Council regrets that the readers of the Journal do not avail themselves of the great advantages for reference presented by this index, which is supplied without charge to each Member and Associate of the Society on application to the Secretary.

An exhibition of articles of interest to pharmacists was held in the Society's Rooms in May last, and, the experiment having been successful, the Council decided to hold a similar exhibition on the 17th, 18th and 19th of May in this year.

The Museum has received during the year considerable augmentation from various sources. Many additional specimens from the India Museum have been received from Kew, and some valuable contributions have been made by chemical manufacturers in Glasgow; the Exhibition in May was also a means of adding to the collection. Duplicate specimens have been sent to local Associations and interchanged with British and Continental Universities and with eminent pharmacists at home and abroad as opportunity offered.

The papers supplied for the Evening Meetings during the past session, though satisfactory in quality, have been scarcely so numerous as could be desired. This is to be regretted as, in addition to the more scientific papers, subjects of practical interest frequently occur to the pharmacist in the exercise of his vocation, the investigation of which would be of general service.

During 1880 numerous infringements of the Pharmacy Act, 1868, were reported by the Registrar, and in all cases inquiries were instituted. Communications with the persons complained of in many instances led to satisfactory results, but in others it was found necessary to resort to legal proceedings.

The decision in the House of Lords in the case of the Pharmaceutical Society *v.* the London and Provincial Supply Association having been adverse to this Society, the Council appointed a Committee to draft a Bill embodying amendments of the Pharmacy Acts to render the restrictions on the practice of Pharmacy, or on the sale of poisons, more definite. Prior to that communications had been addressed to the Society by the Privy Council, calling attention to the public danger arising from the indiscriminate distribution of poisons and other powerful drugs in the shape of patent medicines, and ultimately asking "whether the Society had arrived at any conclusion as to the desirability of legislation on the subject, and if so, what form they are of opinion such legislation should take." These communications were remitted to the Pharmacy Act Amendment Committee, which has reported to the Council, and a draft Pharmacy Bill has been prepared and sent to the Lord President, who has consented to receive a deputation from the Council on the subject. The Bill has been printed *in extenso* in the Society's Journal.

The report of the deputation from the London Board of Examiners in April, 1880, to the Board in Edinburgh was received by the Council in August last, and places on record the conviction of the deputation that the examinations as conducted by the two Boards correspond as nearly as could be expected in general efficiency. A deputation from the Board in Scotland will attend the examinations of the London Board in June, and much advantage must necessarily accrue in the maintenance of strict uniformity in the practice of the two Boards.

The International Pharmaceutical Congress will meet in London on August 1st, 2nd and 3rd, next, and the Council has placed the Society's house at the disposal of the Congress for holding its meetings. It has also issued about three hundred and fifty invitations to societies and individuals of various nationalities, and there is every reason to believe that the meeting will be fully attended. A Committee has been appointed to arrange the business of the Congress and generally to provide for the entertainment of the visitors.

The first "Hanbury" Gold Medal, "for high excellence in the prosecution or promotion of original research in the natural history and chemistry of drugs," has been awarded to Professor Flückiger, by the Committee, which consists of the Presidents of the Linnean, Chemical, and Pharmaceutical Societies, the President of the British Pharmaceutical Conference and Mr. H. B. Brady. The medal will be presented on the occasion of the meeting of the International Pharmaceutical Congress.

The subscriptions and donations to the Benevolent Fund again show a falling off from the previous year. The Council regrets that the support of this Fund is still confined to so small a percentage of those who are entitled to its benefits. Out of 13,462 chemists and druggists on the Register less than 2000 contribute to the Benevolent Fund, whilst a large proportion of the applications for assistance are from persons who have never contributed. The appeals for assistance are becoming more numerous, and the Council would much regret to find itself unable from want of funds to relieve the distressing cases brought under its notice.

The Council cannot close this report without alluding to the loss which has been sustained during the year by the death of old and prominent members of the Pharmaceutical Society.

Mr. Baildon of Edinburgh, who died in January last, had from the earliest days been an active supporter, and Mr. Abraham of Liverpool was for several years a most active member of the Council. But more recently the death of Mr. Mackay has inflicted a severe grief on all. His exertions in extending the Pharmaceutical Society to Scotland are fully recorded in the 'Progress of Pharmacy' recently published, and his unwearied efforts in maintaining it are too well known to need mention; but his value as a member of Council during a period of twenty years can only be fully appreciated by those with whom he was therein associated and by whom it is no exaggeration to say he was sincerely beloved.

Mr. Mackay's name was retained on the Council by the lot taken in February last for the ensuing year.

At the Council meeting on the 4th inst., Mr. James Robertson Young, of Edinburgh, was nominated and elected by the Council to fill the vacancy as Mr. Mackay's successor.

[*The Financial Statement and Benevolent Fund Account are printed on pp.* 964 *and* 965.]

Mr. Mee moved the adoption of the report. From some parts of it, it looked rather as if the Society had got into a rut, but he hoped they would manage to harness some new horses to it, and drag it out again. The receipts from examination fees were less this year, but that they must be prepared for; the only alternative would be zeal and retrenchment. The Library had been increased, which was a move in the right direction, and so was the holding of the Exhibition in the Society's rooms. It was exceedingly interesting and instructive, and they ought to be very grateful to the gentleman who suggested the idea. The Museum had been considerably augmented, which was a great joy to them all. In the next place the report touched on a very important matter, the decision of the House of Lords with respect to the case of the Supply Association. He was very glad that the Society took up the position they did, even though they had lost the case. He always thought the case would be gained, but it went from court to court, and the judges convinced him that if they were going to

FINANCIAL STATEMENT FOR THE YEAR ENDING DECEMBER 31ST, 1880.

Receipts.

	£	s.	d.	£	s.	d.
Balance in Treasurer's hands, January 1st, 1880 . . .				1390	4	5
Balance in Hon. Secretary's hands, N. B. Branch, January 1st, 1880				43	0	4
London and Westminster Bank—On Deposit				500	0	0
Life Members' Fund—Interest				87	18	9
Interest on Investments				615	6	9
Subscriptions :—						
1729 Members, Pharmaceutical Chemists	1815	9	0			
803 „ Chemists and Druggists.	843	3	0			
1025 Associates in Business	1076	5	0			
840 Associates not in Business	441	0	0			
1074 Apprentices or Students	503	17	0			
24 Entrance Fees	50	8	0			
	4790	2	0			
Fines upon restoration to the Society . .	42	5	3			
				4832	7	3
Examination Fees:—						
1276 Preliminary Examination Fees . .	2302	12	0			
13 Modified „ . .	13	13	0			
679 Minor „ . .	1875	14	0			
126 Major „ . .	505	2	0			
				4687	1	0
Registration Fees:—						
16 Registration Fees as Chemists and Druggists	84	0	0			
15 Fees for Restoration to the Register	15	15	0			
				99	15	0
Balance due to Hon. Secretary, N. B. Branch, December 31st, 1880				19	6	5
				£12,274	19	11

Expenditure.

	England and Wales. £	s.	d.	Scotland. £	s.	d.	£	s.	d.	£	s.	d.
Balance due to Secretary, Jan. 1st, 1880										22	19	7
Annuity—Dr. Redwood										100	0	0
Carriage of Books to or from the Library, and other parcels										27	7	11
Certificates of Death										17	7	7
Conversazione							200	14	0			
Exhibition of Apparatus, &c.							26	17	3			
Pharmaceutical Meetings							39	4	1			
										266	15	4
Examiners, Boards of—												
Fees to Examiners	1275	15	0	248	17	0						
Fees to Superintendents — Prelim. Examination .	145	19	0	21	0	0						
Hire of rooms for conducting Prelim. Examination	44	10	0	3	16	6						
Travelling Expenses	177	11	3	9	5	10						
Refreshments for Examiners . .	100	7	1	10	16	0						
Apparatus, Drugs, Chemicals, for Examinations & sundry charges in connection therewith . .	57	1	2	23	13	7						
				317	8	11						
				1801	3	6						
							2118	12	5			
Fees to the College of Preceptors . . .							128	12	6			
Deputation to Scotland							36	8	4			
										2283	13	3
Fixtures and Fittings										64	19	1
Furniture										17	0	0
House Expenses:—Gas. Water, Coal, &c, &c. . . .										233	2	11
Journal Account (which includes £690 4s. 3d. cost of Postage to Members and others)—Balance										680	19	7
Laboratory :—												
Professor of Practical Chemistry—Endowment of Chair							100	0	0			
Prize Medals, etc.							5	8	9			
										105	8	9
Law Costs :—												
General Charges							350	4	3			
The Society *v.* The London and Provincial Supply Association							819	9	2			
										1169	13	5
Lectures :—												
Professor of Chemistry and Pharmacy—Endowment of Chair							100	0	0			
Professor of Botany and Materia Medica—Endowment of Chair							100	0	0			
Subscription to Royal Botanic Gardens .							21	0	0			
Prize Medals, etc.							18	10	4			
										239	10	4
Library :—												
Librarian's Salary							200	0	0			
Catalogue, New Edition, 5,000 copies . .							362	3	9			
Purchase of Books, etc.							97	13	6			
										659	17	3
Museum :—												
Curator's Salary							200	0	0			
Assistant's Salary							60	10	0			
Specimens, Bottles and Sundries							108	0	4			
										368	10	4
Branch of the Society in Scotland :—												
Assistant Secretary in Scotland—Salary .							150	0	0			
Current Expenses							149	12	4			
										299	12	4
Postage										375	13	7
Register										40	18	2
Repairs and Alterations										275	14	9
Rent, Taxes, and Insurance of Plate Glass										398	10	3
Returned Subscriptions to Associates										15	15	0
Stationery, Engraving, Printing, and Office Expenses .										308	3	7
Cost of Publication "Progress of Pharmacy" . . .										481	6	4
Salaries :—												
Secretary and Registrar :—												
Salary				450	0	0						
Rent				100	0	0						
							550	0	0			
Assistant Secretary							300	0	0			
Clerks and Servants							874	18	6			
										1724	18	6
Cost of Materials supplied to the Bell Scholars . . .										10	0	0
Council Prizes and Herbaria Medals										8	12	6
Sundries (including £15 19s. 3d. for Diploma cases) .										21	18	1
Travelling Expenses—Country Members of Council . .										421	17	6
Refreshments for Council										47	18	4
Balance, December 31st, 1880 :—												
In Treasurer's hands							1519	2	7			
In Secretary's hands							68	2	3			
										1587	5	3
										£12,274	19	11

BENEVOLENT FUND, 1880.

Dr.

		£	s.	d.	£	s.	d.
Balance due to Secretary, January 1st, 1880					2	5	8
15 Annuitants, each receiving £35		525	0	0			
14 Annuitants, each receiving £30		420	0	0			
One quarter's payment to an Annuitant (now deceased)		8	15	0			
Three quarters' payment to an Annuitant (now deceased)		26	5	0			
					980	0	0
CASUAL GRANTS.							
A former Member, Dulwich	age 58	10	0	0			
Ditto Birmingham	,, 65	15	0	0			
Ditto London	,, 73	15	0	0			
Ditto London	,, 56	20	0	0			
A Member, Bristol	,, 58	20	0	0			
A former Member, Parkgate	,, 62	5	0	0			
Widow of a former Member, London	,, 64	20	0	0			
Ditto, Horsforth, near Leeds	,, 70	15	0	0			
Widow of an Annuitant, London	,, 62	15	0	0			
Ditto, London	,, 62	5	0	0			
Widow of a former Member, Torquay	,, 59	5	0	0			
Ditto Brighton	,, 72	10	0	0			
Ditto Bristol	,, 62	10	0	0			
Ditto Parkgate	,, 75	10	0	0			
Ditto Devizes	,, 60	10	0	0			
Ditto Torquay	,, 57	20	0	0			
Widow of a Life Member, Surrey	,, 50	10	0	0			
Widow—former Member, Northampton	,, 52	15	0	0			
Ditto Brighton	,, 49	10	0	0			
Ditto Holywell	,, 51	10	0	0			
Ditto Launceston, Tasmania	,, 66	20	0	0			
Ditto Wollaston	,, 45	5	0	0			
Daughter—late Member, Southampton	,, 48	10	0	0			
Ditto East Dulwich	,, 35	10	0	0			
Orphans of a late Member, London,	ages 10, 9, 5 and 4	10	0	0			
An Associate, Wrexham	age 45	10	0	0			
A former Associate, Glasgow	,, 29	15	0	0			
Widow of a former Associate, Greenwich	,, 50	20	0	0			
Ditto Bath	,, 32	10	0	0			
A Registered Chemist and Druggist, Norwich	,, 70	10	0	0			
Ditto Liverpool	,, 53	5	0	0			
Ditto London	,, 68	10	0	0			
Ditto Bristol	,, 46	5	0	0			
Ditto London	,, 44	5	14	0			
Ditto Birmingham	,, 71	5	0	0			
Ditto Sheffield	,, 66	10	0	0			
Ditto Glasgow	,, 54	10	0	0			
Ditto Staveley	,, 78	15	0	0			
Ditto Liverpool	,, 55	10	0	0			
Ditto Plumstead	,, 84	10	0	0			
Ditto Bridgwater	,, 59	10	0	0			
Ditto Dresden, Staffs.	,, 41	12	0	0			
Ditto Liverpool	,, 44	10	0	0			
Widow of Reg. C. & D., Birmingham	,, 55	10	0	0			
Ditto London	,, 57	10	0	0			
Ditto Hollinwood	,, 33	15	0	0			
Ditto London	,, 45	15	0	0			
Ditto Barnes	,, 45	15	0	0			
Ditto London	,, 34	10	0	0			
Ditto Northampton	,, 40	5	0	0			
Ditto Liverpool	,, 58	10	0	0			
Ditto Ince	,, 32	10	0	0			
Ditto Edinburgh	,, 25	10	0	0			
Ditto Acton	,, 56	5	0	0			
Ditto London	,, 40	15	0	0			
Ditto Clay Cross	,, 34	5	0	0			
Ditto London	,, 43	15	0	0			
					637	14	0
Secretary's Casual Fund					5	0	0
Printing and Stationery		31	6	7			
Postage		16	7	8			
					47	14	3
Purchase of £250 Consols					249	1	3
Balance in Treasurer's hands, Dec. 31st, 1880					155	2	5
Balance in Secretary's hands, Dec. 31st, 1880					6	6	8
					£2083	4	3

Cr.

	£	s.	d.	£	s.	d.
Balance in Treasurer's hands, Jan. 1st, 1880				305	17	5
Dividends on Invested Capital				551	5	0
Donations	41	7	0			
Subscriptions	1184	14	10			
				1226	1	1
				£2083	4	

We, the undersigned Auditors, have examined the accounts of the Pharmaceutical Society, as presented in the Financial Statement and Benevolent Fund Account, and find them correct; and that there was standing to the account of the Society at the Bank of England, on the 31st December, 1880:—

		£	s.	d.	£	s.	d.
General Fund	New 3 per Cents.	20,500	0	0			
Life Members' Fund		3,000	0	0			
					23,500	0	0
Benevolent Fund	Consols	18,500	0	0			
Pereira Memorial Fund		100	0	0			
Bell Memorial Fund		2,050	0	0			
Hanbury Memorial Fund		400	0	0			
					21,050	0	0
Secretary's Casual Relief Fund	do.				105	0	0
Hills Prize Fund—Russian Bonds					300	0	0

WILLIAM HODGKINSON
F. HARWOOD LESCHER
S. LLOYD STACEY
HENRY AYSCOUGH THOMPSON
W. MANNING WATTS
} Auditors.

take upon themselves a great responsibility, it must rest on all persons who were actually carrying on the business. They must make up their minds that the Legislature would never allow a man to become qualified, and then, after establishing two or three businesses to put unqualified men into them, and go himself to Nice, Mentone, or some other delightful spot and draw the revenue from them. If they wanted pharmacy put on a sound basis, they must go to the foundation, and insist on education, examination and personal attendance. He would not say anything about the Bill, but he was very glad to see the Hanbury Gold Medal was to be presented to Professor Flückiger. He regretted to see that subscriptions and donations to the Benevolent Fund showed a falling off, and he thought it would be a matter of consideration for the Council whether a rule should not be introduced that no person should participate in the fund unless he had previously subscribed to it. That would stir up a great many people. Many persons thought they would never have to come upon the fund, but sometimes they were mistaken. It was said that riches had wings. He considered riches were gases, and when you considered how many were influenced by them, it was no wonder they lost their balance. They were also reminded in the report of the shortness and uncertainty of life; he could only say, as a general said to his troops when he saw them shattered with grape and canister, "Close up your ranks." That was why he had overcome his natural reluctance to public speaking, and moved—

> "That the Report of the Council as now read be received, adopted and printed in the Society's Journal and Transactions."

Mr. J. B. **Mackey** (London) seconded the motion and desired to thank the Council for their efforts on behalf of pharmacy generally.

Mr. **Smith** (Torquay) said he did not know whether he was in order in asking a few questions on the balance sheet, but he must say the report did not take a very satisfactory view of the state of pharmacy at the present moment. It was only by redoubled efforts that they would be able to cope with co-operation on one side and many other evils on the other. It was not his intention to propose any amendment, although he held it was one of the most discouraging and disappointing reports ever presented to the Society. It commenced with regretting, it went on with regretting, and unfortunately it had to end up by regretting; but no doubt the members of the Council were not responsible for this regret. They could not help the times or the disadvantages under which they laboured, and, therefore, it would be wrong for anyone to move an amendment, simply because he did not think if they were all on the Council they could improve upon it in any way. It was simply the result of the conditions of the case. Having said thus much, there were one or two points on which he should like a little explanation if it were not out of order, and probably some members of the Council would be able to elucidate the matter. In the first place, with respect to the Journal account he found an adverse balance of £680 19*s.* 7*d.*, which included, it was said, £690 4*s.* 3*d.* cost of postage to members and others. Surely there must be some asset somewhere or other. No doubt all that was true, but what he wanted to see was some explanation about it. Was there no supplementary Journal account to which they could refer? This sum of £690 seemed to him a heavy cost of postage, but on looking at the Journal every week to induce him to advertise he was told there was a guaranteed circulation of seven thousand. He wanted to know where did those seven thousand Journals go, and how were they accounted for, because according to their own report there seemed to be five thousand four hundred and seventy-one persons on the Register entitled to the Journal. No doubt there were a few hundreds more who received it, but the difference between six thousand and seven thousand represented a thousand per week, or over fifty-two thousand a year, a very large number of Journals, which on the face of it did not appear in the accounts. He was bound to say he did not think the Journals ought to be posted to every one free. All those who paid their guinea a year were certainly entitled to have it free, but he certainly did not think apprentices or students who only paid half-a-guinea should have it post free. He had never had an apprentice, but in the course of his career he had had a great number of assistants who were entitled to the Journal, and these Journals became an unmitigated nuisance in the house. The young men read his copy of the Journal, and their own were thrown into the waste paper basket; and he did not suppose he was singular in his experience. He had no doubt there were hundreds of Journals that had better not be printed, and on which the cost of postage might be saved. Then, again, with regard to the School of Pharmacy; that school was endowed with something like £350 a year; it had its rent free, and he supposed it had gas and water free. He should like to see stated in the report how many students it had educated during the past year, and how many had passed into the profession, through the Minor or the Major. It was not a pleasant thing for him and others to have the notion that they were subsidizing a school of pharmacy in order to turn out well-educated first-rate chemists, medical men, and so on. He might be wrong, but he certainly had that impression. There was one other point he was sorry to see not mentioned in the report. A great number of the members were provincial men. The year before last there was a miserable pittance of £35 granted to provincial associations, but last year he found it was an absolute blank. He thought the Society ought to do something considerably more for provincial associations, for if it did not the guineas would be withdrawn and would be applied locally. He did not know whether that was desirable, but he should say not, and, therefore, he thought, whether assistance was applied for or not, it was advisable to devise some scheme whereby they might aid provincial associations to a much greater extent than now. In his own part of the country they had no provincial associations; but he saw from the Journal that there were such associations scattered over the country, some doing exceedingly good work, and others not doing such work as they would do if a helping hand were stretched out to them, not grudgingly doling out a few pounds here and there, but systematically; they would then flourish, and when they flourished then he would have little fear of the parent Society flourishing too; but one could not flourish without the other. There was one point he should have liked to say a few words upon, but as it was at the present moment *sub judice*, it perhaps would be hardly right to do so; but he was glad to see the education question was taken up by Mr. Schacht, and that they were likely to have the matter put on a better foundation. For his own part he had been for many years disappointed with the results of examinations. He said it advisedly, after many years' experience; with their present system they turned out neither good assistants nor good masters, for the simple reason that the Minor examination was practically the final one. The Minor ought simply to take place when a youth had completed his apprenticeship, to entitle him to take a situation as an assistant; but all men ought to pass the Major as a matter of course before they went into business. He hoped he had not gone too far in saying what he had done with regard to these examinations, but he felt strongly on the matter, and this was not the time when they should sit still with their hands in their pockets and do nothing. Somebody should speak, and he had taken on himself the task, and he hoped he should hear not only the feet of some of the gentlemen around him indicating that they agreed with what he said, but also their voices.

Mr. **Urwick** said he agreed with Mr. Smith in many points, but thought he was taking too gloomy a view of things. They must remember that this report followed an exceedingly successful year, when there was a great accession of young men coming forward for examination. Although they had gone back this year they must not consider that they were always going backwards in financial matters. The only way to arrive at a conclusion was to take an average over several years. As to the Journal account, they had had that explained several times, and those who had attended the meetings, or read the reports in the Journal, ought to understand the matter by this time. It would not do to explain all the accounts in detail, but any member could get the information very easily. Again, they were told the expenses were very great this year, but they could not have a loaf after having eaten it. They all pressed the Council to take the step they did last year in the store question, which caused the expenditure of a large sum, but he did not regret having spent the money, for he thought it was very well laid out. They knew now where they were, and could look around and try and amend their position by getting a new Act to put them in the right position with the public. The public must be protected by having medicines dispensed by qualified men; if the Act had a loophole by which it could be run through they must go to the Legislature and have it amended, not for their own benefit, but for the benefit of the public. If the Legislature would not do that, let them open the gate to all and have unqualified pharmacy. He should regret as much as any man that this should be so, but they must be consistent. He thought the Legislature would say, No, they must be examined men; and that was the principle he desired to see carried out. He was glad to know the Council had been active in repressing offences; it had been his duty to bring one or two cases before them, and in every instance they had taken it up and been successful, and had recovered fines, so that now grocers were becoming exceedingly careful how they dispensed prescriptions. He hoped the Council would seek to get represented before the Royal Commission, and also that they would not confine themselves to having representatives merely of West-end traders, but would try and get men from various parts of the country, so that the interests of all classes might be made known. He could not close without saying how much he regretted to see that two such valuable men were retiring; they were giving up their first love. They must have been there nearly forty years. He felt that in the departure of Mr. Sandford and Mr. Hills the members of the Society lost two men whom they could not replace; they had not both the same qualities, but they had each qualities of very great value to the Society. Mr. Sandford would never give a thing up which he thought ought to be carried out for the benefit of his fellow-tradesmen, and he felt that their places could not be filled up. Mr. Mackay had been removed in a different way. They must all mourn his loss, and sympathize with his friends. He also had been equally valuable, and he could only advise those coming forward to make him their example, and try, as far as possible, to imitate him. As he had said before, Mr. Sandford was leaving his first love; but he hoped he was not going to make love to the widows. He knew he had a great affection and tenderness that way. He hoped when the Bill was before Parliament Mr. Sandford would assist the Society in carrying it.

Mr. **Brown** thought if the Council could give a debtor and creditor account with regard to the Journal it would be more satisfactory to the Society. They could then charge the cost price of the Journal supplied to members, and it would show exactly whether it was a paying concern or not. Whilst on that subject, he wished to ask whether the Journals could not be posted a little earlier, so that members who resided in the suburbs could get them before Monday morning. Living at Greenwich, he got his Journal, the first week in the month, on the Monday morning, and he was sure that those living in the country must get theirs before he did; no doubt on Sunday morning.

Mr. **Mackenzie** said he should like to say a few words, not to condemn the report, but in some degree to endorse the remarks of Mr. Smith. Last year £35 was put down for provincial education, but small as that pittance was, this year it was absent. He thought anyone who had gone carefully over the figures of the report for some years would come to the conclusion that rather than have this stock question, which always led to discussion, it would be much better if the Council would be kind enough to conform to the wishes of members and give a greater amount of detail as to the expenses of the Journal. He noticed also that there was a air of sadness throughout the report, especially with regard to the examinations. By the providence of God, one who had been conspicuous for many years amongst them had been removed, and they naturally missed him as a man of mark; and he might take that opportunity of saying how much they in Scotland thought of the act of the Council in deputing the President to attend the funeral of Mr. Mackay. Looking over the financial report, the income appeared to be something less than last year. Then it was £14,000 odd, and this year it was £12,000. He noticed also in going through the details in the report, as compared with the one ending 1879, that there were fewer passing all grades. In 1880 there were 2312; in this year 2094. He found also that the expenses were increasing. He should like to see a little more done from a provincial point of view in diffusing the benefit of their funds throughout the country. He thought this Society, with its funded property, ought to step out of the rut and give something liberal. He had argued this question several times, and he believed it would be a good investment. The extremities were getting a little cold, and if they could infuse a little warmth into them they would vitalize the whole constitution. It was a long cry to London from some quarters, and in some respects the system in vogue there was not a healthy one, as it was understood young men could be assisted to pass the examination by methods which were not to be recommended. They had not that difficulty to contend with in the provinces. A reference was made in the report to the Pharmacy Bill, and he was not one who believed that that Bill was in all respects what it should have been. They had enemies, and they found in this Bill too much of direct shooting,—pointing directly at them,—which he did not think was advisable to do for the purposes of passing the Bill, and he should have preferred a different mode of procedure. The purpose ought to be to give as much security to the public as possible, and to show Parliament that was their honest desire, and to take as much as they possibly could in return. The present Bill he did not think exhibited enough of this, either in one respect or the other. The public good being manifestly their desire, they should have made a strong effort to secure that; no shop should be opened by any chemist which was to be under any young man not thoroughly qualified. He would like also all their partnerships to be such that every partner in any business throughout the land should be one and all qualified men. That would strike at the very root of the evil. They were just lopping the tops of the twigs of this upas tree instead of going directly to the root. If that were done it would be a great step; it would meet the difficulty of the stores. He thought they should ask from Parliament a measure providing that the sale of articles intended for medicinal use should be vested entirely in the hands of men who had gone to the expense of qualifying themselves for the purpose of dealing with them. That would commend itself to the Legislature, and it would have been well if the Bill had contained such clauses. Another question which it would become them to grapple with was the question of medical men playing fast and loose. Among a certain substratrum of the profession there were some who seemed to be partly doctors, partly surgeons, and partly druggists, but he thought that they ought to take their choice. He was glad to know that it was the law in the College of Physicians in London, that if any gentleman became possessor of their diploma, he was debarred from dispensing in any way, and he believed that the great majority of the higher class of the medical profession would hail such an Act, and aid in getting it passed. The class of practitioners to whom he had referred were a great torment to the chemist, and they found in the west of Scotland, where a large number of them were manufactured, that they left shops in the charge of a boy, or sometimes a girl, whilst they were out on their professional tours during the day. If chemists were obliged to employ qualified assistants, these medical men ought also to be put on the same footing. It seemed to him that the law charges of the Society were very high. He did not complain of the £819 spent on the special case to which reference had been made, but there was a general feeling throughout the country that the Society did very little in law matters for the benefit of the members, and he did not know how it was so much money was spent. A great deal was done elsewhere not costing so much. He thought they might pay less or the advantages obtained might be greater. He also saw what was a conundrum to many, how there had been a gradual increase of the sums charged for clerks and servants. In 1879 it was £703; in 1880, £770, when he complained of it; but this year it had shot up to £874. He believed in paying servants well, but this year there had not been so much work to do, and he did not understand why the expenses were so much more.

Mr. FITCH said he was not going to find fault with the Council as he had done before, because he thought they had done all that could possibly be desired, though he had a suggestion to make as to the Bill which was to come before Parliament. He considered that no gentleman had any right to keep a branch shop and leave it to the management of an unqualified assistant, and then complain of a co-operative store which did the same or perhaps rather better, because there the drug department was left in charge of a qualified assistant. If they went to Parliament and asked it to sanction a Bill that chemists might have as many shops as they liked and leave them in charge of unqualified assistants, and at the same time asked to restrain the stores which left a branch in charge of a qualified assistant, they would get no Bill whatever. He always thought that the worthy Secretary held a very undignified position in going about in the character of a spy to see where the Poison Bill was contravened, and he suggested the Council should engage some discreet person to fill that position. His reason for making that suggestion was this, that he held in his hand the price list of a co-operative store, in which he was sorry to say one of the peerage had a considerable interest, and in that list there was this statement:—"In all patented articles, either for the toilette or otherwise, the store has an undeniable advantage over the shops, and this is also the case in respect of patent medicines. The reduction in price in these things varies from one-half to one-third, but this is because the chemists and druggists are reluctant to diminish their enormous profits, and have not opened their eyes to the fact that they are gradually driving away customers from their shops." Now, the drugs were kept in the grocer's shop, there was no qualified person present, and among the things sold was Battle's vermin killer, a 3*d.* packet for 2½*d.* It was a disgrace to the peerage of the land that they should patronize such a system as that. In order to give force to the Bill he would recommend that the Secretary be empowered to cut up the Register into sections, and to send a section of it to each town or parish and get one gentlemen to wait upon every chemist in his district and obtain a signature to a petition to Parliament in favour of the Bill, and in addition to ask the Local Secretaries to get a deputation up in their districts to their own individual members to favour the Bill, so that a deputation should wait upon every gentleman sitting in the House of Commons. If the whole trade went in a homogeneous character they would find that Parliament would listen to their wishes, provided they got rid of the evil of allowing unqualified people to conduct business. He begged to move the following resolution:—

> "That the Secretary be empowered to cut up the Register and get the signature of every chemist on the Register to a petition to the House of Commons to amend the Pharmacy Act in accordance with the principles of justice; namely, that the registered members shall have the exclusive right to trade in drugs and physic."

A MEMBER inquired the name of the store to which reference had just been made.

Mr. FITCH said it was the Columbia Market Store.

Mr. LONG seconded the motion.

Mr. HAMPSON submitted that the motion was not in order, inasmuch as there was a motion already before the meeting.

Mr. FITCH accordingly withdrew his motion.

Mr. LONG considered that the law costs which had been incurred in the trial against the London and Provincial Supply Association ought to be paid by the Government, as they were a branch of the Government, and were only carrying out the Act of Parliament. They were entrusted with the management of pharmacy, and had an Act of Parliament which stated that unqualified persons should not do such and such things, and it was their bounden duty to enforce that Act, and yet they were mulcted in these expenses in carrying out the law of the land. He maintained that the law was in their favour still; that they were justly and legally entitled to be the sole persons to retail poisons, and it was not possible for anybody else to conduct the business; they could do nothing but encroach upon the rights of poor chemists and druggists. The Society had always endeavoured to raise the standard of the members and of the articles sold, and where would the present proficiency of chemists and the excellence of medicines have been had it not been for the Society? He thought that whoever was against them was pursuing a very short-sighted policy. If he did not think it would be disadvantageous to lose the whole of the present authority, he should be willing that the Society should be dissolved; but as they had that authority they must cling on to it, and the body of the trade should assume a more independent and less timid and nervous aspect. They ought to have had a mass meeting, and to have shut up their shops until the Act had been passed.

Mr. HOWARD HALL complained that the Journal was not delivered in many instances until Monday morning.

The PRESIDENT remarked, with respect to the distribution of the Journal, that the post office authorities sent a van to the printers at 5 o'clock on the day they were printed, so that if there was any delay in the delivery, the delay rested with the post office.

Mr. HALL said he noticed that the fees paid to examiners had been increased in England and decreased in Scotland. He did not know whether the staff had been diminished in Scotland, and thought that some mention might have been made of this in the report. He noticed the expenses were more this year than they were last, and if they continued having an increased expenditure and a diminished income, they would not be able to continue. Everywhere they had the same tale to tell, namely, that the number of pharmaceutical chemists was diminishing, and he hoped that something would be done at once to increase the number of young men joining the Society. He was glad they had proceeded against the stores, and they had been able to pay the £819 costs out of income instead of out of invested capital. With regard to the funds in the Treasurer's hand, he thought that as the there was such a large balance, part of it should be lodged on deposit.

Mr. WHITTLE said he was the chemist who had been persecuted under the Weights and Measures Act. He bought his glasses from the York Glass Company, and felt sure that he should get the summons dismissed when he went to the magistrates and explained that the measures were stamped according to the Act. However it was not so; and although the magistrates said he had done everything he could do, still he was held accountable. At the Appeal Court he got a really common-sense verdict, and he was glad to say that he had the sympathy of every chemist in the country. He had received some very valuable instruction from the President upon that occasion, and he thought the Society could not have got a better case to have defended, as he had done everything in his power to carry out the statute. What were chemists to do? They could not test their measures; they were obliged to buy them already stamped; and how were they to know whether they were correct? Witnesses had been put into the box to say that they could test the measures to a tenth of a minim. He did not say they could not, but he knew what he thought about it. Medical men had told him that the measures in ordinary use in chemists' establishments were sufficiently accurate for all trade purposes. Chemists only did a small portion of the dispensing in this country, the remainder being done by medical men, and yet the inspectors never visited those gentlemen, which he considered very unfair. He was sorry to see that they were losing the services of Mr. Sandford on the Council, and was also sorry that they had such a poor selection from which to choose the Council for the ensuing year. They had to elect fourteen out of sixteen names, so that everyone would agree with him that that did not leave much margin. The worst thing they could do, would be to select any person engaged in educational work to serve upon the Council. No doubt many chemists might be found who would be willing to sit on the Council, if members did not so criticize the report at the Annual Meeting; and he thought, if the members could not trust the Council with the Journal, the postage and the like, that they ought not to elect them; but having once elected them, they ought to stand by them. It was true the present report was not so good as former reports, but the same might be said with regard to business. They could not expect always to have a good year.

Mr. **Wells** said it was not his intention to criticize the report which had been presented, except that he considered it a subject of congratulation that fewer persons were coming in as chemists; instead of being a matter of regret they ought to be glad that so few were coming forward to share in the unprofitable work. He was delighted to see that there were two hundred and forty-seven less coming forward for the Preliminary examination. With regard to the subscriptions to the Benevolent Fund falling off, much as it was to be regretted, still, at the same time, however trifling it might be, they could not be surprised at it considering the present state of pharmacy; when things improved, no doubt the funds of the Benevolent Fund would be increased. There was one thing he regretted, and that was that as a body they only met once in a year to have their say, or it might be their growl. He thought the law which governed the number of meetings to be held should be altered, because practically the Council were irresponsible for twelve months, and the members could only complain when a large number were going out of office, and then the Council could snap their fingers at any complaint. In all large institutions it would be found that meetings were held at least every six months, and if the members of the Council wished to make themselves amenable—as they ought to be, because they represented the whole of the chemists in the kingdom—they should meet their constituents every six months, and he would respectfully throw out that suggestion for the consideration of the new Council. He did not look so much at the *£ s. d.*, but he thought if there was any honour at all in sitting on the Council, that the Council might meet without debiting the members with refreshments. Surely they ought to be able to put their hands into their pockets and spend a shilling or two occasionally. He was not speaking of individuals, but as a body, and therefore he singled out no particular person. He also had to complain of the large amount of money which was spent for refreshments for the examiners, and it would be found that if these two items were added together there would be a lot of money which might be given away to needy chemists. He thought it would be expedient to have a supplementary statement showing the total receipts and expenditure with regard to the Journal account, and he agreed with the first speaker that they should have some record of the result of the chemistry, pharmacy, botany and materia medica schools in the institution, so that they might see the result of the endowments. While upon the subject of the Journal he might say that he noticed with great regret in a number of the Journal for the present year an advertisement had been inserted, under the head of "Assistants Wanted," for an assistant at the Civil Service Stores in Oxford Street. There again they were lending the columns of the Journal to assist in getting assistants for a society that was not doing the members any good, and there must be lax supervision of the publication to allow such an advertisment as that to be admitted. He did not know whether one or two questions that he was going to put would be considered particularly palatable, but they were with regard to matters which materially affected their interest. All over the country parties advertised that they had the particular advantage of coming from a certain firm, and in the bill which he held in his hand, a person described himself as hailing from Godfrey and Cooke, and that he was able to dispense at prices considerably under those of the stores. He should be glad to know whether there was such a firm as Godfrey and Cooke, and if not, whether it was not an evasion of the Act to trade under a name which had no existence. He did not want to be personal, but he could give a list of some of the leading West-end chemists, who were trading under names that no longer existed. Now was that right? If it was contrary to law, then the Council had been remiss in neglecting to protect the public. He did not say it was so, he merely asked for information. There was a still more important matter affecting their interests, and that was this, that certain persons set up in business and called themselves homœopathic chemists, from whom could be obtained belladonna, arsenic of any dilution, and all the poisons which came under the Act. If these people said the articles contained no poison at all, they were deluding the public, but if they were what they represented them to be, then the Council had been most remiss and had neglected its duty to the whole of the chemists in allowing these unqualified men to sell poisons. The fact was they had got into a humdrum state of things; they wanted a little change in the Council so that it should fairly represent the general body of chemists throughout the kingdom. At present the Council had no sympathy with the members. He said that the late Council, and he spoke of them as the "late" Council, gave a regular slap in the face to the whole of the chemists of Great Britain by electing a gentleman who was not a candidate at the last election over the head of one who held the highest number of votes as an unsuccessful candidate; and he was not using a harsh word when he said it was an insult. Everyone knew there was a certain place paved with good intentions, and the intention of the Council might have been good but the result, to his mind, was anything but satisfactory. He hoped the Council would discourage the system which had lately grown up of professors of the Society signing their names to puffs of proprietary preparations. He did not object to the plain "Mr." or "Esq.;" but they ought to be above allowing the name of the Pharmaceutical Society to be attached to any of these things. The last introduction of the kind was from Belgium, and was called the "Royal Universal Cooked Food," but one had only to taste it or smell it to know that the greater portion of it was nothing but lentils; and yet the name of Professor Attfield was associated with it. In his opinion this was derogatory. He should not know Professor Attfield if he met him, nor Professor Redwood, though he had great respect for these gentlemen; but when he saw another learned Professor's name connected with a certain wine, he should like to ask that Professor whether he had ever marked the progress of wine through all its stages, and if he did not know that an analysis of two casks of wine would not produce the same result, and that therefore there was no uniformity. He had now had his growl, and he hoped it would do some good and lead to some practical results.

Mr. Schacht said with regard to the absence of any mention in the statement of account of moneys bestowed for furtherance of provincial education, he never heard of the expression without sympathizing with it, and if it were uttered in the spirit of a growl he should be uncommonly disposed to join cause with the growler; but his expression of disapprobation would aim rather at the apathy which existed amongst pharmacists in the provinces than at the Council. It was not for him to deliver a lecture upon the subject; but he might say, as some small encouragement to other towns similarly situated to that in which he worked, that whenever their local society made any application to the Council of the Pharmaceutical Society for assistance, they had always received considerable help. It was true that was not mentioned in the report; but they had during the present year received considerable help from the Society, not in the shape of money, but in the shape of a donation of specimens towards filling the Museum; and that was a very important matter, because it could scarcely be measured by money. Anyone could buy specimens, but they could not be sure they were purchasing the actual things the specimens were supposed to represent. If the Society gave directions to the Curator to send such and such specimens, those specimens would come with the very best stamp upon them that they were what they were represented to be. He thought it right to mention that because, on behalf of the local association, in which he was very much interested, he felt that such an expression of gratitude and acknowledgment was due to the Society; and as a member of the Council he was glad to say that the only application made for substantial help had been acceded to. He might go one step further and say that if there had been any number of applications they would all have received the most respectful consideration.

The President, in replying to the various remarks which had been made, said that nothing gave the Council greater pleasure than to find their proceedings fairly criticized, because it showed that the members who made their appearance at the Annual Meetings had taken an interest in the Society's proceedings during the course of the year. Mr. Smith had spoken of the Report, but in placing a report before business men, surely it was sufficient to place figures before them, and they could see for themselves the way in which the money had gone. Last year they had spent £1705 in quite exceptional expenses, £800 of that being for law charges. They could not have appeared before the Annual Meeting again without trying the question as to the sale of poisons at co-operative stores; they were urged to try it, and they tried it, and had obtained law at its usual price. He might say the law which they had obtained was not of the nature and quality demanded by the purchaser. However, they did get it, and having settled the point, they were not afraid to bring the expenses before the meeting. With regard to the Journal, he hoped that question was now thoroughly understood by the members. The Society sent out annually about 300,000 Journals to members and others who had a right to receive the same. The expenses, £690, were really the expenses for postage. That amount might be saved next year if every member would come to the Society's house and fetch his own Journal; and the Journal account would then show a profit of £10, which, added to the expense of the Index, would show a sum of £150 to the good of the Journal. He hoped it would be understood by members that the expense was simply the expense of postage, and that otherwise the Journal was a profit to the Society. Mr. Smith also mentioned about provincial associations, and although that question had been replied to by the Vice-President, still he might say that provincial associations did not make applications; and that in every instance where application had been made the Council had given it attention With regard to the sale of vermin killer, he might inform Mr. Fitch that if he could obtain a packet from a grocer, and it was found afterwards to contain strychnine, the Society would take action in the matter.

Mr. Fitch said that on previous occasions he had brought articles to the Society, but no action had been taken. Three years ago he bought certain articles at the London and Provincial Stores in Regent Street, and the Act of Parliament was then broken in four places. One article that he purchased was aconite, and no entry of its sale was made in the poison book. In the next place, a prescription, written by himself, containing arsenic, was put up and labelled: "Prepared by Mr. Flowers, at 119, Queen Victoria Street," and he knew, as a fact, that Mr. Flowers was dead, and that the person who served him was Mr. Swan. As the name and address of the seller were not given in that case, if the Council had proceeded with it, they must have obtained a conviction.

The President remarked that complaint had been made that meetings were not held more frequently than once a year; but, upon reference to the Charter, it would be seen that they could only hold one meeting a year, and no doubt many would agree with him that that was quite often enough. Mr. Whittle spoke of the Weights and Measures Act and medical men using measures which were not tested; but he must bear in mind that the Act did not apply to medical men.

The motion for the adoption of the report of the Council was then put, and carried unanimously.

The Proposed Record of Donations to the Benevolent Fund.

Mr. Carteighe said that one matter which had excited the interest of a great many people had not been mentioned in the report, and that was the erection of a tablet on which the names of donors to the Benevolent Fund were to be written, and also a tablet on which were to be inscribed the names of successful students. As this was a matter that concerned many members, he hoped the President would state what was the intention of the Council with regard to those tablets. Although there had been discussions in the Journal, he had never seen any reasons given for this particular form of advertisement. He could not help feeling that the Council, in their desire to increase the funds at their disposal for benevolent purposes, had lost sight of the primary objects of the Society. No doubt it was an important thing to have a good round sum for benevolent purposes; but, on the other hand, the Society was not founded simply and solely for that object, and he must protest, with every desire to be liberal, against pushing the Benevolent Fund too prominently before other matters. If the tablets were to be placed in the hall of the Society, with the names of the donors to the Fund upon them, he imagined the Council thought there would be a great acquisition of donors; but he should like to know whether the hall was the proper place to put up what might purely be called by the public local advertisements. If not too late, he would ask the Council to reconsider the matter.

Mr. Wells suggested that the tablets should be placed "In memory of ——."

Mr. Ekin said there was a strong feeling out of doors against these tablets; it was felt that they were hardly in good taste, and that they were not quite worthy of the Pharmaceutical Society.

Mr. Urwick thought that in the matter of benevolence they should not let their right hands know what their left hands did. There were many small givers, although, perhaps, not so many as they could desire, who would be afraid to give anything at all when they saw the large donations of the rich members; and he would warn the Council against the expense of erecting tablets, especially as during the last year their expenses had exceeded their income.

The **President** said that with regard to the erection of these tablets, the matter had been well considered by the Council, who had arrived unanimously at the conclusion that they should be put up. The boards had been ordered, and would be put up, and the names of donors and amounts of legacies would be inscribed upon the board in the hall. Members might differ in opinion with regard to the propriety of these, but for himself he could not see any objection to them.

Mr. **Carteighe** asked whether they were committed to any donors at the present time.

The **President** said he thought not.

Mr. **Carteighe** said that being so, he would move that it be an instruction to the incoming Council to consider the expediency of rescinding that part of the minutes of Council which referred to the placing in the hall of the Society tablets on which to inscribe the names of donors.

Mr. **Frazer** had great pleasure in seconding the motion.

Mr. **Schacht** inquired whether Mr. Carteighe objected to the record of good deeds done in any form or shape by anybody, and whether he objected to the names of persons who had distinguished themselves in scientific work being recorded.

Mr. **Carteighe** replied that he objected *in toto* to the tablets, and he believed that the men who distinguished themselves in the School of the Society, and the donors to the Benevolent Fund, did not require a public form of advertisement, and that the advertisement would not have the effect of increasing the number of donors or stimulating in the slightest degree the work of the students. If the Council had resolved that the good deeds of the various members connected with the Society should be recorded on tablets in any part of the house, whether the good deed consisted in giving money or winning prizes, he thought the system was not a wise one, and he hoped the members would support him in this view.

Mr. **Hampson** said he had a certain amount of sympathy with Mr. Carteighe's objection, but he did not think it necessarily followed that the same objection could be raised to a blackboard being placed in the School of Pharmacy. It was a customary thing to find such a board in every school of medicine throughout the country, and he did not think that a man ought to be ashamed of having his name upon the wall as a memento of good and honest work. If Mr. Carteighe withdrew his opposition to that portion of the scheme he might have a chance of carrying his proposition, but if not he thought he stood a good chance of losing it altogether.

Mr. **Schacht** admitted it was an open question, upon which there might be a variety of opinions, but he must remind the members that in recording the names of gentlemen who distinguished themselves they were only following the example set by almost every educational body of importance throughout the kingdom, and he thought low motives ought not to be attributed to those who had seen something like propriety in recommending such a course.

Mr. **Richardson** was astonished that Mr. Carteighe had brought this question forward, because, if he was not mistaken, he had seen an excellent portrait of Mr. Carteighe embellishing the rooms of the Society. If he was so virtuous about advertising others he was rather astonished that he should have let his portrait embellish the room of the Society. They had only followed an example set by every hospital throughout the country. If the funds of the charity could be augmented by this means he did not see why anyone should carp at it. They all knew that pharmacy was not in the excellent state it ought to be, and every year the applications for their benevolence increased, but unfortunately the donations and subscriptions did not increase in a similar ratio. He did not see that there would have been any disgrace in having the board, and thought that if motives were attributed such as had been suggested it would tend to stamp out benevolence. If he was not mistaken the tablet was already placed in the hall, so that Mr. Carteighe's motion was quite out of order.

Mr. **Carteighe** said if the meeting were of opinion that the institution was of the kind of a public hospital he was afraid that anything he could say would not be of much use. He maintained that the public were not invited to come into their Society, and he objected to the names of donors to the fund being put upon the tablet. He had no objection to withdraw the objection as to the prizemen, and he might at once state that he did not use the word "advertisement" in connection with prizemen. He should be sorry to do anything which would interfere with any stimulus to students, and he would confine himself simply to the tablet on which the names of doners were to be inscribed. He begged to move—

> "That in the opinion of this meeting it is not expedient to place the names of donors to the Society's Benevolent Fund on tablets in the Society's house."

A **Member** said he noticed that appeals were frequently made by the Secretary and others on behalf of the Fund, and he thought one reason why more country members did not subscribe was that there appeared to be so little necessity for so doing.

Mr. **Horace Davenport** looked upon the proposition to inscribe the names of successful students upon a tablet in a very different light to that in which he viewed the proposal to have a board recording donations. He thought it would be a very good thing to see the names of successful students placed in some part of the building, but there was no necessity to put up the names of charitable people. If they did so, was there to be a *pro ratâ* qualification or were the Council to decide whose names should be put up?

The **President** said the incoming Council could take down the tablet if they liked, but he was sure the present Council would not be disposed so to do. Before putting the motion he might say that it was much to be regretted that the matter had been brought forward without previous notice, inasmuch as it had been fully discussed in the Journal and elsewhere, and not a single complaint had been made.

Mr. **Wells** said they came to that meeting to discuss matters and not to be told that the Council had decided on doing a certain act. The whole wisdom of the chemists did not reside in the Council. The Council were present to give an account of their stewardship, and if the members objected to any part of their account and came to the conclusion that the emblems of glory, or he might call them emblems of vainglory, should be removed, the Council were bound to obey the instructions of that meeting.

Mr **Schacht** said he only meant to imply that the question, which had been rather hastily brought before the meeting, could scarcely be decided by a vote taken then. The matter had been fully considered by the Council, and he did not think they should be asked to reverse a decision which had been come to after four or five months' deliberation.

Mr. **Wells** said if they were to believe in the old saying that "in the multitude of councillors there is wisdom," he might say that they were a greater number than the Council, and therefore of course they would be more likely to arrive at a correct conclusion.

Mr. **Wheeler** thought that the erection of the tablets could do no harm and they might do a great deal of good to the Fund.

Mr. **Ekin** disclaimed any wish to act in antagonism to the Council, and asked if the Council were aware of the feeling out of doors upon this subject.

Mr. **Robinson** said that as an outsider he might say he had never heard a single objection to the proposal.

Mr. **Symes** said he had not advocated the erection of the tablet, and therefore might perhaps be permitted to make a few remarks. The matter had been for four or five months before the Council, it having come before them upon the recommendation of the Committee, and if there was anything like the strong outside opinion which had been represented he thought it was only right that that representation should have been made to the Council, so that the matter might have been considered from all points of view. The pages of the trade journals were always open to criticism, and if anyone had a grievance they might bring it forward.

A **Member** said that letters sent to the Journal were not always put in.

Mr. **Symes** said he had never heard of such an occurrence. Without doubting the judgment of the meeting he might point out that sometimes people arrived at a different conclusion on second thought, and after voting against the tablet at that meeting they might repent when it would be too late.

Mr. **Martindale** supported the motion.

Mr. **Urwick** remarked that sometimes members took the trouble to write letters to the Journal which found their way into the waste-paper basket.

Mr. **Bottle** said although he was not one of the advocates for the erection of the tablets, still, as a member of the Council, he felt bound to support his brethren in the decision which had been arrived at, and he did so on the present occasion because he felt that without carrying Mr. Carteighe's proposition a modification of it might be carried, probably with advantage. He must say he was rather astonished when he saw the tablet where it was, and he thought a more fit and proper place for the board might be found upon the Society's premises.

Mr. **Carteighe** could not agree with this suggestion.

Mr. **Bottle** said that being so, he should move as an amendment:—

> "That in the opinion of this meeting it is not expedient to place the names of donors to the Society's Benevolent Fund on tablets in the Society's hall."

Mr. **Atkins** seconded the amendment. He was glad that Mr. Carteighe had modified the motion, because a precedent for setting up the names of successful students might be found in all the best schools in the kingdom, and he thought that the young men would be greatly benefited by seeing the distinguished names on the board. With regard to the tablet he thought, as he did at the Council, that they were spending a large portion of their time upon a comparatively small matter. He did not think that the best place for the board was in the hall, and it might be moved with advantage.

Mr. **Carteighe** hoped the meeting would vote against the amendment. It seemed as if every member of the Council who had spoken on the subject was not strongly imbued with the desirability of the tablet. He thought he could see in it a form of applying to the public which would, at least, become offensive, and, therefore, he called upon the members to support him. It was better to state this at the meeting, than for the Council to waste some hours in deciding upon what should be the qualification for placing a person's name upon the board.

Mr. **Schacht** said the Council had had so constantly borne upon them the desirability of enhancing the Benevolent Fund, that frequently they had spent many hours in sifting who, out of the many deserving cases, they should relieve, and when the suggestion came that it would be well to record their gratitude to those who had in past times done well for that Fund, there surely could be no self-glorification in recording the names of the donors. Their sole purpose had been to adopt a plan which might enhance the utility of the Fund, and he hoped that gentlemen would think over the point before they voted.

Mr. **Hampson** said he should stand by his colleagues, although he had not taken an active interest in the matter. With regard to low motives which had been suggested he could well imagine a person passing the board and saying, I will have my name on that board and will give a £1000, but if the board were dispensed with they might lose that £1000.

Mr. **Abraham** said it was impossible to erect the tablet without doing injustice to the poorer members. If a poor member gave two guineas he did a more charitable act than the rich man who gave ten guineas, but the poor man's name would not be inscribed upon the board. They ought not to be guided by policy, but should do what was right and honourable.

The **President** remarked that the observations which had been made by the various speakers had not altered his opinion in the slightest.

Mr. **Frazer** asked whether the amendment which had been moved was really not in the nature of a rider.

The **Solicitor** said the amendment, according to the House of Commons practice, would be that the word "house" be omitted in order that the word "hall" may be inserted.

Mr. **Bottle** having withdrawn his amendment the resolution was put to the meeting by the President and carried.

The names were then read of gentlemen who had consented to act as Scrutineers in connection with the election of Members of Council. Their appointment was agreed to unanimously by the meeting.

The following Registers were then placed before the meeting by the Registrar in compliance with the provisions of the Pharmacy Acts, 1852 and 1868:—

Register of Members, Associates and Apprentices of the Society.

Register of Pharmaceutical Chemists.

Register of Assistants.

Register of Apprentices and Students under the Pharmacy Act of 1852.

Register of Chemists and Druggists under the Pharmacy Act of 1868.

Mr. **Stacey** proposed a vote of thanks to the President for the very able manner and the kind and forbearing way in which he had presided over the meeting. In asking him to receive such a vote of thanks, they could not dismiss from their minds the fact of the great interest which he always took in pharmacy. The President had shown by his conduct that he had the interest of pharmacy at his heart's core, and that he desired to do his utmost for the benefit of the Society. That led them to another thought, viz., the able and efficient way in which he had presided over the Council. He was sure that the meeting would unanimously join in according to their worthy Chairman and President their most hearty thanks.

Mr. **Urwick** had much pleasure in seconding the motion.

The resolution having been unanimously carried, and briefly responded to by the President, the meeting was adjourned until Friday, to receive the report of the Scrutineers.

ADJOURNED GENERAL MEETING.

Friday, May 20, 1881.

MR. THOMAS GREENISH, PRESIDENT, IN THE CHAIR.

The adjourned meeting for receiving the report of the Scrutineers was held on Friday, May 20.

Mr. W. K. Hopkin, Chairman of the Scrutineers, upon being called upon for the report, said that the bye-law which requires that voting papers transmitted to the Secretary under cover shall be received by him not less than one clear day prior to the day on which the election is to take place had been the subject of some conversation amongst the Scrutineers. Several voting papers were received by post too late, and it was thought that this bye-law placed voters residing in the country under some disadvantage as compared with those residing in London, for whilst the former, unless they came to town, had to post their voting papers so as to reach the Secretary not later than Monday, the latter could deliver theirs personally on Wednesday. He had, therefore, been requested by the Scrutineers to suggest the propriety of an alteration being made in the bye-laws to allow of voting papers being received by post as late as Wednesday morning. Mr. Hopkin then read the following:—

SCRUTINEERS' REPORT.

We, the undersigned Scrutineers appointed at the Fortieth Annual General Meeting of the Pharmaceutical Society of Great Britain, do hereby certify that we have examined the voting papers committed to us, and report the following:—

Voting papers reported by the Secretary to have been issued	3627	
Voting papers received	1635	
Voting papers issued but not returned		1992
Voting papers received		1635
Voting papers disallowed:—		
Informal	8	
Received by post too late	87	
		95
Voting papers registered		1540

Result of the Poll.

Greenish	1448	Richardson	1339
Symes	1436	Radley	1323
Churchill	1428	Carteighe	1287
Bottle	1426	Hills	1273
Hampson	1426	Butt	1212
Williams	1398		
Gostling	1394	Spink	774
Woolley	1380	Wills	282
Robbins	1354		

W. K. HOPKIN, *Chairman.*

CHARLES A. BLAKE.
RICHARD A. ROBINSON.
ISAIAH BOURDAS, junr.
J. H. BALDOCK.
W. B. MASON.
T. EDWARD GREENISH.
PHILIP PRINCEP.
CHARLES J. MEAD.
WILLIAM GULLIVER.
ALFRED E. TANNER.
W. H. FERGUSON.
CHARLES B. ALLEN.
EDWARD H. RIDLEY.
W. H. SYMONS.
WILLIAM WARREN.
ROBERT SAMUEL BATHE.
R. FISHER YOUNG.

The Chairman said it was a fact to be regretted that at a time when subjects of great interest to pharmacists were under discussion less than one-half of the voting-papers issued had been returned. He thought it showed great apathy on the part of many persons entitled to vote.

THE NEW COUNCIL.

The Chairman then declared that the following gentlemen would constitute the Council for the ensuing year:—

ANDREWS, FREDERICK, 34, Leinster Terrace, Hyde Park, W.
ATKINS, SAMUEL RALPH, Market Place, Salisbury.
BOTTLE, ALEXANDER, 37, Townwall Street, Dover.
BUTT, EDWARD NORTHWAY, 13, Curzon Street, W.
CARTEIGHE, MICHAEL, 180, New Bond Street, W.
CHURCHILL, WALTER JOHN, 46, New Street, Birmingham.
FRAZER, DANIEL, 113, Buchanan Street, Glasgow.
GOSTLING, THOMAS PRESTON, Market Hill, Diss.
GREENISH, THOMAS, 20, New Street, Dorset Square, N.W.
HAMPSON, ROBERT, 205, St. John Street Road, E.C.
HILLS, WALTER, 338, Oxford Street, W.
RADLEY, WILLIAM VALENTINE, 42, Hampton Road, Southport.
RICHARDSON, JOHN GEORGE FREDERICK, Houghton House, Stoneygate, Leicester.
ROBBINS, JOHN, 372, Oxford Street, W.
SAVAGE, WILLIAM DAWSON, 4, Park Road East, Brighton.
SCHACHT, GEORGE FREDERICK, 7, Regent Street, Clifton, Bristol.
SQUIRE, PETER WYATT, 277, Oxford Street, W.
SYMES, CHARLES, 14, Hardman Street, Liverpool.
WILLIAMS, JOHN, 16, Cross Street, Hatton Garden, E.C.
WOOLLEY, GEORGE STEPHEN, 69, Market Street, Manchester.
YOUNG, JAMES ROBERTSON, 17, North Bridge, Edinburgh.

AUDITORS.

There being only the requisite number of candidates (five) for the office of Auditors, the Chairman declared the following duly elected for the ensuing twelve months:—

HODGKINSON, WILLIAM, 74, Golden Lane, E.C.
LESCHER, FRANK HARWOOD, 60, Bartholomew Close, E.C.
STACEY, SAMUEL LLOYD, 300, High Holborn, W.C.
THOMPSON, HENRY AYSCOUGH, 22, Worship Street, E.C.
WATTS, WILLIAM MANNING, 32, Lower Whitecross Street, E.C.

A vote of thanks to the Scrutineers was proposed by Mr. Walter Hills, seconded by Mr. Howard Hall, and carried unanimously.

Mr. Hopkin, in acknowledging the vote, referred to the fact that this year the ballot box had been during the whole of the meeting in charge of an official, whose business it was to see that no voting papers were placed in it improperly. He thought that all was now done that was possible to secure the proper conduct of the election.

A vote of thanks to the Chairman was then passed and the proceedings terminated.

Chemists and Druggists' Trade Association.

MEETING OF THE EXECUTIVE COMMITTEE.

The annual meeting of this Association was held on Tuesday, the 17th inst., at the Inns of Court Hotel, Lincoln's Inn Fields.

As usual, a meeting of the General Committee was held previous to the public meeting, Mr. Thomas Barclay, President, in the chair.

The Secretary having read the notice convening the meeting,

The report which had been circulated (see before, p. 929) was taken as read.

Mr. Durrant (Hertford) moved that the report and statement of accounts be adopted.

Mr. Mason (Liverpool) seconded the motion.

Mr. Paterson (Aberdeen) thought the Association had gone somewhat far in its approval of the Pharmacy Act Amendment Bill as drawn. There were some good things in section 1 and he thought it very desirable that if a gentleman passed part of the examination he should be told where he had failed and be able to concentrate his attention on those subjects; but it seemed to him that if the conduct of the Pharmacy Act was to remain in the Pharmaceutical Society, that Association must take the matter up and endeavour to get the Pharmaceutical Society to do a great deal more for education in the provinces than it had hitherto done. A great proportion of the money was drawn from the provinces, but it was nearly all spent in London or Edinburgh, principally in

London. Their apprentices had no means of finding that scientific and technical education which they were entitled to from such a Society as the Pharmaceutical Society. If it were to be entrusted with the whole regulation of the profession wherever there were large university towns or large centres, such as Birmingham, Manchester and other places, where there were a large number of chemists and apprentices, there ought to be educational appliances. They sent up from Aberdeen on one occasion for assistance and were kindly informed that the Society would make them a loan of £10 for three years and they would have to replace all apparatus which they broke in that time and send it back complete. They did not think that particularly handsome, and they themselves started a school for the education of apprentices, but they found it very difficult to carry it on and to get up a museum, laboratory and other appliances required to enable apprenprentices to pass the strict examination which is now required. He thought the least the Society could do was to help in education, and wherever there was a laboratory and other appliances established in a town, the examiners should be sent there to examine the young men instead of putting them to the expense of coming to London or Edinburgh. Clause No. 2 he could not see any reason for at all. If a person was registered at present as a chemist and druggist, by passing his examination or being in business before, it was only nonsense that he should have to go and register again. Section 4 again would make it unlawful for any executors to continue a business for a longer period than three years except by permission of the Council of the Pharmaceutical Society. He thought that a widow ought to be allowed to carry on business, if she kept a properly qualified assistant, without having to apply to the Pharmaceutical Society. He knew that it had been the means in several instances in his own district of saving the widow and family from coming upon the parochial board. He should, therefore, like to move an amendment something to the effect, that no amendment of the Pharmacy Act would be satisfactory which does not provide for the establishment of schools to enable apprentices to get a scientific knowlege of their profession while learning it, and to provide for examiners visiting the various local centres throughout the country where classes are established.

Mr. Hampson wished to make an observation or two with reference to the remarks of the last speaker. He had referred to the Pharmaceutical Society, but did not seem to understand the position of things with regard to provincial pharmaceutical education. Whenever an application had been received by the Society it had always been treated with respect and wherever possible a grant had been made; but although the Society appeared, as he said, to swallow all the funds and to give nothing out, it was extremely careful how it expended the funds, and it was necessary to have some guarantee that the money spent in the provinces, in education, should be spent in such a manner that sound solid education should be given. That was the reason that the £10, £30 or £40 per year were not sent broadcast over the country. It would be very unwise expenditure unless they were absolutely sure that there would be an equivalent value in teaching. Surely, in Scotland, with its cheap universities and admirable scheme of education, it was scarcely necessary to apply to the Pharmaceutical Society at all. They could get teaching in chemistry of the most admirable character at almost any of the schools in Scotland, and instruction in materia medica could be obtained wherever there was a medical school, so that he was rather surprised to hear this complaint from that country which had always been looked upon as setting such a good example to England in the matter of education. What they wanted was something of a permanent and satisfactory character. He would say the Pharmaceutical Society had never been wanting in its duty, and if their Aberdeen friends would only show a fair case, according to the rules laid down and applicable to the whole country, for a grant, the money would be voted as freely as could be desired. With regard to widows, if Mr. Paterson had sat on the Benevolent Fund Committee he would find the effects of permitting widows to carry on business. They came before that Committee as the consequence of carrying on business, for it was a great mistake to do so in the majority of cases. If the law were so framed that a widow could carry on business to an indefinite extent by the aid of qualified assistants it would only apply to those who least required it, namely, the widows of men in large businesses. A small business would not pay for a qualified assistant and besides that they would be sacrificing the whole principle of the Bill, namely, the principle of personal responsibility.

Mr. Churchill (Birmingham) said Mr. Paterson was evidently in error as to the clause affecting registration. There was no suggestion that there should be any further difficulty about registration on the part of those already on the list, but the intention was that no new demands for registration should be entertained from persons who had been entitled to registration for the last twenty years, but had failed to come in.

Mr. Pollard (Ryde) thought the permanence of education which had been referred to militated against piecemeal examinations. He should not like it to go forth that a candidate was to be examined in that way; he ought to be competent at any time to pass the examination. There had been some writing on the subject lately in various quarters to the effect that candidates who failed should be informed—and he thought it quite right they should—as to the points in which they were weak; but when they went up at any time they ought to be prepared to pass the whole examination. He should not like it to appear that they might go on cramming little by little.

Mr. Delves (Exeter) remarked that the amendment had not been seconded, and it was therefore out of order to discuss it.

Mr. Mason said there was nothing in the report antagonistic to the Pharmaceutical Society, and it was a pity that any discussion of that nature should arise.

Mr. Symes (Liverpool) said he thought the gentleman from Aberdeen was quite in order, because the report referred to the Committee having endorsed the Pharmacy Act. He could not approve of the suggestion that candidates should go up and pass an examination piecemeal, especially in these days when men could get crammed for each separate subject at a time. He would supplement what had been said by Mr. Churchill by saying that the reason for the second clause was that now and then applications came before the Registrar of the Society from persons who he felt morally certain had no right to registration at all, and so dissatisfied was he that in nine cases out of ten he brought the matter before the Council. It was a very unpleasant business to be trying to decide whether a medical man had given a correct certificate, or getting him to withdraw it, which was frequently done. It was felt, therefore, that the time was now arrived when the line should be drawn, and after a certain interval they should cease to place such persons on the Register. If Aberdeen had shown a good case for help in the matter of education he was sure it would have been granted, but speaking from his own experience it was far more difficult to get young men to come and form a school than to get the means to support it. If the young men would feel that the responsibility was their own, and do their utmost to obtain the instruction they required, there would be no difficulty in forming the schools or finding the means.

Mr. Mackenzie (Edinburgh) said he had always held the opinion that there ought to be some method different from that which had been pursued by the Pharmaceutical Society with regard to examinations. Two years ago the question was brought up about candidates failing, and Mr. Williams, being then President, confessed that he had told parties where they had failed, but others had gone away and were not told at all. In the

College of Surgeons, in one notable instance, a man was all abroad on one particular subject, and he was very much downcast in consequence, and so set himself to the study that since then his name had been famous in connection with that very subject. He referred to Sir Robert Christison, who was plucked in materia medica. He wished he could endorse heartily what Mr. Hampson had said with regard to assisting education, but he could not do so. In the Council's report last year, they found a paltry pittance of £35 paid for provincial education, but this year salaries were going up by hundreds of pounds. He wished the Society would be as careful of the hundreds as of the units.

Mr. Harrison (Sunderland) did not know that the case of Sir Robert Christison would apply to the argument. He presumed that when he was sent back on materia medica, he would also have to go through the entire examination *de novo*.

Mr. Mackenzie: No, that is not so.

Mr. Harrison said if not, if he had satisfactorily passed in other subjects, he would be able to pass in them if required, and there was no injustice done to young men in asking them to go through an entire examination. A man did not present himself solely for the purpose of passing, but that he might prove to those who examined him that he was competent to carry on business which he intended to practise. He would point out to Mr. Paterson that they would risk the passing of any Pharmacy Act at all if they introduced the principle of making the examinations more simple. Some time ago the Legislature decided that a man who dealt in certain poisons should be competent to undertake that serious responsibility. They were now going to ask that that principle should be enforced still further by making the clauses more stringent, and if, at the same time, they attempted to make the examination less stringent, it would be self-contradictory, and the Bill would certainly be thrown out.

Mr. Paterson asked leave to explain that in medical examinations if a man passed in 75 per cent. in any subject he had no further trouble about it; he had passed finally. He did not suggest making the examinations less strict than at present, but that if a man passed on one particular point he should be free from further examination in it. In Scotland there were many apprentices who could not attend classes until 9 o'clock at night. In Aberdeen one or two of the chemists were gratuitously teaching apprentices after that time at night; but they wanted to provide a place where they could go and study and see the requisite specimens. There were no apprentices in the north able to pay the fee of three guineas for the university classes.

The Chairman said, in regard to the examination question, he had seen a great many students who had been up to Bloomsbury Square, and who had been plucked, and he knew there was a great deal of heartburning amongst many of them. They felt that they should like to go back and pass in one or two subjects in which they had failed; but the great question amongst examiners and amongst all pharmacists now was how to put down cramming, and they would be adopting a wrong plan if they allowed students to pass, as had been suggested, in two or three subjects and then to go up for a final examination in the subjects in which they had failed. Many of them would simply cram up and pass one subject at a time; but they did not want that class of men in the trade at all. He was not surprised that the widows question had cropped up, because it had occupied a great deal of the time of the Executive Committee; but eventually they could not see their way to any other course than adopting the Bill as it stood. Before putting the resolution, he should like to know if anybody had anything to say with regard to the financial position of the Society. The report showed a deficit of something like £200.

Mr. Urwick said he was astonished to see how economically the Association had been worked. He did not think any chemist ever invested five shillings better than in that society; even with regard to weights and measures the services rendered the trade fully repaid all that they had subscribed. He thought the failure in education was in many instances through the masters not seeing that the apprentices and students attended to their studies and worked gradually on. Every case he had known of failure was where a young man had tried to get four years' work into three months by cramming, instead of steady and gradual work. The examinations ought rather to be increased in stringency than relaxed.

The resolution for the adoption of the report was then put and carried unanimously.

The Committee then proceeded to select 21 names out of a list of 35 for recommendation to the general meeting to be elected as the executive for the ensuing year.

Mr. Urwick and Mr. Wade were appointed scrutineers. Whilst they were absent examining the voting papers, the Chairman again appealed to the Committee on the question of the funds. He thought possibly that the fact of having £800 in the bank last year had affected their receipts.

Mr. Paterson said the Association deserved support, and no doubt when the report was read and the trade and members saw what had been done the donations would come in.

Mr. Harrison (Sunderland) thought the members of the Committee might do a great deal by canvassing for subscribers. The gentleman who preceded him on the Committee was particularly energetic in bringing the claims of the Society before the chemists in the district, and the result was that they had a larger proportion of subscribers than perhaps any other district in the country. The Association could only go on in its work if subscriptions were regularly and punctually paid.

Mr. Hampson said the list of members was less by two hundred this year than last. There would have been an increased of two hundred over last year, but the Committee had decided to strike off a number of names of persons who had not paid their subscriptions for two years. He quite endorsed the remarks of Mr. Harrison, that it was through the personal influence and interest of members of the General Committee that the success of the Association would be insured. After all, the great thing required was an increase in the number of annual subscribers; they had four thousand when they ought to have eight thousand.

Mr. Paterson said it would be well if the Secretary had the list of the names of gentlemen in the different towns, who were Local Secretaries.

Mr. Mason did not think it advisible that one gentleman should have to collect for two or three associations, as he would have great difficulty in carrying out his duties. It occurred to him that it would be very well if a list of members were prepared, classified according to locality, so that they could each see in a moment which of their neighbours belonged to the Association.

Mr. Bell (Hull) said he had to go round, as secretary to different associations, to the chemists of his town, and he felt that when he was entering their places of business he was looked upon something in the light of a tax-gatherer. They had, however, been pretty successful in Hull in supporting the Association.

Mr. Mackenzie suggested that it was a good plan for two gentlemen to go together, as they often had more influence than one going by himself. One reason their funds were getting low was that the analysts and the inspectors were getting so much afraid of them and their energetic officers, that they had been very quiet of late. He believed that those gentlemen had done more for the Association than any member of the Committee.

Mr. Ellinor (Sheffield) thought that the greatest plea was not what the Society had done but what it intended to do.

Mr. Jervis (Sheffield) said the greatest difficulty i getting subscriptions was from the smaller men, on who behalf they were most likely to be brought into legal proceedings.

Mr. Churchill said he could not quite agree with Mr. Hampson in his desire to have eight thousand 5s. members. He would rather have four thousand 10s. subscribers. He quite agreed with Mr. Jervis, that it was the 5s. members who were the source of danger. If a man would only come into the Society because he was afraid of being prosecuted and would only give 5s., he was not unlikely to land them in £50 expense.

Mr. Walker (Coventry) thought that remark cut both ways. They ought to consider in subscribing to the society that they were doing a good work for themselves, for their fellow-tradesmen and for society at large, and the more they could persuade that it was a good investment the better.

Mr. Green (Woolwich) said the only argument that made any impression in canvassing was that it was a good investment.

Mr. Durrant said it was impossible to make too much of that point that men should be induced to invest 5s. for their own benefit. He had made personally a canvass of every chemist in his district, which cost him a great deal, but the result was not very satisfactory; there seemed no very general desire to give, and the only thing he could attribute it to was that there was scarcity of funds, and that they only paid those things which they were obliged.

Mr. Maltby (Lincoln) endorsed Mr. Hampson's remark that their strength must consist in the number of members, because they not only got each man's money but his sympathy and support. He was anxious that they should have a surplus and have some funded property, and if that were placed before the Association properly he thought the Executive Committee would be enabled to take up cases with greater zeal and less reluctance than they did at the present time when they might have a fear of funds not being forthcoming.

Mr. Williams (Manchester) said many of the members were in a very good way of business and comparatively wealthy, and yet the amounts paid were in nearly all instances the same. He thought the richer members should be appealed to to give more handsomely than the poorer ones.

Mr. Laird (Dundee) said there was a large number of men in the trade who, he believed, did not take in either the *Pharmaceutical Journal* or the *Chemist and Druggist*, and knew very little what was going on about their business. He thought it would be well if the Secretary, in sending for the subscriptions, could give a short statement of what had been done during the year.

Mr. Ellinor suggested the formation of a reserve fund, to which all members should subscribe 10s., or less if they preferred, in addition to their ordinary subscription, until it attained a certain amount.

Mr. Jervis seconded the motion.

Mr. Mason supported it, and suggested that the wholesale houses should be asked to give the reserve fund their support.

The Chairman then asked what amount they would suggest the reserve fund should be.

Mr. Maltby thought it should be £5000, which would bring in £200 a year.

Mr. Mackenzie thought that sum too large.

Mr. Durrant said it was always best to have an object sufficiently high to work at. There was no reason why £5000 should not be raised if time were given. He should be glad to give the same amount to a reserve fund as he now subscribed, and he was sure there was a large number who would as soon give 10s. as 5s., if there was some object put before them.

The Chairman said there was nothing like having a good amount in hand; they would not have been so likely to be attacked if it had been known they had 5000 in their hands.

Mr. Mackenzie did not believe so much in endowments; he had greater faith in the members gen
than in having £5000 in the bank.

Mr. Churchill thought if such a resolution was pa
it should be carefully drawn by the Solicitor, as it wo
bind the action of the Association for many years.

After some further discussion, in the course of wh
Mr. Stead, of Leeds, supported Mr. Mackenzie's i
that £5000 was too large and would tend to check sm
subscriptions,

Mr. Holdsworth suggested that it would be bette
take a little more time to consider the exact form
which this motion should be passed, and that it woul
well to bring it before the general meeting.

This was agreed to.

The Scrutineers then reported that the followi
names were chosen for recommendation to the gen
meeting:—

Andrews, Frederick, London.
Arblaster, C. J., Birmingham.
Barclay, Thomas, Birmingham.
Barnaby, Henry, Rochester.
Bell, C. B., Hull.
Churchill, W. J., Birmingham.
Cole, F. A., Colchester.
Cross, W. G., Shrewsbury.
Davis, H., Leamington.
Hampson, Robert, London.
Harrison, John, Sunderland.
Holdsworth, T. W., Birmingh
Jervis, W., Sheffield.
Maltby, J., Lincoln.
Mason, A. H., Liverpool.
Passmore, G., Exeter.
Southall, Wm., Birmingham.
Stead, T. B., Leeds.
Symes, Charles, Liverpool.
Walker, G., Coventry.
Williams, F. P., Manchester

The following names had been sent up from th
Scotch members. Messrs. Charles Kerr, Dundee; Rob
McAdam, Glasgow, and James Mackenzie, Edinburgh.

THE ANNUAL MEETING.

The report having been taken as read,

Mr. Wade moved its adoption. He said on th
occasion it did not appear to be of a very exciti
character, and he did not suppose there would be v
much discussion or dispute about it. It appeared to b
of a very business-like character, containing a plain sta
ment of what had been done during the year, and he di
not think any exception could be taken to any part of
Great credit was due, not only to the Committee, but t
the officers for what had been done, and he thought th
statement was not unsatisfactory when they consider
the depression of trade, the unjust competition, and oth
matters which chemists had had to cope with. It was
wonder to him that the Society had been carried on a
such a small expense. It was true there had been
deficiency of £200; but he was glad to find, havi
regard to all the circumstances, that it was not m
greater when they considered what the Society had d
for the protection of trade; that it had been star
under a cloud, and began with only fifty members, a
had now attained the position it had. He thought th
had every reason to be proud of it. The Association h
done a deal of good by protecting the trade from th
inconvenience put upon them with regard to the A
affecting the adulteration of food and drugs, and als
respect of the Weights and Measures Act. He thoug
they had acted very wisely in allying themselves wit
the Pharmaceutical Society. With reference to the Phar
macy Act Amendment Bill, it was possible there migh
be some little difference of opinion amongst the memb
and some might think they had given in too readil
the Pharmaceutical Society on some points; but it
appeared to him from past experience of antagoni
societies going to Parliament, that they had taken th
only wise course. Whatever differences of opinion mi
be brought forward later, at the commencement t
had done well to join the Pharmaceutical Society, s
to show that there was no division on the main questi
They had also done well in making it understood th
legislation could be effected against the chemists and dr
gists without that Association having a voice in the ma
The Juries Bill was also under notice, and probably
might remember eighteen years ago, when Mr. W
Hunt first introduced the Juries Bill into Parliam
and the question was then before the Legis

ether the whole of the druggists throughout the gdom should be exempted. For a considerable time was hoped that that would be so, and it was almost an omplished fact; but unfortunately jealousies cropped which at the last moment made it appear that so ge a number of druggists would be exempted, that it s necessary only to exempt those who belonged to other society, so that that attempt which had a very d chance of being carried out only fell through, ough the jealousy of another society. He hoped they uld be warned on this occasion and take a wiser course. th regard to the arbitration which had taken place, it ack him that although it had been successful this e, such attempts were not alway successful, and he uld like to know if both gentlemen were satisfied. doubt the intention was good, but he thought haps in other cases it might lead to great difficulties, l that arbitration was hardly the thing for a society of t kind to undertake. He was pleased to see that the ort contained an allusion to the loss the society had tained by the death of one of its foremost members; l perhaps he should not be out of place, while alluding the loss of Mr. Abraham, if he also alluded to the re recent loss of Mr. Mackay. He had had the asure of meeting him on several occasions, and a re earnest man he never met with. The strength of Association was within within fifty-two of the other iety; and when they considered that there were rteen thousand in the trade, and that between four l five thousand belonged to them, and between four l five thousand belonged to the other society there s still about one-third to account for. The report wed that they had done all that could be done, and gave hopes that more would be done yet, if more mbers would be got into the Association. He hoped t year the finances would be in a much better condi- n; but the whole report was so satisfactory that he ught the meeting would endorse it in every way.

Mr. Pollard (Ryde) seconded the motion. In his ticular town, the members had not received any direct efit, as he believed there had been no cases defended l no particular advice given. Still they felt grateful, titude being an appreciation of favours to come. The iety had made a reconnaissance in force, by going to nchester, and successfully carrying on a prosecution; l as those in his district whose names were on the jury were liable to be summoned to Winchester, it naturally ited their sympathy and admiration. If they had not uired to be defended, it was not because inspectors were about in their neighbourhood, and he had had several its himself; but unfortunately for the inspector his s a very sterile preserve. He looked on the Association being strictly a mutual assurance society, and in that at it recommended itself to every individual of the rteen thousand five hundred who got their living in same way. He cordially indorsed most of what the ort stated; the Committee stood on the same plat- m as those, and on the whole they had done wisely l well.

The Secretary (Mr. Haydon) reminded Mr. Pollard t not only had the Association been called upon to end cases in the south of England, but they had ended a near neighbour of his, a chemist of Romsey, on occasions.

Mr. Whittle said he was the unfortunate chemist who s prosecuted under the Weights and Measures Act, ugh he had done everything any man could do. He l bought new glasses, had them stamped according to Act, and he felt quite confident when he went down ee the Marylebone magistrates that they would dis- s the case. Those Solomons, however, thought other- e, and consequently they had to learn their lesson at Appeal Court. He must say he had to thank the ecutive Committee for the very energetic manner in ch they had taken up his case. They were quite nimous that he should be defended, and he had also to thank the Secretary and the Solicitor for the great interest they took in the case and the attention they bestowed upon it. Some chemists thought they had not benefited, because they did not happen to have been persecuted, but he could only say he wished the inspector had gone into their shops instead of his. He considered that every chemist in Great Britain was under a certain amount of obligation to the Association, because who could say how many prosecutions would have taken place if it had not been for the action of the Society? But these inspectors now knew that if they attacked a chemist, the Association was willing to step forward without hesitation and defend him, if they considered he ought to be defended. He thought the wholesale houses might support the Association to a larger extent than they did.

The Chairman said the wholesale houses had responded most liberally when they were appealed to for special donations.

Mr. Shepperley was quite pleased to see at what a small cost the various law suits had been conducted by the Association during the last two or three years, considering how very important many of them were. The future peace of pharmacy generally would be influenced in a very considerable measure by the conclusions arrived at in the deliberations and recommendations of the Royal Commission about to sit, and which he believed would sit within a week from the present time. He hoped that their representatives would put matters in as plain and straightforward a manner before that Commission as they could. He noticed that the Commission included three or four medical men, and they might naturally infer that those gentlemen would look well after the interests and privileges of the medical fraternity; it would therefore behove their representatives to explain their wants and the general public convenience before that Commission.

Mr. Long was very much obliged to the officers of the Association for what they had done, and much pleased with the success which had attended the action of the Association during the past year. Since the last meeting, they had suffered a most unjust grievance. They were continually hearing appeals to support the law, and there had been an Act passed to maintain the law in Ireland, but it seemed simply to be a case as to whose interest it was. Their interest had not been maintained. They had a law undoubtedly, which said that no person except a chemist should be a chemist, and yet for the sake of pandering to popular delusion, it was said that any artificial person might be a chemist. He was not anxious to introduce strife or to interfere with the passing of the Bill; but if it were necessary, as it was, that any person who sold medicine should be qualified, no one else should have a right to sell it.

Mr. Andrews said, with regard to the Juries Act, that eighteen years ago it was endeavoured to exempt all chemists and druggists; but the difficulty then was to define what a chemist and druggist really was. Since the passing of the Pharmacy Act, 1868, that difficulty no longer existed. He had always maintained that a pharmaceutical chemist had no more right to be free from serving on juries than a chemist and druggist; the right should extend to the whole of the body. He believed that both societies had their eyes open to this point, and that it would not be lost sight of.

Mr. Churchill wished to make a remark on the arbitration case to which Mr. Wade had alluded, in which their Secretary acted as arbitrator, and he could not help thinking that both parties must have been pretty well satisfied. Mr. A. had been selling something which was very much like an imitation of a proprietary article belonging to Messrs. B. and Co.; Messrs. B. and Co. set to work with the law, and heavy penalties would no doubt have been recovered; but Mr. Haydon brought both parties together. Mr. A. made an apology, destroyed all the labels, paid a small fine and got off very much more cheaply than he would have done if he had gone to law.

Mr. Harrison said he knew there was a little feeling on the part of some members about this arbitration case; he thought an unnecessary amount of feeling. If they put themselves forward, and endeavoured to interfere and settle cases without the consent of the parties, it would no doubt, be unwise; but if both parties had perfect confidence in the Committee, and were willing to abide by their decision, it was impossible to discover a method of settling a difficulty more satisfactory to both. He was pleased to hear the interest which the jury question had excited, and was glad to find there was such an amount of enthusiasm on the subject. He trusted that in a short time equal justice would be done to chemists and druggists as well as to pharmaceutical chemists.

The motion was then put and carried unanimously.

The Chairman having read the list of names recommended on the Executive Committee, for the ensuing year, as given above,

Mr. Ellinor moved that the names of gentlemen to be members of the Committee for the ensuing year, as recommended by the General Committee, are hereby appointed a Committee for the ensuing year.

The motion was seconded by Mr. Long and carried unanimously.

The meeting then proceeded to ballot for the election of officers for the ensuing year; Mr. Radley, Mr. Bell and Mr. Jervis being scrutineers.

The Chairman said Mr. Ellinor had proposed [a motion that morning in the Executive Committee, which there was not time to discuss thoroughly, and he would now bring it before the general meeting.

Mr. Ellinor said he had great pleasure in proposing that a reserve fund be formed in connection with this Association, the amount to be £5000 or such other sum as may be thought proper, and that it be obtained by annual subscriptions, say of 10*s.* or any smaller amount. He thought it would do good service; it would make their enemies really fear them more than anything else. They did not know what the course of legislation might be, and they might have to defend themselves, and therefore they could not do better at the present time than form a reserve fund.

Mr. Maltby endorsed the views expressed by Mr. Ellinor, that it would be desirable to have a reserve fund. He did not know whether that was the best term which could be used; but he thought a sum of money could be raised with very little difficulty if chemists and druggists would put their shoulders to the wheel and endeavour to raise it. Since he had been a member of the Executive he had seen that if they had had a fund of this kind on which they could fall back, it would often relieve them from great anxieties when they had cases brought before them which they were anxious to defend. No case, to his knowledge, had been refused assistance on those grounds, but sometimes one had been undertaken with considerable anxiety, on account of the want of funds. It had been thought by some that this scheme was impracticable, but he thought there would be very little difficulty, amongst twelve thousand or thirteen thousand chemists, in raising a sum of money, whereby the society would be placed in circumstances, not of affluence, but in a position to vigorously take up any case.

Mr. Pollard asked if the minutes contained any record of a discussion on the same question some years ago.

The Secretary referred to the minutes of the Second Annual Meeting held May 14, 1878, when it was moved by Mr. Pearson, seconded by Mr. Lance, and unanimously resolved, that a special effort be made to raise at least £2000 by donations, to be used in protecting and furthering the legitimate interests of chemists and druggists.

Mr. Mackenzie asked to what extent that was realized.

The Chairman said there were £1645 received as donations that year.

Mr. Mackenzie said he would move an amendment. He thought the fact, when on a former occasion there was a necessity of having a reserve fund, that their ambition pointed to £2000, and that the trade generally responded to the extent of about £1600, showed that the amount now named was too large. It had been said that necessity produced the man and he also believed that necessity produced money. As mentioned already, they had never neglected a case for want of money; they had been misled by fears and had been torn by doubts; but they had really always had sufficient for what they wanted, and the proof of that was that they had £800 at the present time invested. He thought it would be rather adverse to their ardour to have a reserve fund; it would cut two ways. Experience had taught them that in many departments money lying idle had not always been an advantage to the vitality of the institution possessed of the money. Its day had begun to decline from the day it had money; whilst it flourished so long as it depended entirely on the freewill offerings of its members. At the same time it might be well to have a little more than £800. He did not like to put his hand to anything there was not a fair probability of realizing. He would, therefore, move an amendment that they complete the former effort to raise £2000 before launching the new one.

Mr. Urwick seconded the amendment.

The Chairman asked if Mr. Mackenzie meant that £400 more should be raised.

Mr. Mackenzie said he meant that the £800 should be put as a nucleus towards raising £2000.

Mr. Urwick said that in attempting to raise £5000, they would be attempting more than they could carry out, and if they succeeded in getting it, it would tend to check subscriptions. It was always well to keep interest alive in what a society was doing. If they could by any means bring those who did not at the present time take an interest in the society amongst them, and convince them that 5*s.* or 10*s.* given as a donation was money which paid better interest than any other investment, they would be doing more good. They ought to impress upon members of the trade the benefits the society conferred upon them; and there was no doubt that if it had not been for their success in defending the prosecutions in London, many others would have been placed in the same position.

Mr. Harrison supported the amendment, because it would be far better to complete a matter begun some years ago than to embark on a fresh project of the same nature. Although there had been anxieties on the part of the Executive whether the money would be forthcoming for any work to be done, yet no work had absolutely gone undone of want of funds. It appeared, as Mr. Mackenzie had put it, that the occasion had always brought the means, and whenever a special emergency had arisen, means had been forthcoming to meet it. There was another reason why it was not well to have too large an amount. There was no better control which a constituency could have over those whom it elected than providing the funds. If they provided the Executive with a large sum of money they would not have such a control over the Executive; if on the other hand the Executive were compelled to make an appeal directly to their constituents for means to carry on the work, it would be a guarantee that that work would be in thorough accord with the sympathies of those they represented. On this broad principle he strongly opposed any extension of the resolution passed five years ago.

Mr. Mason asked if it was a fact that the resolution passed two years ago limited the amount of subscriptions to £2000. He should prefer making an appeal without mentioning any limit. If they were now £200 in debt, some of the amount raised might be appropriated in that way. He thought it would be easy to make it known that until that £2000 were raised, members of the Association only would be defended if occasion arose.

The Chairman said that would not do, because sometimes typical cases arose, which it was necessary to defend lest they should be made a precedent.

Mr. Hampson said he did not mind whether they got £2000 or £5000; but there was one advantage in mentioning £5000, because they would probably get a larger sum than if they only mentioned £2000. The effort put forward would be greater when the larger sum was named. Still it might be desirable to simply carry out the resolution which stood on the minutes. He should like, if possible, to infuse a little zeal into the meeting in the attempt they were about to make. Once in the early history of the Association he remembered remarking that a very low body in the social scale, even the cats' meat men, had a sort of benevolent fund, and some organization by which they could operate for their own benefit: the publicans, the bakers, dairymen and others, had their trade societies, and he believed it would be found that the sum at their bankers was very much larger than that the Association was possessed of. If the Executive were to feel at ease, and free to take important steps as occasion may require, they must feel that they had something to depend upon. It was very irksome when they had to consider whether a case should be taken up, to have to send out a circular appealing for funds. They ought to be able to put their hands in their pockets at once, and he felt quite certain there were many gentlemen in the trade who ought to give £10, and some who ought to give £100 to the Association.

Mr. Pollard said he must support the amendment on the ground that it was desirable to preserve contact with the constituency. If Antæus did not sometimes touch the ground he was in danger of being strangled.

Mr. Wade feared from some remarks which had been made that the idea might be abroad that the enemy had been scotched or killed, and too much faith would be placed in the idea that there was an end of these prosecutions. He was afraid it was only the beginning of them, although for the present there might be a pause, and there might not have been many occasions on which it was necessary to defend druggists during the last twelve months, still, he was not sanguine that there would not be very many cases to defend during the next year or two, and that they would not want funds to do it. It would take all the spirit and energy out of the Committee if they did not feel they had the whole of the trade at their back to support them. When it went forth that there was no fear of further prosecutions, but that the inspectors were all afraid of their officers, he feared it would make chemists think there was no longer any necessity of contributing to the funds, and therefore he would rather put forth the other view, and let chemists understand that any one might be called upon at any moment and have to pay legal expenses out of his own pocket unless he had that Association to help him. He could only look forward to the success of this movement by making a selfish appeal to men's own interests. He must say he approved of Mr. Hampson's idea, which was something in the Joseph Hume style, to ask for double as much as you want, in order to get as much as you could.

Mr. Andrews said he should like to ask everyone here what he had done in his own circle. He had not a single friend in the trade who was not a member of the Association.

Mr. Jervis said one gentleman had remarked that this scheme would cut both ways. He wished to remind him that those who came from Sheffield were accustomed to make weapons which did cut both ways; they made guns to smash armour plates and they made armour plates that guns could not smash; but one thing that all the people of Sheffield tried to make was money. The sooner they had a balance at their bankers, the sooner they would be in a sound position.

Mr. Ellinor thought it was desirable to get as much as they could. If £1600 could be raised in one year there was no doubt that in a few years £5000 could be raised. If they could not get £5000 let them get as much as they could, but at any rate let them have a reserve fund.

Mr. Haydon suggested that perhaps the views of the mover and seconder of the resolution and of the amendment might be met by a slight alteration of the wording. They might simply ask the Executive to take steps to raise an amount, say £5000, or such other sum as they might think advisable.

Mr. Mackenzie said if they would say £2000 or such other sum as they might think it advisable, he would agree to it.

Mr. Stead thought £2000 was a preferable sum; they would put themselves in a wrong position if they added to the prior resolution. It was much better to call on the Committee to make a strenuous effort to carry out the resolution carried at the Annual Meeting in 1878. Chemists and druggists were not a wealthy body, for the vast majority were struggling to make a living.

The Chairman suggested that the amendment might be put in this form:—"That the Executive Committee be requested to make the amount £2000 and to maintain it so that they should always have a reserve fund of £2000." It was patent to all that going on in the way they were doing they were living on their capital to a very great extent. The law expenses had been very small this year, but notwithstanding all their efforts to keep down expenses they could not live on their natural income and had to encroach on the capital. If it were a recommendation to raise £2000, and keep it at £2000 it would meet all the requirements.

Mr. Stead then moved another amendment:—"That the Executive Committee be called upon to make a strenuous effort to carry out the resolution standing on the books and bring the reserve fund to £2000."

Mr. Harrison said that was just the effect of the amendment.

Mr. Ellinor then said he would adopt the amendment.

Mr. Maltby was surprised at the modesty of some gentlemen in only asking for £2000. They got £1600 in one year when they only asked for £2000, and that augured well for the probabilities of raising £5000 if they put their shoulders to the wheel. If they attempted to raise it in one year their efforts would be futile, but he should prefer that the resolution be worded somewhat in this way:—"That it is desirable to raise a fund of £5000, and that it be left to the Executive Committee to carry out measures for the purpose."

Mr. Whittle seconded the amendment.

After some further discussion was it resolved unanimously that the Executive Committee be requested to take steps to raise and maintain a guarantee fund of £2000 for the purposes decided at the Annual Meeting in 1878.

The Chairman wished to remind members that this amount would not be raised simply by talking about it, he hoped the Association would strengthen the hands of the Executive Committee in carrying out the resolution.

The Scrutineers then reported the result of the poll for officers, as follows:—

Mr. Thomas Barclay, President.
Mr. Robert Hampson, Vice-President.
Mr. William Southall, Treasurer.
Mr. T. W. Holdsworth, Honorary Secretary.

The Chairman, in thanking the meeting for the vote which they had passed, said he felt it a great responsibility; but he had wished that Mr. Hampson should take the duties of President this year, and it was only on that gentleman declining to do so that he allowed his name to stand. However, the time, he hoped, would soon come when the change he had suggested would take place, when the Association would have for its chief officer a gentleman who would do it credit and whose heart had before them always beaten truly in the interests of the trade. The Association had entered on another year and they had a considerable amount of work. All looked smooth at present, but those on the Executive Committee knew what responsibility pressed upon them and anticipated that they would have to use their best endeavours to maintain the integrity of the trade and uphold its interests in many ways. During the past year they had endeavoured to protect chemists by all legitimate means. Whilst the last Annual Meeting was sitting, it was stated that a Mr. Wilkinson was attacked on the question of apothecaries' weights, and they at once took measures to defend him. Mr. Chamberlain's attention was drawn to the matter, and the result was that the circular was sent out, which had been of great service to chemists throughout the country. With regard to the Pharmacy Bill, that had not yet been launched; but recognizing the responsibility attaching to the Association with regard to the Royal Commission on the Medical Acts, which might include the discussion of other subjects, the Executive had sent out a number of inquiries as to the condition of pharmacy in other countries in order to obtain definite information. There was a considerable amount of information on the subject, but when they wanted chapter and verse, scarcely anybody knew anything about it. A good deal of very valuable information had now been received, which he trusted would help them in future legislation. The inquiries were made with regard to such questions as the amount of education required, the curriculum of education, the International Pharmacopœia, the sale of secret remedies, the relation of medical men to pharmacy, the legality of persons not being qualified in engaging in the business of pharmacy in partnership with those who were qualified, and so on; and a great number of answers had been received, some of which he read to the meeting. Of course it did not follow that the conditions which regulated pharmacy abroad could all be applied to this country, but he thought it was wise to get as much information as possible so that they might in some way or other be able to use it when the time of trial came. There was not much chance, he thought, of the Medical Act Amendment Bill passing at present, but the Executive were watching it and would do their best to prevent its becoming law in its present form. One of the provisions would deprive chemists of the right to use the words "Dispensing" or "Medical Hall" on their premises; and this was a point on which some difference of opinion prevailed, but they were all of opinion that the Act of 1815, should not be abrogated without some provision being made in its place to protect the rights of chemists. He should like to know whether it was the opinion of the meeting that the Executive should endeavour to represent it before the Royal Commission.

Mr. Hampson also thanked the meeting for having chosen him as their second best man in the Society. With regard to the Pharmacy Bill, the report stated that the Executive had virtually accepted the Bill as proposed by the Pharmaceutical Society, and he was glad it was so, because the only chance of carrying the Bill through was in their being perfectly unanimous, and not attempting anything of a quixotic nature. The main principle which the Bill attempted to carry out was perfectly clear. It was an attempt to repair a certain imperfection which was found to exist in the present Act, and to bring co-operative stores and limited liability companies more especially within the law. There was another very important advance which the Society attempted to make in promoting pharmacy, viz., to enact that no person should keep a shop for the purpose of dispensing physicians' prescriptions unless he was qualified. He believed that if the principle of past legislation was good, they might safely ask for this extra privilege. Whatever might come of the Bill in the future, he hoped the Society would be found working heartily with the Pharmaceutical Society in carrying it forward. They would remember the difficulty which existed in 1866, when they were clashing interests, and when they had to have a patchwork Bill, which was now found wanting. He believed that if that Association were in earnest, and the Pharmaceutical Society also, the Bill was safe. They must throw as much enthusiasm into the work as possible, and then when the Bill came before the House they would be able to bring sufficient pressure to bear and give sufficient reason to members of Parliament to enable them to carry the Bill through successfully.

Mr. Holdsworth also returned thanks, saying he was now the oldest officer of the Association. If his office involved any great responsibility or was anything more than what it was called, viz., an honorary office, he most certainly should have declined to accept it for another year, but as it only involved a certain amount of work being done in the Central Department, Birmingham, and as he happened to be on the spot, he was glad to render such services as he could there.

Mr. Radley said he had great pleasure in reciprocating the remarks of the Chairman, and as he was present at the inauguration of the Association, he might be allowed to express the pleasure he felt in seeing how it kept up its interest. His opinion was that if the £2000 effort were to be successful a larger field required to be cultivated. He hoped the Association would take some steps with reference to the Royal Commission in defence of the ancient rights of chemists and druggists to prescribe in simple cases.

Mr. Mackenzie said that members might do a great deal of good by writing special letters themselves to their own members of Parliament when the Bill came before the House.

Mr. Ward (Sheffield) asked if there were any local secretaries in connection with the Association.

The Chairman said every member of the General Committee was a local secretary *ex officio*.

Mr. Ward (Sheffield) full endorsed the pointed remarks made by Mr. Hampson with regard to the friendly feeling which should exist between the Association and the Pharmaceutical Society. He thought that the sooner they dispensed with such titles as "Medical Hall" and "Dispensary" the better.

Mr. Urwick thoroughly endorsed what Mr. Mackenzie had said, and thought that the sooner they dropped such titles as had been referred to the better.

Mr. Kerr (Dundee) moved:—"That the Executive Committee be authorized to take such steps as they deem desirable to place the claims of the chemists and druggists before the Royal Commission on the Medical Act."

Mr. Wade seconded the motion, and said many members of the Executive Committee were also members of the Pharmaceutical Council, and as they were all agreed he thought they had better leave it to them.

The resolution was then put and carried.

Mr. Harrison moved a vote of thanks to the Executive Committee and Officers for their work during the past year which was carried unanimously, and the meeting separated.

Correspondence.

⁂ No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

TESTING OF OLIVE OIL.

Sir,—In his article on olive oil, in the last number of the *Pharmaceutical Journal*, Mr. Conroy appears to us to be unaware that the test he describes is, in a slightly modified form, well known as Hanchecorne's.

We may add that in the course of a large number of experiments instituted for the purpose of establishing a reliable scheme for the detection and estimation of the adulterations of commercial oils, we have (as far as we know) been the first to remark that Hanchecorne's reagent is a still more delicate test for mineral than for seed oils.

F. W. AND A. F. STODDART.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Field, Haydon, Hicking, Jeffery, Ferrum, Aqua, Puzzled, Provincial, Elgina, Medicus, Pill Driver, 3/4 H_2O, A. B. C., J. M. J.

"THE MONTH."

It is only now, when the trees are bursting into beauty everywhere, that one notices what damage the recent severe winter has done to half-hardy shrubs and trees, and their bare and leafless branches, covered, in the case of evergreens, with brown and withered leaves, look as unseasonable as the skull at the Egyptian feasts. The welcome rain in the earlier part of the month, and the absence of cold winds and frost, will, however, probably ensure a plenteous autumn, the mulberry trees in particular being loaded with blossom this year.

In the Herbaceous Ground at Kew, a number of medicinal plants may now be seen in bloom. The delicate bluish-white flowers of the Florentine iris, and the dark violet-blue ones of the *Iris Germanica*, planted near together, form a pleasing contrast The pretty little *Viola pedata*, official in the American Pharmacopœia, and remarkable for its pedatisect leaves, is now in full blossom, and the broom is one mass of gold.

In the Umbelliferous bed, *Carum Carui* and *Archangelica officinalis* represent the order, and in the Ranunculaceæ bed there are numerous specimens of *Podophyllum peltatum* whose flowers are almost concealed by the luxuriant leaves. Of the rarer British plants, *Meum athamanticum*, *Anemone Pulsatilla*, *Trollius europæus*, *Geranium phæum*, *Cypripedium Calceolus*, *Euphorbia cyparissias*, and the singular little mousetail (*Myosurus minimus*) may now be seen in blossom.

In the country the pastures have been white with the blossom of *Cardamine pratensis*, and in some localities the double flowers have been met with in abundance. In this plant the double character of the blossoms appears to be due, not as in the buttercup (a specimen of which has been sent by a correspondent during the past month), to the alteration of the stamens into petals, but, like the daffodil, to a series of flowers growing one inside the other; as if an excess of nourishment had something to do with the unusual development, or as if each ovule had developed into a flower. The various causes which lead to the formation of these flowers do not appear to be thoroughly understood as yet, at all events in this country.

Arum maculatum is such a common plant that it is only when a case of poisoning occurs from eating it, that one is surprised such cases do not more often happen. In the *British Medical Journal*, p. 668, a fatal case of poisoning by this plant is recorded. It is remarkable that so little is known of the poison contained in this plant, or of its medicinal action. In a subsequent number of the same journal, Dr. Murrell points out that the corm was the active ingredient in the vaunted Portland powder, a so-called specific for gout, and that it was official in the London Pharmacopœia of 1788, in the form of a conserve made in the proportion of 1 part of the fresh root to 1½ of double refined sugar, which was given in doses of a drachm to adults. It is still used by herbalists in the same disease.

The inflorescence of this plant is worthy of examination. The flowers are proterogynous, the pistil maturing before the anthers, and although the stamens are placed above the stigmas, the latter are withered and incapable of fertilization by the time the pollen is shed. The fringe of hairs which closes the mouth of the tube points downwards, and prevents the small insects which pass below it into the cavity of the spathe from returning until the maturity of the stigma is over, when the stigmas each secrete a drop of honey, the pollen ripens and falls on the insects, and soon after the hairs become flaccid and allow them to escape. Above the ordinary stamens there are barren ones and sterile stigmas above the productive ones.

Among the plants now in flower at the Royal Gardens at Kew, in the Economic House, is a specimen of the *Sium Helenianum*, or angelica of St. Helena, known to the natives as "Jelico." The stems of this plant are brought to the market like bits of bamboo, and are eaten raw by the natives. It is remarkable for having been found only in ravines which traverse the sides of Diana's Peak in the island of St. Helena, where it grows in company with cabbage trees and ferns (*Gardeners' Chronicle*, May 21, p. 663).

The winter-bark tree is also now freely in blossom in the winter garden. In the orchid house the singular flowers of the Sarracenias are now in full bloom, and their structure can easily be observed, the stigma being visible in the form of a projection, not much larger than a pin's head, on the under surface near the extremity of each lobe of the umbrella-shaped style, which occupies the whole of the centre of the flower. Although the leaves are furnished with contrivances, in the shape of honey-secreting glands, to lure insects inside the pitchers, and with others to prevent their exit, and with others again by which apparently the manure afforded by their decay can be absorbed, yet an excess of insects in the pitchers causes the latter to decay, and thus they are classed by Mr. Boulger as hemi-saphophytes rather than as carnivorous plants, there being no antiseptic digestive juice present, as in drosera, etc. Mr. W. G. Smith has recently observed that in a saturated atmosphere and in a strong light the petals rise and thus take a part in permitting the ingress and egress of insects. Some engravings of the flowers and much interesting information on the genus may be found in the *Gardeners' Chronicle*, May 14, pp. 627, 633.

One of our native plants, which grows near rivulets and streams, in woods and meadows, and now just coming into flower—*Œnanthe crocata*—is one which should be known to all engaged in pharmacy, on account of the dangerous nature of the poison it contains in the root. This is furnished with four or five white tubers, which somewhat resemble parsnips, and are, unfortunately, sweet to the taste. As it bears some resemblance in foliage, and grows in similar places to wild celery, it was recently mistaken for that plant by some Greek sailors at Plymouth, one of whom died in five hours from eating a tuber and a half. The account given in the *Lancet*, May 21, 1881, p. 823, is instructive, as it points out (1) that the exact physiological action of this common plant is unknown; (2) that a sailor, who ate the leaves only, recovered after drinking a quarter of a pint of rum; (3) that profuse bronchial mucus is a prominent symptom, and that the heart's action was slowed. These details seem to indicate belladonna or atropine as a probable antidote, and it may be hoped that anti-vivisectionists will not object to experiments being made on animals with this poison in order to find an antidote with which to save human life. Homœopathists, too, might take the hint, and try it in minute doses in chronic bronchitis, if they have not already done so.

A circular recently received from the United Kingdom Botanical Exchange Society indicates the probability of a society being formed, whose objects will be looked upon with some misgiving by many botanists. The society proposes—

> "First. To obtain specimens of the flora of various districts, so that each member may procure any particular one he may require.
>
> "Second. To collect seeds from plants that are rare or local, distributing them among members for propagation in suitable soils and localities, throughout the length and breadth of the country, thus extending their growth over a far wider area, and preventing their entire annihilation.
>
> "Third. To send seedlings, young plants, medicinal plants, ferns, etc., as far as *may be practicable*, to any member desiring them, that through such transmission he may introduce them into neighbourhoods where they otherwise would never have appeared."

The definition of the first object seems to avow ignorance of the existence of the Botanical Exchange Club, which has been successfully carried on during the past ten or more years.

The second and third propositions, if carried out, will render futile any future attempts at obtaining a knowledge of the natural geographical distribution of plants in Great Britain, and would make Watson's grand 'Cybele Britannica' a dead letter.

Our rare wild plants are becoming exterminated to a certain extent, and there is good scope for a society to prevent their extinction by carefully sowing the seeds of these plants in their natural habitats, so that the ruthless depredations of collectors may be rendered harmless. Unfortunately, many so-called botanists are mere collectors, and provided they get good specimens of rare plants in their own collection care little about the extinction of the plants themselves. The society also proposes to induce pharmacists to test the medicinal value of our rare plants, and to acclimatize foreign medicinal and other plants. The energy of young botanists would be far better expended in recording the variations of our common plants under different conditions of soil, climate and altitude, and in observing their relations to insects, their various modes of propagation, etc., and, in short, doing the work of a true naturalist, which is to observe and reveal Nature's secrets, but not to attempt to traverse her laws of geographical distribution.

The explosive character of the anthers of *Parietaria* has already been alluded to in these columns. These organs have been examined by E. Askenasy, who finds that the outer side of the filament is covered with transverse ridges lying close to one another. The cause of the sudden straightening of the filament and discharge of the pollen in *Parietaria erecta* depends, according to this author, on the development of the compressed elastic turgescent tissue of the filament itself.

Pringsheim's researches on chlorophyll have frequently been alluded to, but it may not be out of place to sum up the researches as far as they have gone. These may be stated as follows. Contrary to the usual opinion, chlorophyll is not directly instrumental in decomposing carbonic acid, but acts as a regulator of respiration by absorbing the chemical rays of light and preventing the oxidation of the carbon compounds from exceeding the assimilation of carbon. Chlorophyll corpuscles are sponge-like porous bodies, whose pores are filled with oily matter, in which the green pigment is dissolved. This oily matter generally contains hypochlorine, the mother substance of the carbohydrates, and this is protected from too rapid oxidation by the chlorophyll. Hypochlorine is a powerful solvent of chlorophyll and is always present in the green parts of plants. It is the only product that phanerogamic plants cannot form without the aid of light in the course of their germination, and is probably an immediate product of the decomposition of carbonic acid and serves to support respiration. The absorption of oxygen increases in proportion to the chemical power of the light, and, unless protected by the chlorophyll, the hypochlorine would be destroyed by excess of light causing excessive oxidation (*Gardeners' Chronicle*, May 14, 1881, p. 635). This view of the action of chlorophyll seems to be corroborated by the fact that while the thin leaves of plants growing in deep shade, such as *Oxalis Acetosella*, *Mercurialis perennis*, etc., have scarcely any of the palisade tissue, full of chlorophyll, so common in the horizontal leaves exposed to the sunlight, in phyllodes and vertical leaves the palisade cells are equally developed on both sides of the leaf. In the spongy parenchyma in the lower surface of horizontal leaves the chlorophyll granules occupy a position parallel with the surface of the leaf, but in an intense light they take up a profile position, which is that always occupied by the granules in the palisade cells.

One of the questions most frequently asked by students who read about the fertilization of the ovule, is, how do the pollen tubes reach the micropyle? According to recent investigations of M. Detmar, this is effected in several different ways. In *Daphne Mezereum*, the conducting tissue of the style projects in the form of a cone into almost immediate contact with the ovule. In the Compositæ the conducting tissue of the style is continued in the form of two parietal lines of mucilaginous cells on the inside of the ovary, meeting beneath the basilar anatropous ovule. In Plumbagineæ the long coiled funiculus brings the micropyle of the anatropous ovule immediately beneath the base of the styles from which, as in *Daphne Mezereum*, a cone of conducting tissue descends nearly to the ovule. In *Ricinus*, the trifid conducting canal of the style opens into the three loculi just above the insertion of the ovules, so that the pollen tube is conducted straight to the funiculus, which is swollen on the upper side and covered with papillæ that project in a tuft above the micropyle. In *Linum usitatissimum* and *Citrus Aurantium* similar arrangements occur. In *Verbascum Thapsus* a conspicuous mucilaginous layer overlays both placentæ and funiculi. In ovaries with free central placentation, as in *Lychnis vespertina*, in which there are four rows of campylotropous ovules, and the micropyles in each pair of rows face each other, there are two conducting bands between the rows bearing mucilaginous papillæ. In *Primula elatior* and *Anagallis arvensis*, a cone of conducting tissue projects from the free central placenta into the stylar canal. In *Acorus Calamus* the upper margin of the integuments near the micropyle is developed into a long papilla. In *Arum maculatum*, in which the single parietal placenta bears four to six orthotropous ovules, a short canal extends from the style into the cavity of the ovary, round the mouth of which and covering the placenta are uni- or multicellular papillæ of various length. From these papillæ at the time of blossoming a mucilage is developed which surrounds the mouth of the canal and the ovules, reaching to the micropyle. In *Euphorbia helioscopia* the papillæ temporarily contain starch grains and the nucellus projects into the micropyle and is in immediate contact with the papillæ. The pollen tube is thus directed on its way by papillæ, which nourish it by their amyloid or mucilaginous contents, and its conduction to the micropyle is therefore purely a mechanical phenomenon.

In most botanical text-books it is stated that the boundary line between the animal and vegetable kingdoms is by no means well defined, and that such is still the case is evident from the discussion at present taking place in certain scientific journals concerning the Myxomycetes, hitherto classed among the fungi. In the *Popular Science Review* for April, p. 112, Mr. Saville Kent brings forward evidence to show that, "these organisms have nothing whatever to do with fungi, but are rightly referable to the protozoic division of the animal series." Dr. M. C. Cooke, on the other hand, writing in *Grevillea*, refuses to part with them from the group of fungi. Mr. Kent states that he has seen the protoplasmic spheres ultimately become amœboid and flagellate, and extruded from the spores of the fungus; that carmine and bacteria are both ingested by the amœbiform units, and that the Myxomycetes differ only from the flagellate infusori in the fact that the final act, that of encystment, is accomplished by a mass of units coalescing into a colossal spore receptacle or sporangium. He therefore designates them Mycetozoa rather than Myxogasters, and compares the capillitium, or horny rete, to the keratose skeleton of certain sponges, while the stellate calcareous crystals scattered over the outer wall of the sporangium are likened to the extra-cellular spicules of the sponges, the raphides of plants being, in his opinion, characteristically intra-cellular.

On the other hand, in a paper read at the Royal Horticultural Society (*Garden*, April 30, p. 458), the author stated his belief that bacteria or euglæna give rise to the potato fungus. He placed on a patch of cooked potatoes some fluid containing euglæna, and after keeping at a temperature of 60 or 70°, some fungus appeared in seven days, and after a fortnight the *Phytophthora infestans* was developed.

It would seem to be a difficult thing to cut sections of a diatom. Mr. U. Pring, however, has succeeded in doing this by making thin slices of a diatomaceous rock from Nykjobing, in Jutland, and his observations relate chiefly to three species, in two of which (*Coscinodiscus oculus-iridis* and *Trinacria Regina*) he finds that the markings of the valves are true alveoli, traversing the thickness of the outer layer, and terminating against the inner one, which is also perforated by similar apertures.

According to a statement in *New Remedies*, May, 1881, p. 131, M. Fleischen finds that the yield of tannin is greater in oak bark grown on peaty soils than in that grown in sandy loam.

In the same publication, p. 138, it is said that the culture of the olive in California promises well, and seems as well adapted to the climate of the Pacific coasts as the native oak, that it grows faster, and bears earlier than in Europe, and that at the age of eight years good returns are expected, a six-year-old tree having been found to yield as much as a gallon of fruit.

In the *Mich. Med. News*, Dr. H. M. Hurd, states that he has tried cocculus indicus in cases of confirmed epilepsy with good results, the number and severity of the attacks being almost invariably reduced and the intellectual activity improved, rather than diminished as it so often is by the use of bromides. It appears to answer best where the patient is otherwise in good health and the convulsive attacks are attended with mania. In the *Virginia Med. Monthly*, Drs. A. U. Wiseman and W. S. Crump record cases of epilepsy treated with gelsemium, in which the fits ceased soon after the treatment and did not recur again for several months.

In the *Boston Medical and Surgical Journal*, Dr. C. R. S. Curtis recommends the use of a decoction of the leaves of the black walnut (*Juglans nigra*) in diphtheria; the improvement in each case is said to have been rapid, the œdema subsiding and the ash-coloured spots disappearing. He was led to experiment with the leaves from having seen *Juglans nigra* recommended by Professor Nélaton in his 'Eléments de Pathologie chirurgicale,'

Mr. R. H. Firth, of Blackport, writing to the *Lancet*, confirms Dr. Lee's statement of the efficacy of carbolic acid in the treatment of whooping cough, which Mr. Firth cured in his own person by inhaling carbolic spray for five minutes at a time, without the use of any other medicine.

Dr. A. H. L. Hamilton has recently remarked in the *Lancet* that the tribasic phosphate of silver may be given with advantage in place of other silver salts, as its administration is not attended by the gastric irritability that often attends the use of nitrate of silver or phosphide of zinc, while it can be given in doses of ⅓ to ½ grain for months without causing discoloration of the skin.

In the *Lyon Médicale* (December 19, 1880), Weiser recommends the use of nitrite of amyl as a disinfectant and preservative of urine, and states that it is preferable to carbolic acid, as it does not interfere with the tests for albumen.

It is stated in the *Lancet* that the oil of eucalyptus is being used by Professor Lister, in combination with dammar resin and paraffin, to impregnate gauze for antiseptic purposes.

In a recent paper in the *Practitioner*, Dr. G. Oliver states that certain of the natural Harrogate waters, such as the "Old sulphur" and "Chloride of iron," owe their efficacy to the presence of small quantities of chloride of barium, which in these natural solutions does not cause that irritation of the mucous membrane of the throat and stomach and sensation of dryness on the palate which the soluble salts of barium, even when largely diluted, are apt to produce when given in ordinary water. As a vascular tonic, in the treatment of some cases of scrofula where iodine is of little use, and in some forms of eczema, Dr. Oliver thinks the use of these waters containing barium chloride of considerable service.

According to information lately received from British Guiana (*Gardeners' Chronicle*, May 14, p. 635), salicylic acid is being largely used in the manufacture of sugar to keep the juice from fermenting. Cane juice, which in its natural state would ferment in a couple of hours, can be kept for days perfectly sweet, and much of the lime hitherto used can be dispensed with, which would allow the bright yellow colour of the juice to be retained.

A simple method of preparing iodoform bougies with cacao butter is described by Mr. Rogers (*Canad. Pharm. Journ.* for May). It consists in melting the cacao butter to the consistence of cream, mixing the ingredients, and pouring the mixture into a piece of glass tubing of the calibre required, corked at one end. When cold the bougie may be easily pushed out of the mould.

Podophyllum resin has been the subject of a very thorough investigation by Dr. Valerian Podwissotzki, and his report, which is in course of publication in the *Pharmaceutische Zeitschrift f. Russland*, points to results somewhat different from those obtained by previous observers. He considers the ordinary product obtained by precipitating an alcoholic extract of podophyllum root to be a mixture of various substances, and in this respect comparable to opium. By separation of fatty and colouring matters he obtained an amorphous resinous substance, which he found to possess all the active medicinal properties of the drug; this purified product he proposes to call "podophyllotoxin," leaving the name "podophyllin" to the crude precipitated substance. Podophyllotoxin, in its turn, is said to be separable into a bitter crystalline acid (pikropodophyllic acid) and a bitter crystalline neutral body (pikropodophyllin), both of which are medicinally active, and an amorphous acid resin (podophyllic acid) which is inert. The colouring matter has also been obtained in a crystalline form; but notwithstanding that it is usually looked upon as a criterion by which to judge the quality of the resin, Herr Podwissotzky finds it to be devoid of medicinal activity. This colouring substance has been assigned the name "podophylloquercetin," as indicating its chemical properties.

Some further cases of poisoning by the fruit of *Illicium religiosum* are reported from Japan, five children having been found lying, convulsed and foaming at the mouth, in the public park in Uyeno, in the neighbourhood of some fruit-bearing plants. Notwithstanding that medical aid was obtained, three of the children died soon afterwards, whilst the other two rapidly recovered. As a consequence, Professor Eykman, of the University of Tokio, was requested by the Japanese Government to make an investigation as to the poisonous principle in this kind of star-anise (known as "Shikimi"), and he has described his results in an exhaustive and important memoir, of which a translation will appear shortly in this Journal. It will be sufficient now to say that he reports having separated from the seeds of *Illicium religiosum* an extremely poisonous crystalline substance, which he has provisionally named "sikimine."

Under the commercial name of "essence de linaloës," an essential oil has recently been introduced into Europe from French Guiana, for perfumery purposes, which notwithstanding the similarity in name is a different product from the lignaloe oil imported from Mexico. The latter, as formerly shown by Mr. Collins (*Pharm. Journ.*, [2], x., 590), is derived from the "citron wood" of Mexico, probably a species of *Amyris*. The Guiana product is, on the other hand, obtained from the wood of the "licari kanali," the "female rose" or "white cedar" of the French colony, which has been referred to a species of *Acrodiclidium*, a Lauarceous genus. According to M. Morin (*Comptes Rendus*, xcii., 998) the oil of licari, as met with in commerce, is a limpid slightly coloured liquid, lighter than water, possessing an agreeable aromatic odour, recalling the smell of the rose and citron together, and burning with a smoky flame. When freed from a small quantity of water that it usually contains it has a density of 0·868 at 15° C., boils regularly at 198° C. with a pressure of 775 mm., and has a levogyre action on polarized light. Further, it is soluble in alcohol, ether and glycerine. A chemical examination shows that its elementary composition, like that of oil of cajuput, is identical with the composition of Borneo comphor ($C_{10}H_{18}O$), and that it can yield by dehydration a carbide of hydrogen having the formula $C_{10}H_{16}$.

The discovery of Professor Selmi as to the formation of poisonous alkaloids, which he calls ptomaïnes, in the human body after death, has introduced a considerable element of doubt into the subject of *post-mortem* examinations, and it has been alleged that in respect to a recent conviction for poisoning in Italy the experts mistook one of these ptomaines for delphinine. A convenient means of distinguishing between the two classes of alkaloids would therefore be of great value. According to Messrs. Brouardel and Boutmy (*Comptes Rendus*, xcii., 1056), such a reagent is available in potassium ferrocyanide, which in the presence of all the vegetable alkaloids they have been able to try, with the exception of morphia and perhaps veratria, remains unaffected, but in the presence of a ptomaïne is converted into ferricyanide, forming prussian blue with salts of iron. The method of procedure recommended is to convert the base extracted from the corpse into sulphate and place a few drops of a solution of the salt on a watch-glass containing a small quantity of dissolved ferrocyanide. If upon the addition of a drop of neutral chloride of iron there is a formation of prussian blue, all the vegetable alkaloids (with the exception of the two named) are excluded. Like the ptomaïnes, however, morphia acts freely upon the ferrocyanide, with a production of prussian blue; the veratria experimented upon gave only traces of the reaction, and this result the authors think may have been due to the presence of some impurities.

M. Armand Bertrand reports (*Mon. Scientifique*, [3], vol. xi., p. 493), that when a current of hydriodic acid is passed into anhydrous bromal or chloral a double decomposition takes place, hydrobromic or hydrochloric acid being given off and iodal formed, according to the equation $C_2HCl_3O + 3HI = C_2HI_3O + 3HCl$. Upon dissolving this product in water and saturating with potash, iodoform is obtained. M. Bertrand criticizes the statement of Dorvault, in 'L'Officine,' that iodal is a well-known body, boiling at 25° C., which has been tried as an anæsthetic. This, he says, has had its origin in the acceptance as a fact of some particulars which Gerhardt gives as quite doubtful. This is hardly all the truth, for different experimenters have claimed to have prepared iodal as an oily liquid, boiling at 110° to 115°, whilst Schoonbroodt obtained, by the treatment of alcoholic solution of iodine with potassium hypochlorite, crystals which in contact with alkalies were decomposed into formic acid and iodoform, and were supposed to be iodal. M. Bertrand does not appear to have given any details as to the physical properties of the iodal prepared by himself, so that a comparison cannot at present be made in this respect between it and the products obtained by earlier experimenters.

A compound of iodoform and strychnine, containing 1 molecule of strychnine to 3 of iodoform, and represented by the formula $(C_{21}H_{22}N_2O_2)3CHI_3$ has, been recently described by M. Lextrait (*Comptes Rendus*, xcii., 1057). It is said to be best obtained by dissolving 5 parts of crystallized iodoform and 12 parts of strychnine in 500 parts of 85 per cent. alcohol at a temperature a little below the boiling point; the solution becomes decolorized, and upon being allowed to cool in a closed vessel deposits long prismatic crystals, which are removed, washed with a little alcohol, placed between blotting paper and dried rapidly, protected from light or air. The compound is very unstable, being gradually decomposed by light with the liberation of iodine. It is decomposed at a temperature of 90°, and hot water decomposes it, the iodoform distilling off and leaving a residue of strychnine. Acids set free the iodoform and form salts of strychnine. It is also partially dissociated by alcohol. It is insoluble in water, hot or cold, slightly soluble in 98 per cent. alcohol, and freely soluble in ether and chloroform, but the solutions soon become coloured. Quinine appears to form an analogous compound, but the author only succeeded in obtaining it in a gelatinous form, containing an excess of quinine.

According to Fraude (*Berichte*, xiv., 319) the genuineness of a specimen of *Aspidosperma Quebracho-blanco* bark may be determined by boiling 5 grams of the powdered bark for five minutes in 25 c.c. of very light petroleum spirit, filtering while hot and shaking the coloured extract with 10 c.c. of dilute sulphuric acid; then, after separating the sulphate solution from the petroleum spirit, decomposing with ammonia and shaking with ether, heating the ethereal solution in a test tube and boiling the residue with solution of perchloric acid, or, in the absence of this, treating with a little water and a few drops of concentrated sulphuric acid, and after the addition of a small quantity of potassium chlorate, boiling for a longer time. If the bark be genuine, the result is the appearance of the beautiful fuchsine-like colour characteristic of aspidospermine.

In view of the extreme variability of the commercial nitrates of bismuth M. Tedenat proposes to substitute the phosphate for the subnitrate for use in medicine (*Journ. Pharm. et de Chim.* [5], vol. iii., 421). According to him it acts in rather smaller doses (1 to 2 grams) and can be administered in a similar manner. Phosphate of bismuth may be prepared by dissolving phosphate of soda in distilled water, heating to ebullition in a porcelain or glass vessel, and adding subnitrate of bismuth previously dissolved in a large excess of nitric acid gradually to the boiling solution. The reaction commences at once, and if the boiling be prolonged the phosphate of bismuth is precipitated as a dense white granular powder, separating clearly from the acid liquid in which it is contained. The precipitate should be washed on a filter until the washings are neutral to test paper and then dried in a stove.

During some recent experiments having for their object the separation of organic bases contained in certain roots and leaves, M. Schlagdenhauffen was surprised to notice the constant occurrence of considerable quantities of sulphate of lime in the liquid after dissolving the alcoholic extract in water, treating with a lead salt, removing excess of lead by means of sulphuretted hydrogen and filtering (*Journ. Pharm. et de Chimie*, [5], vol. iii., p. 397). The fact that an evaporated alcoholic extract had been used seemed to exclude the introduction of the lime salt from that source, and eventually he was induced to seek an explanation in the lead salts that had been used as precipitants of colouring matter, resin, etc. He found that specimens of litharge from three different sources, when boiled in water, filtered, the liquid treated with sulphuretted hydrogen and the solution evaporated, yielded crystals of sulphate of lime amounting to from 0·35 to 1·15 per cent., whilst specimens of acetate of lead yielded a still larger proportion. M. Schlagdenhauffen considers the sulphate of lime to be an impurity derived in the process of manufacture, rather than an intentional adulterant, but points out the necessity that chemists engaged in the investigation of the constituent principles of plants should exclude this source of error.

As mentioned some time since the United States Pharmacopœia Committee has decided to recommend the official adoption, under the name "saxolinum," of a hydrocarbon compound, to represent the numerous mixtures of paraffins that have become so popular with dispensers. That the name suggested should be criticized might be expected, and the *Pharmacist* objects to the latter part of it on the ground that the substance is not, chemically speaking, an oil; but with curious inconsistency it presently recommends the form "petrolardum," where the latter part is the Latin word for lard or fat.

Many of the difficulties and doubts which beset the pharmacist in his dispensing experience are such as need not have any existence and would not if the prescriber would try to consider prescriptions more from a dispenser's point of view than is frequently the case. Some time ago an attempt was made to secure the adoption of a sign to mark large doses of powerful drugs, but the result was hardly encouraging. According to the *Medical Times and Gazette*, in Paris the Prefet de Police has taken a somewhat similar subject in hand, and the walls of the city have been placarded with copies of a decree issued in 1846, which enjoins upon all medical men practising within the jurisdiction of the prefecture that when writing prescriptions ordering any poisonous substances they shall write out the doses in full instead of employing figures, and it further prohibits pharmaciens from dispensing any prescriptions in which this rule is not observed.

Just about the time of the appearance of the last instalment of "The Month" the Pharmacopœia was under the consideration of the Medical Council, and it is a significant indication of the little importance attached by the Council to this portion of the duties confided to it by the Legislature, that it turns out that during the last three or four years the reappointment of a Pharmacopœia Committee has been omitted through forgetfulness! Well might Sir William Gull stigmatize the neglect which has been shown in respect to the Pharmacopœia a disgrace to the Council! Further, the reappointment of a committee after this lapse of time seems to have excited a certain amount of nervousness, for the mover is reported to have expressed a hope that it would not be considered that the object was to take immediate steps for the publication of a new edition, because there were at present about four thousand copies on hand. Even Sir William Gull does not seem to contemplate a complete revision of the Pharmacopœia at present; but he considers that the proper course would be to publish a fresh Addendum every year, dealing with new remedies. If this plan were carried out until the stock of the present edition is exhausted, supposing four hundred copies were sold annually, there would then be a Pharmacopœia and ten official "Addendums" in existence. A motion instructing the Committee in this direction was nevertheless carried, and perhaps the very impracticability of such a scheme may lead to the attempting of something more reasonable. The question as to the propriety of pharmacists being represented on the Pharmacopœia Committee seems to have been entirely ignored.

Japan is to have a national Pharmacopœia, and if anything were required to emphasize the singularity of the position of the pharmacists for whom the British Pharmacopœia has the force of law, as compared with the pharmacists of the continents of Europe and America, it is to be found in the fact that in the construction of this Asiatic Pharmacopœia also pharmacists are to have a voice. The work is confided by the Japanese Government to a Committtee consisting of ten natives and five Europeans (four German and one Dutch) in the Government service. Among the latter are Professors Geerts, Eykman and Laangaard, whose names are already known in connection with the investigation of articles of the Japanese materia medica.

When a prescription is written containing a preparation such as that in No. 540 of the "Dispensing Memoranda," for which there is no published formula, the dispenser must exercise his judgment, taking care, whatever proportions he may use, that a good emulsion results. He will in this matter be much assisted by a reference to what has been written on the subject. In a paper by Mr. Gerrard, read at the Conference at Swansea last year (see before, p. 285), the relative proportions were given of powdered gum arabic and cod liver oil to make a good emulsion, and if to these be added a little syrup of orange flower, or as suggested, rose water and tincture of orange peel, a satisfactory result will be obtained, which by some persons is more easily taken than the pure oil. Yolk of egg may be used, but as it gives to the emulsion a yellow colour, the gum arabic is to be preferred. The formula is most probably one of those that owe their origin to hospital practice.

In the mixture No. 541 the relative proportions of olive oil and gum arabic are not suitable for a permanent emulsion. By a reference to Mr. Gerrard's paper above alluded to, it will be seen that 1 ounce of olive oil requires 4 drachms of gum arabic for complete emulsification, and with these proportions the emulsion is all that could be desired, and possesses the usual permanency, but it cannot safely be said that it will not separate.

Probably the best mode of dispensing the prescription No. 542 is, in the first place, to put from 1 to 2 drachms of rectified spirit into a bottle and on it the ½ drachm of powdered tragacanth; shake so that the spirit may separate the particles of powdered tragacanth, then pour on it the water in which the ammoniæ carb. is dissolved, and with fresh shaking the mucilage will at once be formed. The carbonate of bismuth should then be put into a mortar, and the mucilage added with trituration.

The quantity of tragacanth ordered in the prescription is less than would be required if, instead of water and tragacanth, mucilage of tragacanth had been prescribed. If pulv. tragac. comp. had been used by a previous dispenser it was an error, unless he knew that it was the prescriber's intention, and if so, a note should have been made on the prescription for the guidance of others into whose hands the prescription might fall. It must, however, be observed that the pulv. tragac. co. would have made a mixture more manageable by the patient; the present formula resulting in a very thick fluid, and the quantity of tragacanth for a 6 ounce mixture is unusual, and for the purposes of suspension unnecessary.

A satisfactory pill cannot be made extemporaneously with the ingredients of No. 543. The carbolic acid, although used in a crystalline condition, deliquesces. It is a prescription that should, if possible, be brought under the notice of the writer; if that cannot be done, equal parts of flour and bread crumb may be used, 2 grains to each grain of carbolic acid, which would necessitate two pills being given for each dose. With regard to the excipient for carbolic acid, reference should be made to previous remarks in the Journal, which will be found in the Index recently published.

In the prescription No. 544 there is no reason why the acid. nit. mur. should not be used, the dose, although somewhat large, is not exceptional; at the same time much difference of opinion may arise amongst dispensers as to the intention of the prescriber. What he has written is evident, but what he intended to write may be open to question. The dispenser would have been justified, taking the dose of acid into consideration, in using the undiluted acid in this prescription, but it very properly arrested his intention, and if possible, it would be very desirable to refer the prescription to the writer as being unusual, seeing that the acid. nitromur. in its undiluted state is not official, and an ingredient very rarely met with in a prescription.

It is not easy to understand why a difficulty should have been raised with regard to the ingredients of prescription No. 545. What did "Inquirer" expect to take place on pot. chlor. being mixed with dilute sulphuric acid and the quantity of water ordered? If to a fragment of chlorate of potash two or three drops of sulphuric acid be added an explosive gas is evolved, but this does not take place with dilute acid; there is, however, a slow disengagement of chlorine. An assistant would not be authorized in refusing to dispense the prescription in the usual manner.

In prescription No. 546 the same remarks will apply as for the one just previously considered with carbolic acid. But in this case with phosphorus bread crumb is not admissible. Reference should be made to former remarks on phosphorus pills, where it is stated that ol. theobromæ should be used in preference to bread crumb where phosphorus forms an ingredient in the pill mass; but bread crumb may be used with great advantage, in addition to wax or cacao butter, to give solidity to the mass.

There is too much carbolic acid in the formula No. 547 for a suitable mass, and in this instance flour and bread crumb may be used. But it will make the pills too large; each one must be made into two, and directions given that two be taken for each dose. Carbolic acid is not very generally ordered in pills, and when it does occur it frequently causes dispensing difficulties. It is very desirable that the subject be brought under the notice of those writers, few comparatively, who adopt the practice.

Vaseline has been suggested for the ointment of hypochlorite of sulphur, mentioned in No. 548, as being preferable to lard, but reference should be made to a notice of this ointment and the change it undergoes, [3], vol. ix., pp. 689 and 698.

It is difficult to say what sized mixture the writer of prescription No. 549 intended, but most probably a 6-ounce mixture. In some establishments a rule prevails that when the ingredients of a mixture are over 6 ounces and under 7, they be put into a 6-ounce bottle, but that when beyond 7 ounces they should be put into an 8-ounce bottle. Happily for the comfort and peace of mind of a dispenser these peculiarities of prescriptions are somewhat uncommon, and make their appearance at long intervals.

It is to be hoped that some of these anomalous conditions as regards prescriptions occasionally come under the notice of medical men, and that these memoranda, originally introduced to assist dispensers, may at the same time contain matter deserving some consideration at the hands of the profession.

Correspondents from time to time raise objections to some of the queries in the "Dispensing Memoranda," on the ground that they do not involve any difficulties which might not be easily overcome, and quite recently an instance of this kind has occurred in reference to the queries Nos. 544 and 545. The writer asks, as to the former, why Mr. Lyle should not dispense his prescription as written? thus apparently begging the real question as to what is to be understood by what is written. As to No. 545, the opinion expressed is much stronger, and probably there is more justification for it; but in either of these cases, and indeed generally, a detailed statement of the reasons for disputing the existence of difficulty or uncertainty in regard to the dispensing of prescriptions would be more effectual in demonstrating the superfluity of the questions asked than *ex cathedrâ* declarations that they are absurd. It has been repeatedly pointed out that the "Dispensing Memoranda" are designed for the instruction of juniors, and for affording the better informed an opportunity of rendering them assistance from their superior knowledge and experience. From this point of view it is to be desired that the correspondent who has pronounced Nos. 544 and 545 to be "foolish queries" should communicate more specifically his views concerning them, and thus render the inquirers a service they will be able to appreciate.

DIALYSED TINCTURES.*

BY CHARLES F. HEEBNER, PH.G.

QUERY: Can a dialysed tincture be prepared from drugs having alkaloidal active principles, so as to fairly represent in their medicinal strength the corresponding official tinctures of the United States Pharmacopœia?

The interesting and highly important discoveries made by Graham in 1861, upon the separation of crystalline from uncrystallizable colloid bodies, by means of dialysis, were the means of recommending this process to the attention of the chemist and pharmacist as a method of effecting certain kinds of analyses or separations.

The design of this paper is to demonstrate, from a chemical point of view, that solutions of alkaloids may be prepared by dialysis from powdered drugs, and that these solutions will have the same alkaloidal strength as the official tinctures prepared according to the formulæ of the United States Pharmacopœia.

This proposition received additional interest, from the fact that in the thirteenth edition of the 'United States Dispensatory' (foot-note on page 935) the following statement is made, viz.:—"Notwithstanding the very important aid promised to us by this process to pharmacy when first announced, we are informed that it has proved less practically useful than was hoped, as the great dilution of the diffusate renders it liable to chemical change in the amount of evaporation necessary."

Many of our drugs, such as opium, aconite, nux vomica, belladonna, etc., contain salts which are soluble in water, and to which their activity is due. They also contain various gummy, resinoid, albuminoid, fatty, protein, extractive and colouring matters, which are objectionable from a pharmaceutical and physiological point of view.

In endeavouring to ascertain the alkaloidal strength of a tincture, we are obliged to remove these inert principles, as they interfere with the action of chemical reagents, and their removal is a most embarrassing task, particularly if we have had but a small portion of tincture to be subjected to analysis.

In order to obtain a standard with which to compare the results that might be obtained in the experiments, a sufficient quantity of the following drugs was reserved for all of the experiments detailed below, viz.:—Opium, belladonna leaf, aconite root, and nux vomica, in powder suitable for making tinctures.

Sixteen (16) fluid ounces of tincture were prepared from each of the above-mentioned drugs by the United States Pharmacopœia process. Eight (8) fluid ounces of each of these tinctures were subjected to the following process of assay, for the purpose of obtaining a quantitative estimation of the amount of alkaloid present. This process is a modification and combination of several well-known methods for the determination of alkaloids. (For the sake of convenience in referring to them, the process of assay is divided into *six* successive steps of manipulation, designated by the letters *a*, *b*, *c*, *d*, *e*, *f*.)

a. Solution of subacetate of lead is added to the tincture until no more precipitate is produced. This precipitate is poured on a filter and washed with distilled water until the filtrate is colourless. The washed lead precipitate, made up of organic matter, is then treated—

b. with hydrogen sulphide to decompose the lead compound: sulphide of lead subsides, and the free acid and combined alkaloids remain in solution. The precipitated lead sulphide is washed with distilled water; the

c. washings and filtrate are then evaporated to a small bulk and treated with an equal volume of strong alcohol, causing the precipitation of pectin and albuminoid principles. This precipitate is washed with alcohol on a filter, and the filtrate and washings are evaporated at a temperature below 100° F. to dryness.

d. This dried residue is dissolved in a small bulk of distilled water, and, after twelve (12) hours' maceration, the acid solution of alkaloids is filtered from the residuary organic matter, and made slightly alkaline by the addition of a dilute solution of soda.

e. The alkaline solution is evaporated at a gentle heat to dryness and reduced to a fine powder, and exhausted with amylic alcohol.

f. The amylic alcohol is shaken vigorously with one-fourth its bulk of distilled water, acidulated with sulphuric acid; this is repeated twice. The aqueous acid solution of alkaloids, having been separated with a separatory funnel, is then evaporated to a definite bulk [in the experiments of this series, to two (2) fluid ounces], filtered, and titrated with Mayer's one-half normal solution of potassium iodo-hydrargyrate.

The composition of Mayer's solution is as follows, viz.:—13,546 grams of mercuric chloride, and 49·8 grams of potassic iodide in 1 litre. The results are based on the fact that a double iodide of the alkaloid is obtained, which is very insoluble in water. The end of the reaction can only be determined by the absence of further precipitation, which may be ascertained by filtering a drop of the liquid under examination, after each addition of the reagent, upon a watch glass, and bringing the same in contact with one drop of the titrating solution.

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* Abstract of a thesis presented to the College of Pharmacy of the City of New York, March, 1881. Reprinted from *New Remedies*, May, 1881.

The one-half normal Mayer's solution is made by diluting the normal solution with an equal bulk of distilled water. Dragendorff (in *Werthbestimmung*) recommends the use of this diluted Mayer's solution, and advises that it should be added very slowly, drop by drop, in order that the expected precipitate may be crystalline, and may be deposited quickly. If the addition is made too rapidly, the precipitate will be amorphous, and requires a long time to assume the crystalline form.

The results obtained at the completion of step *f* of assay process will be given below. In order to ascertain whether a solution of the alkaloids of these drugs could be obtained by dialysis, I moistened different portions of the powdered nux vomica with variable proportions of alcohol and water, with the intention of checking fermentation. The mixture finally decided upon was a menstruum containing 25 per cent. of alcohol. The drug was made into a soft magma with the menstruum and placed on parchment, and was subjected to the process of dialysis for one week; at the end of that time the dialysate was filtered, and a few drops tested for alkaloid with Mayer's solution produced a dense white precipitate.

The diffusate was then subjected to the same process of assay as were the United States Pharmacopœia tinctures.

After the separation of the aqueous solution of alkaloids from the amylic alcohol (step *f* of assay process), the nearly colourless solution was tested for alkaloidal reaction with the following reagents, and with the following results, viz.:—

Platinic chloride produced a yellow precipitate.

Mercuric chloride produced a white precipitate.

Mayer's solution of potassium iodo-hydrargyrate produced a dense white precipitate.

Marmé's test[*] produced a dense white precipitate.

Nitric acid produced an orange-red colour with precipitate.

Potassium hydrate and ammonia produced a white precipitate.

Potassic bichromate produced a yellow precipitate.

Auric chloride produced a light yellow precipitate.

The above tests proved conclusively the presence of strychnia and brucia.

The next step was to make experiments upon a definite quantity of the drug, and estimate the amount of alkaloid present in the diffusate. Accordingly, with the intention of obtaining sixteen (16) fluid ounces of the dialysate, the same amount of drug was used as is directed by the United States Pharmacopœia for preparing the officinal tinctures, viz.:—Powdered aconite root, 6 troy ounces; powdered nux vomica, 4 troy ounces; powdered opium, 1¼ troy ounce; powdered belladonna leaf, 2 troy ounces. While these drugs were being subjected to the process of dialysis, the diffusate of aconite root was subjected to a physiological test, which proved that this method of testing is attended with difficulties, which are far from pleasant, though decidedly convincing. A few drops of the diffusate were placed upon the tongue. In a few moments the lips, tongue and throat become numb, the lining of the throat felt hard, like leather; in fact, the symptoms of poisoning by aconitia increased to such an extent that I was obliged to resort to a dose of tincture of nux vomica for relief.

From each of the drugs subjected to dialysis sixteen (16) fluid ounces of dialysed tincture were prepared.

By comparing the dialysed tincture of aconite with the United States Pharmacopœia tincture, it will be noticed that the former has a pleasant odour, far superior to that of the latter; it also has a sweet taste, with no acidity. The same is true of the dialysed tincture of nux vomica, which is nearly colourless. The dialysed tincture of opium is an elegant preparation; it has scarcely any of the acrid nauseous taste which is so characteristic in the officinal tincture, and the odour is far more pleasant; its colour is reddish brown.

The dialysed tincture of belladonna is also as far superior to the officinal tincture as those already mentioned and has a pleasant taste.[*]

The table shows the difference in weight between the two kinds of tinctures.

Weight of fl. ℥ xvi. of Tincture.

Tincture.	Aconite.		Nux Vomica.		Opium.		Belladonna.	
	Weight.	Sp. Gr.	Weight.	Sp. Gr.	Weight.	Sp. Gr.	Weight.	Sp. Gr.
Dialysed[†] ...	7266·2 grs.	0·9965	7119 grs.	0·9764	7190 grs.	0·9862	7169 grs.	0·9833
U. S. P.	6165·3 grs.	0·8592	6049 grs.	0·8297	6961 grs.	0·9548	6954 grs.	0·9536
Difference ...	1100·9 grs.	....	1070 grs.	....	229 grs.	....	215 grs.	....

Eight (8) fluid ounces of each of these dialysed tinctures were carried through the same process of assay, for estimation of alkaloidal strength, as the officinal tinctures spoken of above.

Result.—Amount of Mayer's one-half normal solution required to produce complete precipitation:—

Tincture.	Aconite.	Bella.	Nux. Vom.	Opium.
U. S. P.	6·5 cc.	[‡]2·8 cc.	7·7 cc.	53· cc.
Dialysed	[‡]7·2 cc.	[‡]3·3 cc.	7·2 cc.	74· cc.

While carrying the tinctures through the series of experiments mentioned above, after the completion of step *c* of assay process, a considerable amount of residue was obtained from the United States Pharmacopœia tinctures, which represents the albuminoid matter, etc., while the dialysed tinctures showed none whatever. The United States Pharmacopœia tinctures presented a large amount of residue after the completion of step *e* of the assay process, while the dialysed tinctures presented a much smaller amount. Solution of subacetate of lead failed to remove all of the colouring matter from the official tincture, probably on account of the presence of alcohol. This excess of colouring matter has been dissolved in part by the amylic alcohol, which was used in steps *e* and *f* of assay process, particularly with the opium, while in that used for a similar purpose with the dialysed tinctures scarcely any colouring matter is perceptible.

From the above notes, it may at once be inferred that the dialysed tinctures excel the officinal tinctures in every respect, and, in their alkaloidal characteristics, may be considered equal, if not superior, to the alcoholic extractive tinctures of the United States Pharmacopœia, though physiological experiments are required to demonstrate their medicinal activity before we can accept the strong chemical evidence submitted in this paper.

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[*] CdI_2, 2 parts; KI, 4 parts; H_2O, 12 parts.

[†] Containing 25 per cent. of alcohol.

[‡] The aconite and belladonna gave a marked precipitation, but, on account of not having added the test solution slowly enough, the precipitate was amorphous, and could not be gathered upon a filter.

[*] Samples of all these preparations were submitted by the author.

In conclusion, we may state with great confidence that dialysed tinctures, or solutions having the official degree of strength, may be prepared from drugs having active crystallizable principles, therefore the query of this paper is answered affirmatively.

THE KAURI GUM OF NEW ZEALAND.*

Consul Griffin, of Auckland, makes an interesting report to the State Department, from which we make the following extracts, on the product of the kauri gum, which is so extensively used in the United States for the manufacture of varnish. It consists of the dried and solidified sap of the kauri tree, a species of pine known to botanists as the *Dammara australis*. It does not exist in any other part of the world. It is found only in the province of Auckland, in that part of the colony lying to the northward of the thirty-ninth degree of south latitude.

It was the opinion of many for a long time that kauri gum is a fossil article, like amber, and is no longer being produced. This, of course, is a mistake, but it is nevertheless true that the best and by far the largest quantity of merchantable kauri gum is dug out of the ground. It is found at various depths, from just above the surface of the soil to many feet below the surface. It is found on bare hillsides, on flat clay lands, in swamps, and even in some places that are covered with a more or less thick coating of volcanic *débris*.

Sometimes the gum is found in small detached lumps, and at other times large deposits will be found in one hole. On cultivated land it is not unfrequently turned up by the plough, and in many places the cutting of large drainsin swamps has revealed large deposits of this vegetable product.

In the forks of the large branches deposits varying from a few pounds to nearly a hundredweight are sometimes met with. When a kauri tree is cut in the bark, even one of the largest and oldest, varying in diameter from six to ten or twelve feet, it will bleed like a young sapling. In a few weeks, if the weather be dry, a large mass of half-dried gum will have oozed from the wound, not unfrequently appearing in the form of a great thick band, reaching from the wound to the surface of the soil around the tree. When a tree is felled the stump bleeds in a like manner until large masses of gum can be broken off from the stump. This "young" gum is white in colour, and has not the rich amber colour which age imparts to it when stored beneath the surface of the soil away from the action of sun and weather.

The gum is not soluble in water. It ignites freely and burns with a lively sooty flame. It froths and bubbles, and produces a pleasant aromatic odour. The perfume it exhales when burning in the open air is not unlike that of frankincense and myrrh.

Some of the finer specimens of kauri gum are used in the manufacture of jewellery, but, while it is very clear and beautiful, it is not so desirable for this purpose as amber. It is nothing like as hard as the latter, and is much more brittle, and insects and plants are not so frequently found imbedded in it.

Kauri gum was known to the native race long before the islands were settled by Europeans. They used it for the purpose of kindling their fires, and it is also said to have been employed by them in their religious rites, but there does not appear to be any ground for the statement.

Kauri gum became an article of commerce immediately after New Zealand became a British colony. At first the exports were small, amounting to about 100 tons per annum. The price of gum at that time ranged from $24 to $28 per ton. The natives then were the only persons engaged in searching for it and bringing it to market.

The implements used in digging for the gum consist of a spade and a spear. The spear is a long steel rod about half an inch in diameter, with a wooden handle with a cross on the top like that of a spade or a shovel. The rod is brought to a point, and the gum digger pierces in into the ground. Practice and experience enable him to tell whether he is touching a stone or a piece of gum. When he touches the gum he digs around it until it is extricated, and then renews the search as before.

The number of persons regularly engaged in digging gum varies from 1800 to 3000, the greater part of whom are Maories, but even they do not show any special fondness for the work. They resort to it when they become pressed for food and clothing on account of the failure of their crops, or other causes. Many Europeans have resorted to this kind of work, but they belong generally to a class who are unruly and impatient of the restraints which a civilized life imposes upon them, and who prefer to camp out after the fashion of gipsies, and live in tents and ranpo huts rather than in houses fitted for civilized beings.

It is generally supposed that a European who resorts to gum digging is unfitted for any other occupation. He leads a reckless dare-devil sort of life, away from friends and kindred, and from the restraints of civilization. All the finer feelings of his nature become blunted, and he falls to a lower depth than the savages with whom he makes his home. Among this nomadic class are a number of the degenerated sons of the aristocracy of Great Britain.

When the gum is taken out of the ground it is covered with earth, and its surface is found to be in a partial state of decay. When the digger is tired of work he puts his gum into a bag and carries it to his tent or hut, and in the evening or upon rainy days he, with the assistance of his wife and children, scrapes off the decayed surface until the clear solid gum beneath is reached. When a sufficient quantity of it has been scraped, it is put into a box or bag and taken to the nearest store or public house, where it is sold for what it will bring. Sometimes the purchaser will assort it, but it is not generally sorted till it reaches the city buyer, who employs a large number of skilled hands for that purpose. The gum, after it is scraped and assorted, is packed carefully in boxes, so as to prevent the lumps from breaking. It is then ready for export. The dust and scrapings are also exported.

Some of the gum is used in New Zealand for the manufacture of varnish, but in no great quantity.

The export of kauri gum for the year 1880 will be larger than that of any other year. The total export for 1878 was 3410 tons, and 3247 tons was the total export for 1879. The invoices thus far received indicate that the total shipment for the year 1880 will be 5500 tons.

The price of gum varies, of course, according to quality and the condition of the market. It ranges from $144 to $720 per ton. The greater part of it, however, is bought at the former price. The average price may be safely set down at $216 per ton. At this rate the total value of the estimated shipment for the year 1880, viz., 5500 tons, would be $1,188,000. More than two-thirds of the gum goes to the United States. It is either shipped to New York and Boston in sailing vessels, or to London for transhipment to the American cities.

It is a matter of regret, adds Mr. Griffin, that the kauri forests are disappearing. The trees are being so rapidly cut down that they will soon cease to exist. The Government has not taken any steps to protect them, either by conserving those that remain or by planting new ones. At the present rate of consumption, fifty or eighty years will see the great bulk of the kauri trees cut down. Of course, when the trees are destroyed there can be no deposits; and kauri gum will become a thing of the past.

The amount of gum taken out of the soil up to the present time has been so great, Mr. Griffin concludes, that it would probably require a forest growth of ten thousand years to replace it.

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* From the *Scientific American*, April 9, 1881.

INULIN.*

BY H. KILIANI.

The author at the outset alludes to the discordant results of former researches on inulin and to the necessity of a fresh study of its properties and chemical relations. In order to prepare it, roots of the *Dahlia variabilis* and *Inula helenium* were boiled with water in the presence of sodium carbonate. The liquid obtained was cooled by a freezing mixture, and the separated precipitate was dissolved in hot water, filtered, and again exposed to a freezing mixture. After repeating this process three or four times, the inulin is obtained perfectly white, and is subsequently purified from levulose by absolute alcohol, and finally dried over sulphuric acid.

Inulin obtained in this way is a white powder resembling starch; by slow evaporation of an aqueous solution it forms "crystal spheres," as observed by Sachs and Prantl (*Jahresb.*, 1870, 849). It is insoluble in absolute alcohol, sparingly soluble in dilute alcohol and cold water, but very soluble in hot water. The author has confirmed the formation of a gum-like and horny modification of inulin; the latter the author considers to be a highly hydrated inulin, which is converted into solid lumps of inulin in the same way that ferric hydrate and silicic acid are converted into their corresponding anhydrous oxides. Its sp. gr. is 1·3491, and its optical rotatory power, as determined with a Wild's polaristrobometer, $[\alpha]^d = 34{\cdot}6$ to $36{\cdot}4$, gives results agreeing with those of Lescœur and Morelle (*Ch. Soc. Journ.*, 1878, 970). The author assigns to inulin the composition $C_{36}H_{62}O_{31}$-$(= 6C_6H_{10}O_5 + H_2O)$. He has also confirmed the observations of others that inulin, when heated with water in sealed tubes at 100°, is converted into a sugar which resembles levulose in chemical and physical properties. When oxidized with dilute nitric acid, inulin yields formic, oxalic, racemic, glycollic and probably glyoxylic acids. The author finds that glycollic and saccharic acids alone are formed when dextrin is oxidized with dilute nitric acid.

Inulin is slowly oxidized by long contact with bromine in sealed tubes, with formation of bromoform and carbonic and oxalic acids; the hydrobromic acid formed in the reaction converts the unchanged inulin into levulin. This latter, by the further action of bromine, gives the same products as inulin. By heating the brominated liquid with silver oxide, some of the unchanged levulose is converted into glycollic acid. As this acid is formed by the direct action of bromine and silver oxide, it is possible that the inulin is converted by the bromine into levulose, which is then oxidized by the silver oxide into action of bromine and silver oxide on dextrose, and finds glycollic acid. For comparison the author has studied the that no oxalic, but only gluconic acid is formed, according to the equation $C_6H_{12}O_6 + O = C_6H_{12}O_7$. Glycollic acid is formed as a secondary product of the action of silver oxide on the gluconic acid. By distillation of inulin with hydriodic acid, a small quantity of an oil containing iodine is obtained, but its constitution could not be ascertained, as it readily decomposed. By the action of nascent hydrogen on inulin (sodium amalgam and water) neither mannitol nor mannitan is formed. Pure inulin reduces ammoniacal silver solution and gold chloride, but not Fehling's solution, or gold nor platinic chloride.

When inulin is heated with baryta-water it is partly converted into lactic acid. By inversion, inulin is not converted at ordinary temperatures nor at 40° C. into levulose (Barth, *Ber.*, [11], 474; 1878, 591). It appears from these properties that inulin stands in near chemical relation to levulose, and is probably its anhydride. This is shown by the readiness with which it takes up water in many reactions, being converted into levulose. It, however, differs from levulose by not reducing Fehling's solution, and not undergoing fermentation with yeast, and not forming an additive compound with hydrogen. Levulose, the hydrate of inulin, differs from dextrose in its oxidation products with nitric acid and bromine water; the former gives glycollic and oxalic, the latter gluconic acid. This difference may be simply explained by supposing dextrose to be the aldehyde, whilst levulose is the ketone of mannitol.

SIMPLE PROCESS FOR PREPARING PYROGALLIC ACID.*

BY T. E. THORPE, F.R.S.

Pyrogallol, or pyrogallic acid, is made, as the latter name implies, by heating gallic acid, but the process as usually conducted is very uneconomical, on account of the difficulty of preventing the decomposition of the pyrogallol into metagallic acid. According to the equation—

$$\underbrace{C_7H_6O_5}_{\text{Gallic Acid.}} = \underbrace{C_6H_6O_3}_{\text{Pyrogallol.}} + \underbrace{CO_2}_{\text{Carbon Dioxide.}}$$

gallic acid should yield 80 per cent. of its weight of pyrogallol, but the amount usually obtained is very much less than this; on the average not more than 30 per cent. is formed. The greatest yield is given at a temperature of from 185° to 200° C. If the heat be allowed to rise to 250°, the gallic acid is converted into metagallic acid, carbon dioxide, and water, thus:—

$$\underbrace{C_7H_6O_5}_{\substack{\text{Gallic}\\\text{Acid.}}} = \underbrace{C_6H_4O_2}_{\substack{\text{Metagallic}\\\text{Acid.}}} + \underbrace{CO_2}_{\substack{\text{Carbon}\\\text{Dioxide.}}} + \underbrace{H_2O}_{\text{Water.}}$$

The difficulties attending the conversion of gallic acid into pyrogallol have their natural effect on the price of the latter article. Photographers may be interested, therefore, in knowing how they may be able to prepare their own pyrogallol from gallic acid by a very simple and sufficiently expeditious process.

Ten grams (say 150 grains) of dry gallic acid and 30 c.c. (say 1 fluid ounce) of glycerine (preferably Price's) are placed in a 2-ounce flask or wide test-tube, and heated on a sand-tray to a temperature of from 190° to 200°, so long as bubbles of carbon dioxide are seen to be formed in the liquid. The gallic acid readily dissolves, and in a very short time it is entirely converted into the theoretical quantity of pyrogallol; this fact has been verified by direct observations made in my laboratory. The brown viscous liquid, after cooling, is diluted with 1000 c.c. (say 34 ounces) of water. A solution is thus obtained, each ½ ounce of which contains rather more than 1½ grain of pyrogallol, sufficient, therefore, for developing a quarter-plate according to Mr. Swan's instructions. In containing glycerine it of course resembles Mr. B. J. Edwards's solution, which has found favour with many photographers.

I have developed a number of plates (mostly Swan's) with solutions of pyrogallol procured in this way, with results in nowise different from those obtained by the use of a pure aqueous solution of crystallized pyrogallol of equal strength. The method of conversion is very easy; the only point to be attended to is the temperature, which should not be allowed to exceed 200°, otherwise the glycerine becomes very brown in colour. The thermometer should be supported in the flask or tube by a cork, perforated, of course, to allow of the escape of the carbon dioxide; and the bulb should be surrounded by the liquid, which should be shaken from time to time. The solution may, however, be very dark coloured without sensibly staining the film, provided of course, that the time of development be not unduly prolonged—a remark which applies equally to the ordinary method of developing by means of the crystallized acid.

As the present price of pyrogallol is about seven times that of gallic acid, the above process may be worthy of the attention of photographers who practise alkaline development.

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* *Annalen*, 205, 145—190. Reprinted from the *Journal of the Chemical Society*, May, 1881.

* Read before the Photographic Society of Great Britain

The Pharmaceutical Journal.

SATURDAY, MAY 28, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary,* 17, *Bloomsbury Square, W.C.*

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PROTECTION OF PHARMACEUTICAL INTERESTS.

THOUGH we fail to appreciate the advantages to be derived from making use of the Society's Annual Meeting for the utterance of growls, there can be little doubt that the expression of opinions for which an opportunity is afforded by this meeting may serve as a useful indication in regard to the actual state of pharmaceutical affairs and the means by which improvement may be effected. On the present occasion we may gather from the remarks of the speakers that there is a general recognition of the necessity for seeking, in other ways than by appeal to the law as it stands, to obtain such protection of pharmaceutical interests as would conduce to the welfare of those engaged in the business consistently with regard for the public benefit.

So far as we may take the late meeting as representing this state of feeling among the trade at large, it does not appear that so much is looked for from amendment of the Pharmacy Acts as from possible measures of internal organization by which some further advance might be made towards the achievement of the objects set forth in the Society's Charter. One of the most important things of this kind, referred to by several of the speakers at the Annual Meeting, is the mode of education now prevailing, and we are glad to find that there is evidence of an advance in the state of opinion as to the desirability of improving the education of apprentices and assistants.

The large proportion of failures in the examination by passing which legal qualification to carry on the business of pharmacy is obtained, sufficiently demonstrates the fact that the establishment of such a uniform system of technical education as it is one of the chief objects of the Pharmaceutical Society to promote still remains to be accomplished. Notwithstanding the facilities afforded by the School of Pharmacy founded by the Society, and by the numerous other educational institutions where instruction is to be obtained in the branches of science that a pharmacist requires to be acquainted with, more than half the candidates who present themselves for the Minor examination are unable to endure that test of fitness to carry on the business of a chemist and druggist. This circumstance is one which may reasonably be deplored from various points of view. In the first place it indicates a general want of any adequate appreciation of what is necessary in regard to qualification for carrying on the business of pharmacy. This is the case not only with the candidates who seek to obtain the legal right, but also with the general public, since it cannot otherwise be supposed that parents would so frequently neglect to secure for their sons a proper education and thus expose them to the risk of rejection after having spent several years in the capacity of apprentices. As regards the persons now referred to, it is evident that this deficiency is one that urgently requires to be removed, inasmuch as it must be a fertile source of serious disappointment and possibly disastrous consequences to those concerned.

Again, as a matter affecting the protection of those who carry on the business of pharmacy, the fact that legal qualification is sought by so large a number of persons who are not fit for the duties of that business is deserving of serious consideration, for it points to the possible danger of properly educated men having to face the competition of those who may have managed to elude the tests of examination. Natural instinct should lead pharmacists to guard with jealous tenacity the portal of admission to legal qualification and to regard the power of exercising this influence as one of the most efficient means of protecting themselves. The passing of the Pharmacy Act in 1868, rendering it necessary for everyone thereafter entering upon business on his own account to be registered and to undergo an examination for the purpose of testing his fitness, was an important step in support of the Society's efforts to advance pharmacy. But experience has shown that examination alone is not to be trusted as an infallible safeguard against the admission of inadequately educated men, and when it is remembered how much ingenuity is bestowed upon the art of preparing candidates for examination there is good reason to fear that in some cases, if not in many, a parrot-like capacity of answering questions may be sufficient to hide from the examiners the want of real knowledge.

It is now generally admitted that a sound knowledge of the principles of chemistry and fair skill in the conduct of chemical operations constitute an essential part of the qualifications of a pharmacist. The regulations of the Board of Examiners leave no doubt as to what is required, even of candidates for the Minor examination, in this respect; but in the absence of any special provision for giving the candidates an opportunity of acquiring the knowledge demanded, it is scarcely to be wondered at that so many of them make their appearance in the examination room without being able to pass.

As regards botany the same remarks apply, though in a less degree, since the study of this science can be carried on with greater facility than that of chemistry; but in regard to both chemistry and botany there seems to be strong reason for requiring candidates to produce evidence of having gone through regular courses of instruction at recognized schools before being admitted for examination. How this is to be done is a question that does not seem to have been very thoroughly considered even by those who think that the time has arrived for doing it. We hear of complaints that the Council of the Society has done so little towards the support of pharmaceutical education in the provinces, but it would perhaps be more reasonable if the Council were to complain of the neglect of the education of apprentices which results in rejection of candidates for examination. Those candidates come up for examination after having been for some years apprentices, and perhaps assistants, in pharmaceutical establishments, and it is during the time they were so engaged that they should have devoted their attention to the study of chemistry and botany.

Now that examination is no longer voluntary it cannot be expected that the means of education can be furnished by the Society in the same way that it was while examination was altogether voluntary and when the Society had to carry out the work of demonstrating the necessity of scientific knowledge on the part of pharmacists. If a knowledge of chemistry and botany is to form part of the pharmacist's qualification it must be provided for by a system of practical instruction. It will not do to regard this matter like the stuffing of a goose, as a matter of taste, and chemistry and botany as resembling the sage and onions which some look upon as superfluous or even detrimental. We hope the time has passed when such a view of the matter was possible, and we are certain that is to the interest of pharmacists that such a view should be discountenanced.

As regards materia medica and practical pharmacy it may well be expected that the ordinary duties of an apprentice to a qualified pharmacist will furnish ample opportunity for acquiring a knowledge of these subjects, as well as the practice of dispensing and the reading of prescriptions, and that, if the passing of the Preliminary as a condition of being eligible as an apprentice were enforced, the ordinary period of apprenticeship would offer ample opportunity for attending systematic courses of lectures on chemistry and botany, as well as passing through a course of instruction in practical chemistry. There are now many institutions throughout the country where this can be done, and as regards the provincial schools of pharmacy connected with various associations we cannot imagine any step that would do more to support them than a regulation made by the Council of the Society and the Board of Examiners requiring every candidate for examination to produce evidence of having attended such courses.

As regards the Preliminary examination it would not be unreasonable to introduce chemistry as one of its requirements, now that chemistry is taught fairly well in so many boys' schools, and if that were done we might expect to find a wholesome improvement in the state of public opinion as to the educational preparation needed for lads who are to be brought up to the business of pharmacy.

Doubtless the consideration of this subject by the Council, when the report of Mr. SCHACHT's committee comes before it, will lead to some steps being taken in the direction above indicated, and perhaps the desire that is entertained by some to have a more marked distinction of the better qualified members of the trade may at the same time meet with satisfaction. We do not admit having very much sympathy with the project of establishing a fellowship in connection with the Society, inasmuch as such a distinction is apt to be of little real value, and merely an indication that its holder pays so much a year for the privilege. But we should be glad to see the title of pharmaceutical chemist made more effectively a distinction than it is at present, and the Minor qualification restricted to assistants according to the original intention.

TEMPERANCE ACTS AND PHARMACISTS.

As "Local Option" regulations as to the sale of alcoholic liquors are among the possibilities of future legislation in this country it may be of interest to see how the pharmacists in certain sections in Canada, in which a Temperance Act, known as the "SCOTT Act," is coming into force, expect to be affected by its provisions. According to the *Canadian Pharmaceutical Journal* a sub-section of the Act provides for the supply of "intoxicating liquors" for exclusively medicinal purposes, or for *bonâ fide* use in some art, trade or manufacture. For strictly medicinal purposes, druggists and other vendors may sell, but only on the certificate of a legally qualified physician, quantities of liquor of not less than one pint, such liquor to be removed from the premises. If for use in the arts, etc., a certificate signed by two justices of the peace, together with an affirmation from the applicant, must be forthcoming before a sale may be made. All sales, for any purpose, are to be recorded, and a return of them is to be made annually to the collector of inland revenue for the district. Only one licence to druggists, or other vendors, is to be granted in each township or village, and two in each town; in cities the allowance is to be one to each four thousand inhabitants.

PROFESSOR DR. RUDOLPH BOETTGER.

THE death of this celebrated chemist is announced as having taken place recently at Frankfort-on-the-Main, in the seventy-fifth year of his age. Professor BOETTGER's name will be associated principally with the history of gun-cotton, of which, in 1846, he was one of the discoverers.

Provincial Transactions.

SHEFFIELD PHARMACEUTICAL AND CHEMICAL SOCIETY.

The third general meeting of the session was held in the Society's rooms, on Wednesday evening, May 11, Mr. Ellinor, President, in the chair.

The minutes of the previous meeting having been read, Messrs. G. H. Dunnill and Turner were elected members of the Society, after which Mr. E. R. Learoyd, Vice-President, read some "Notes on the Relation of the Medical Profession to Chemists." He first referred to the immense advance that had been made from the anomalous position held by chemists and druggists before legislation was obtained through the efforts of Jacob Bell and others. He then pointed out that as it had taken many years to raise the medical profession to its present position, so it was not until 1868 that a legal definition was given as to who were to be allowed to practise pharmacy. With the Pharmacy Act came a new era, so with that incoming came a new school of thought, and he thought he could as distinctly trace the progress of this new school of thought as he could the progress of pharmacy as a profession. It followed that if new it must be opposed in some way or other to what had gone before. Time, a long period of time, must necessarily elapse before its doctrines became understood and its laws adopted, but he had no hesitation in saying that the period was now rapidly approaching when many of the ideas handed down by their predecessors will have gone the way of the obsolete, or be remembered only as matters of historical interest. To this old school of thought it was that, even in our day and generation, pharmacists held a somewhat unfortunate position in the estimation of certain sections of the medical profession. Whether this would continue depended upon themselves. If conscious of their integrity and intelligently awake to their responsibilities he contended that the old order of things would for ever have passed away; and not only to the public, but to the medical profession itself, would it become clear and undisguisable that the chemist of to-day had actually become, by reason of his educational fitness for his calling, a functionary whose importance and usefulness in his own particular department was not second to the medical profession itself.

A free discussion on the various points of the paper ensued, and a cordial vote of thanks was awarded to Mr. Learoyd, which concluded the meeting.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, May 19, Professor Roscoe, President, in the chair.

The following certificates were read for the first time:—H. Frankland, A. J. Hailes, J. P. Wilkes.

The following papers were read—

On Ammonium Nitrite and the Reaction between Hydrogen and Nitric Oxide in the presence of Spongy Platinum. By L. T. Wright.—The author has been engaged in studying the reaction between ammonium chloride and potassium nitrite when a solution of these substances is boiled. He finds that free ammonia and ammonium nitrite are always present in the distillate, and that the equation is much more complicated than that usually given

$$NH_4Cl + KNO_2 = N_2 + KCl + 2H_2O.$$

Further quantitative work on this reaction is promised. The author then repeated the experiments of G. S. Johnson (*Chem. Soc. Jour.*, March, 1881) on the synthesis of ammonia from nitrogen and hydrogen in the presence of spongy platinum. He has been quite unable to confirm Mr. Johnson's results. When hydrogen and nitrogen (3 : 1) were passed through spongy platinum, small quantities of ammonia were always formed, but the nitrogen always contained traces of nitric oxide, recognized by the odour of nitrous acid when mixed with air and the discoloration of iodide of potassium and starch papers. The author found that the ferrous sulphate solution did not absorb the nitric oxide completely, and as is well known nitric oxide and hydrogen form ammonia when passed over spongy platinum. When nitrogen from the action of potassium hypobromite and ammonium chloride was used instead of the nitrogen from ammonium nitrite, no ammonia was formed in the above experiment. Also by passing the nitrogen evolved by boiling potassium nitrite and ammonium chloride through absorption tubes charged with an alkaline solution of sodium sulphite, instead of ferrous sulphate, the nitric oxide was decomposed, and in one experiment, lasting an hour, only 0·003 milligram of NH_3 was produced, and in a second, none. The author draws the following conclusions:—That nitric oxide is not completely absorbed by ferrous sulphate at ordinary temperatures; that hydrogen reacts upon nitric oxide to form ammonia in the presence of cold spongy platinum when the hydrogen is in sufficient excess; that with nitrous oxide no such reaction takes places; that nitrogen and hydrogen do not synthetically combine to produce ammonia in the presence of spongy platinum, at least when the nitrogen is produced by the decomposition of ammonium nitrite.

Mr. Johnson said that practically the author confirmed his result that when nitrogen, purified by passing through ferrous sulphate, was passed with hydrogen over spongy platinum ammonia was formed. He begged to dissent, however, from the author's conclusion that the nitrogen employed by himself contained NO. The gas which he used had been passed for a whole hour over heated, finely divided copper without altering its weight; it was, therefore, quite free from NO.

Mr. Warington suggested that the question as to whether the gas contained NO or not, might be set at rest by adding oxygen to nitrogen and passing the mixture into potassium iodide.

A short discussion then ensued, in which Dr. Tidy, Messrs. J. M. Thomson, Johnson, Wright, Thorp and Warington took part, as to the decomposition of nitric oxide by heated metallic copper. The general opinion seemed to be that under certain circumstances traces of NO might escape decomposition although passed over several inches of heated copper.

Mr. J. M. Thomson then communicated a paper—

On the Synthetical Production of Urea from Benzol, Ammonia and Air, by the Action of Heated Platinum. By E. F. Herroun.—The author has aspirated air through benzol and ammonia and then passed the mixed vapours over a heated platinum wire; urea was formed, mixed with ammonium carbonate and sulphate and some substance of a resinous nature soluble in ether. The urea was purified and agreed in its reactions and composition with ordinary urea. Spongy platinum and platinized asbestos and charcoal were substituted for the wire, but no urea was formed; also when olefiant gas was used instead of benzol vapour no urea was produced. Acetylen, on the other hand, behaved in a similar way to benzol, and a considerable yield of urea was obtained.

On a Proposed Volumetric Method for the Ready Estimation of a Soluble Sulphite and free Sulphurous Acid or of Free Sulphurous and Sulphuric Acids even in the Presence of Sulphates. By O. V. Pisani.—This proposed method is based on the following two equations:—

$$(1)\ M''SO_3 + I_2 + H_2O = M''SO_4 + 2HI$$
$$(2)\ SO_2 + I_2 + 2H_2O = H_2SO_4 + 2HI$$

By (1) it is seen that one molecular weight of a sulphite yields two molecules of hydriodic acid, and by (2) that free sulphur dioxide yields in addition one molecule of free sulphuric acid. The author proposes to estimate the iodine used and the soda required to neutralize the fluid after the addition of the iodine, and from these data estimate the free and combined sulphurous acid. To estimate the sulphates all the sulphur is oxidized by chlorine and the sulphates produced from the sulphites deducted. The author has apparently not tested the practical working of the process and no experiments are given in the paper, which he submits to the criticism of the Society.

On the Identification of Crystallized Alkaloids, etc., by the Microscope and the Use of Polarized Light. By A. PERCY SMITH.—The author states that the use of the microscope in chemical analysis is usually ignored in text-books not specially devoted to microscopic research, and that he has found the advantage of an optical examination in determining the purity of a crystalline salt. He has used polarized light with selenite plate in the ordinary way. The paper is accompanied with careful drawings of crystals of strychnine, santonin, brucine sulphate, cantharidin, etc. In most cases this mode of identification only applies to pure alkaloids or their salts, any admixture with other crystallizable bodies proving fatal. The author has, however, recognized cantharidin in a mixture of twenty-five alkaloids and identified strychnine, cantharidin, santonin, opium and laburnum in a mixture of lentil soup, bread, meat and cheese.

Professor Tidy said that he had some experience in this subject, and that in most cases the microscope was of little use in identifying the alkaloids by their crystalline form, as a trace of some other substance sometimes altered the appearance enormously. Thus a trace of piperine would completely alter the crystalline form of strychnine.

On the Colour Properties and Colour Relations of the Metals of the Iron-Copper Group. By T. BAYLEY.—The author continues in this paper his previous investigations as to the quantities of cobalt and nickel or cobalt, copper and iron as sulphates, which, when mixed, produce colourless grey solutions. Thus at 5° C. a mixture of 1 part of copper and 1½ part of iron simulates a solution of nickel sulphate; at 15° C. equal parts of iron and copper are required. The two following mixtures are chromatically neutral, 20 parts copper, 7 iron, 6 cobalt and 13 copper, 8·75 nickel, 6 cobalt. So that 8·75 parts of nickel are equal, as regards quality and colour, to 7 parts of iron + 7 parts of copper. These colourless opaque solutions in sufficient thickness transmit no light, and the light transmitted by solutions of less thickness is compound white light made up of the rays of two complementary beams, one having its centre in yellow and the other in the indigo. Under certain circumstances described in the paper nickel forms the yellow, copper forms copper-red, and cobalt forms orange solution.

On the Effects of the Growth of Plants on the Amount of Matter removed from the Soil by Rain. By E. W. PREVOST.—The experiments were carried on in large glazed stoneware pans 18″ in diameter, 10″ deep, each containing 100 lbs. of soil and provided with arrangements for collecting the drainage water. Analysis of the soil, drainage water, composition of the ash of the plants, etc., are given in elaborate tables; the plants grown included cabbage, wheat, beans, clover and turnips.

The President, in asking for any remarks on the paper, took the opportunity to express his regret that the authors of communications were not more frequently present, as it was almost impossible to grasp the salient points of a paper on hearing it read for the first time.

On the Action of Sodium on Cinnamic Ether. By F. HATTON.—This paper is a continuation of some previous work of Dr. Hodgkinson. The author has studied the reaction and concludes that it is probably represented in the case of β phenyl acrylate by the equation—

$$6C_6H_5.CH=CH,COOC_2H_5+Na_2$$
$$=2\left\{\begin{matrix}CH_3\\COOEt\end{matrix}\right.+2\left\{\begin{matrix}C_6H_5CHCH\\COONa\end{matrix}\right.+2(C_{20}H_{20}O_2)+H_2$$

The substance $C_{20}H_{20}O_2$ decomposes partially on distillation. The action on ethylic β phenyl propionate is similar.

The Society then adjourned to June 2, when the following papers will be read:—"On Isomeric Acids obtained from the Ethers of the Hydride of Salicyl and from Coumarins," by W. H. Perkin; "On the Saponification of Fatty Oils and Waxes," by A. H. Allen and W. Thomson; "On the Sulphides of Copper and a Determination of their Molecular Weights," by S. Pickering.

CHEMISTS' ASSISTANTS' ASSOCIATION.

At a meeting of the above Association, held March 30, Mr. F. W. Branson in the chair,

Mr. G. Brownen, F.C.S., read a paper on "Phosphoric Acid and some of its Combinations." By phosphoric acid, the author said he meant tribasic or orthophosphoric acid. He urged the desirability of a strong as well as of the dilute acid becoming recognized and defined in the next British Pharmacopœia. The various processes for making phosphoric acid were noticed, the peculiarities of the processes and the chief impurities of their results, arsenic as arsenic acid being shown to be the most serious and objectionable contamination. After describing the method for the detection of this and other impurities, the author passed on to notice those salts of phosphoric acid most commonly used, *e.g.*, phosphate of potash, soda, ammonia, iron, manganese and zinc; formulæ and processes were given for the manufacture and estimation or purification of these salts; the modification of the less soluble phosphates, when dissolved in acidulous media, were also noticed, as well as the conjugated or double salts. In the manufacture of phosphate syrups, preference was given to the use of a liquor obtained by the action of a strong phosphoric acid on metallic iron in the form of turnings; the strength of the resulting solution being estimated by pouring into alcohol, washing the precipitate with alcohol, drying and weighing. Some samples of phosphate of manganese having little solubility in phosphoric acid, Mr. Brownen preferred to add the carbonate to ac. phos. dil. and thus at once form the soluble phosphate.

A very practical paper was brought to a conclusion by a notice of the phosphatic compounds of glycerine, oleic acid, etc., in the human economy, the union of calcium phosphate with lactic acid, the digestive ferments, etc.

The paper was illustrated by experiments, and numerous specimens were shown, including ferrous phosphate in crystals, also a soluble scale compound.

After an interesting discussion, a cordial vote of thanks was passed to the author.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, May 12, Mr. R. H. Parker, Vice-President, in the chair. A report on Pharmacy was made by Mr. W. H. Symons, F.C.S., dealing with the subject of "Scales, Weights, and Measures." The author first insisted upon the importance to the pharmacist of delicate scales and accurately graduated weights and measures, and then described the various forms of scales and balances in ordinary use, stating that the scales or balances employed should turn, at least, to the tenth of a grain. The various forms of weights were then described, the following table representing the excess allowed on weights—

On the ½ grain weight	1/50th grain.
On the 1 grain weight	1/30th grain.
On the 1 scruple to 4 drams . .	1/10th grain.
On the 1 ounce to 10 ounces . . .	¼ grain.

The method of graduation, and incidentally of stamping glass measures, was then noticed, and the various forms of glass measures in the market described. The paper was illustrated by specimens of the various kinds of scales, weights, and measures.

A lengthy discussion followed the reading of the paper, in which the Chairman, Secretary, Messrs. Bird, Elborne, Groves, and MacDermott took part. A vote of thanks was passed to Mr. Symons for his paper.

Parliamentary and Law Proceedings.

PROSECUTION UNDER THE 17TH SECTION OF THE PHARMACY ACT.

At the Manchester City Police Court, on May 11, 1881, before Mr. F. J. Headlam, stipendiary magistrate, a summons was heard which had been issued on the application of the Chemists and Druggists' Trade Association of Great Britain, against Lewis and Company, Market Street, general dealers. Mr. Henry Glaisyer (Birmingham), solicitor to the Chemists and Druggists' Trade Association, appeared for the prosecution, and Mr. Cobbett, of Manchester, for the defence.

Mr. Glaisyer said the summons was issued under the provisions of the 17th section of the Pharmacy Act, 1868. The complainant was George Revill Templeman, assistant secretary of the Chemists and Druggists' Trade Association of Great Britain, and the defendants were David Levy, Samuel Eleazer Levy, Lewis Samuel Cohen, Beresford Samuel Cohen and Herbert Samuel Cohen, who carry on business in Manchester as Lewis and Company. They seemed not to be content with a very large and legitimate business, but they also dealt in poisons which the Act said they had no business to deal in. The 17th section of the Pharmacy Act, 1868, said it should be unlawful to sell any poison either by wholesale or by retail, unless the box, bottle, vessel, wrapper, or cover in which such poison is contained were distinctly labelled with the name of the article and the word poison, together with the name and address of the seller of the poison, and it should be unlawful to sell any poison of those which are in the first part of schedule A of the Act or may be hereafter added thereto under section 2 of the Act, to any person unknown to the seller, unless introduced by some person known to the seller. On April 5 Mr. Templeman went to the defendants' shop and there purchased a packet of Hunter's vermin killer, which he ultimately analysed and found it to be a preparation of strychnine. He was unknown to the seller at the time and was not introduced by anyone, and the name and address of the seller did not appear on the packet.

George Revill Templeman, assistant secretary of the Chemists and Druggists' Trade Association of Great Britain, being called, sworn and examined by Mr. Glaisyer, deposed to the facts stated by Mr. Glaisyer.

Cross-examined by Mr. Cobbett, he said he personally analysed the contents of the packet and found it to consist of strychnine, another substance which he believed to be rice powder, and coloured with a blue matter.

Mr. Cobbett, for the defence, said he would like to call his worship's attention to the Act; he would find that section 17 said it should be unlawful to sell any poison, and so forth, except in the manner provided; and there were different provisions made with reference to two different classes of poisons, which were separated by being placed in different parts of the schedule. In the case of poisons included in part one an introduction seemed to be necessary, but in the case of poisons included in part two no introduction seemed to be necessary. There seemed to be a distinction made as to the two, but with regard to the whole section, if his worship noticed, the prohibition was against the selling of poisons which were specially mentioned in the schedule. After reading the second section of the Act he (Mr. Cobbett) said the Act was particularly careful to define what shall be a poison within the meaning of the Act. If he would look at the schedule he would find that it defined exactly and in particular words what were to be considered poisons. There was nothing whatever to show that a mixture of poisons with other matters was a poison within the meaning of the Act; the Act used the word poison and the particular poisons were defined and mentioned in the schedule, and neither throughout the schedule nor in the rest of the Act did he find any stipulation that any article mixed with poison was to be a poison within the meaning of the Act. It seemed to him the reason for this was a very obvious one. Some poisons, as they knew, were mixed with a variety of articles which would not cause death or even injure health, and these articles were sold without a knowledge probably on the part of those who sold them what the ingredients were, and his contention was that it was never intended the provisions of this statute should apply to a mixture of materials and poisons, but to poison itself. If this contention were correct then the Act would not apply to the case in question. In support of his argument Mr. Cobbett quoted the case of Berry *v.* Henderson, reported in 22 *Law Times Reports*, new series, page 331.

Mr. Templeman re-called.

Mr. Headlam: What is the percentage of strychnine?—I did not test the quantity, but I should say about 2 grains.

Would that poison a human being?—It is poisonous in doses of from one-half to two grains. Two grains are in an average packet generally.

Mr. Cobbett then repeated his former arguments and said that the construction placed upon the section of the Act by Lord Justice Lush also applied in this particular case.

Mr. Headlam: I think the case comes within the meaning of the Act.

Mr. Cobbett then addressed the Court in mitigation, and at the conclusion of his address—

Mr. Headlam considered the case proved and inflicted a fine of forty shillings and costs.

SUICIDE OF A CHEMIST AND DRUGGIST.

On Thursday, May 12, Dr. Danford Thomas, held an inquiry at the Railway Hotel, New Southgate, as to the circumstances attending the death of Mr. Edmund Henry Ombler, aged 43, a chemist and druggist, of 8, Southgate Place, who had died from the effects of a large quantity of prussic acid administered by himself.

Harriet Fordham, domestic servant to deceased and Mrs. Ombler, said she last saw deceased alive on Tuesday morning between seven and eight o'clock. He was generally very dull, but on Monday he went up to London to vote at the election for coroner. When he came back, and up to the time he went to bed at ten o'clock, he appeared in better spirits. He first came downstairs from his bed-room about a quarter before seven on Tuesday morning, a thing most unusual, and went into the shop, but shortly after went up stairs. In about half an hour he came down a second time and again went into the shop. She did not see him go up stairs again, but shortly before eight her mistress met her on the stairs and asked her where her master was. On going into the drawing-room she found her master lying on his face on the rug. She raised an alarm, and it was found that he was dead.

Mr. Evan Jenkins, assistant to deceased, said he had just returned from his morning's walk when he was called by last witness, and found the deceased on the rug in the drawing-room dead. A bottle with prussic acid, about half full, and stoppered, was on the mantel shelf by the side of a measuring glass. He at once saw what had happened and ran for the medical man.

The Coroner observed that he perfectly recollected seeing deceased at the polling booth at Islington on Monday, and shaking hands with him.

The Jury ultimately returned a verdict that deceased died from the effects of prussic acid self-administered, whilst in an unsound state of mind.—*Standard.*

A Coroner on the Sale of Oxalic Acid.

On Friday, May 13, Dr. Danford Thomas, the recently appointed coroner for Central Middlesex, held an inquest at the Clerkenwell Coroner's Court, into the circumstances attending the death of Harriet Lambert, aged 36, who committed suicide by poisoning herself on the previous Tuesday.

According to the evidence it appears that the deceased, the wife of a bonnet-shape maker, had been for some considerable time past addicted to habits of intoxication, and that when she had no money to procure drink, she would take clothing out of the house and pledge it, so that she and her companions could obtain it. On Tuesday she was joined by one of her companions, and as she had no money, things were pawned, and after they had been drinking for some hours, she told her companion to go and get her a pennyworth of oxalic acid as she wished to clean two hats with it. The companion went to the shop of Mr. Huxtable, of St. John Street, and there she purchased the poison, which she took to the deceased, who some time afterwards mixed it up in some beer, drank a part of it, and soon after died.

Mr. Charles Phill, assistant to Mr. Huxtable, chemist, of St. John Street, stated that he remembered serving the deceased's companion with a pennyworth of oxalic acid, which she said she wanted for cleaning two hats; and thinking that he knew her, and as it was only seldom that they caused persons they knew to enter their names in the register kept for registering the names of purchasers under the Act of Parliament, he did not ask her to do so.

The Coroner, after looking at the Act of Parliament, said there was not the slightest doubt but that in this case the law had been broken, for it was clearly laid down that the article of poison should not only be labelled poison, but also the name of the poison, besides which the purchaser, where known, should enter his or her name and address in the register kept for that purpose, and where the purchaser was unknown to the seller, then another person known to both parties should also be required to sign the book. In this case the law, he was afraid, had not been complied with, and the chemist was liable to £5 penalty. He knew that although chemists were bound to take and use precautions, yet people could go and buy as much poison as they liked at anyone's shop without being asked a question, and this, he thought, showed the imperfect state of the law on the subject.

The jury returned a verdict "That the deceased committed suicide whilst of unsound mind, produced by continual habits of intemperance.—*Clerkenwell Press.*

Suicide of a Druggist's Assistant.

On May 20, Mr. Malcolm held an inquest at the Leeds Town Hall, on the death of John Wood (42), druggist's assistant, formerly employed by Messrs. Goodall, Backhouse, and Co., Boar Lane. In July last the deceased left his house at 12, Rockingham Street, for his work-place, but instead of going thither he went to the Wakefield Asylum, where he gave himself up. Recently he was discharged, on his sister, Mrs. Ann Webster, of Merrion Place, agreeing to take charge of him. It was stated by Mrs. Webster that he progressed favourably until last Sunday week, when he met his wife and child in the street. He afterwards became depressed in spirits, and, it is thought, took a dose of hydrate of chloral, which caused his death on Thursday. The *post-mortem* examination, made by Mr. W. M. Hurtley and Dr. Jacob, showed that narcotic poisoning was apparent, and during Wednesday, when the deceased seemed to be conducting himself somewhat strangely, he admitted to his sister that he had simply taken a dose similar to one which used to be given him whilst at the Wakefield Asylum. A verdict of "Committed suicide whilst temporarily insane" was returned.—*Leeds Mercury.*

Poisoning by Chlorodyne.

The Liverpool Workhouse has furnished another illustration of the mania some "hospital birds" have for tasting medicines. A girl, twenty-three years of age, an inmate of the Lock wards, secreted the keys of the medicine closet, and, while the nurse was searching for them, she abstracted a ten-ounce bottle of chlorodyne. With the exception of two small quantities, which she gave to two other girls, the deceased drank almost the whole of the bottle of medicine, or fully eight ounces! The most of it was taken about nine o'clock in the evening. At half-past ten, the night nurse was attracted to her bed by the smell of chlorodyne. The patient was then unconscious, and could not be roused in the slightest degree. Dr. Forbes washed the stomach out thoroughly, tried galvanism, artificial respiration, and cold affusion, without any effect in restoring consciousness. The treatment prolonged the action of the heart and lungs, but the stimulation became less and less effectual, and death occurred at five o'clock next morning. A *post-mortem* examination was made forty-eight hours after death. The lungs were extensively congested, and the left heart full of a soft, whitish clot. The arteries were slightly atheromatous. The stomach contained some undigested food; its walls were pale; and both stomach and contents smelt strongly of chlorodyne. The liver was intensely congested. The spleen and kidneys were not much affected.—*Medical Times and Gazette.*

Supposed Poisoning by Laudanum.

On Thursday, May 26, an inquest was held at the Sessions House, Westminster, before F. S. Langham, Esq., Deputy-Coroner, on the bodies of William Taylor, late a dispenser at the Army and Navy Stores, and Elizabeth, his wife.

Mrs. Bignall, 47, Morton Terrace, Pimlico, said both the deceased had lodged with her about thirteen months. Just after twelve o'clock on Friday night or Saturday morning, the 21st inst., she heard a noise downstairs, she went down and saw that the husband was dying, and ran to fetch Dr. Hunt. On returning, he was dead. He had been unwell all the time he lodged there, and had been in the hospital for a month before Christmas. He was thirty-four, and his wife thirty-six. In less than half an hour the wife became delirious, and was so the whole night; about half-past six she dropped asleep, and did not wake again. She had been a great sufferer from some internal complaint.

Mr. J. H. Redding, assistant to Dr. Hunt, deposed to seeing the deceased man on the Saturday morning at about one o'clock. He was quite dead. The wife was in a very excited state, but she seemed pretty well. About three he was sent for again, and found her very sick and faint, and then took Dr. Hunt to see her. About half-past six or seven he was again sent for, and found her quite dead.

Dr. John Hunt, M.R.C.S., L.S.A., said he had made a *post-mortem* examination of the bodies. When he first went he was informed that a bottle of laudanum had been found. He heard from the landlady that the deceased had been dispenser at the Army and Navy Stores, and afterwards had joined the Army Service Corps. He noticed no smell of laudanum from the mouth. On making a *post-mortem* examination he found the brain very soft; the lungs were healthy; the heart somewhat flabby; the liver about three times its natural size, and much congested; the stomach was healthy, but with the exception of being congested, there was no odour from the stomach. The kidneys were diseased; the other organs were healthy. He concluded that the deceased had been a very persistent drinker, and had not eaten much. He believed he died from a sudden attack of faintness, consequent on persistent drinking. He had since made an examination of the stomach, and found no trace of opium. When he went to see Mrs. Taylor, he found her in a state of almost hysterical mania, and very sick and faint. She had taken one dose of medicine, and they persuaded her to take another. She died as had been described. A *post-mortem* examination showed that she had diseased lungs; very feeble heart; liver congested; stomach healthy, but empty; kidneys healthy; but she had a large fibrous cancer in the uterus. He had no doubt that she died of shock to the system in consequence of the sudden death of her husband. She was quite conscious when he first saw her, and she told him she did not think her husband had taken any laudanum for some time. It was quite possible he might have taken it occasionally. A person given to drink often did.

The jury, having consulted, wished to know where the bottle was found.

Police Constable George Ellis deposed that he was called in and found the bottle produced on the table; it bore the label "Tincture of Opium, B.P.," it had no other label. The cork was not dry. The woman said her husband had been drinking heavily for three days: also that he had been in the habit of taking something to make him sleep. She did not know that he had taken any that night.

The landlady, recalled, said she had not seen the bottle before.

The jury returned a verdict of death from natural causes in the case of the wife, and in the case of the husband of death from excessive drinking.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[541]. If W. C. W. uses ʒiv. of mucilage (equivalent to ʒij. of gum acacia) and forms an emulsion with it and the ol. olivæ, and then adds the pot. bicarb. (previously dissolved in part of the aqua) shaking the bottle constantly, he will get a nice-looking emulsion, which will not separate.

M. H. Jones.

[541]. I should triturate the ol. olivæ with the gum. acaciæ in a mortar, and having dissolved the potassæ bicarb. in the water, should then add gradually that solution so as to form a presentable emulsion.

"374."

[542]. If "Tick" were to dispense the prescription as it was written and not trouble about how it has been dispensed before, I do not think he could be wrong.

"374."

[544]. I think that this might be dispensed either way. Acid. nit. mur. dil. is in more frequent use than aqua regia.

"374."

[545]. I do not see on what grounds "Inquirer" would be justified in refusing to dispense this prescription.

"374."

[547]. The best excipient for these pills, in my opinion, is bread crumb and a little simple syrup.

Pill-driver.

[548]. In reply to "Vaseline," I should say that vaseline is a very good basis for ung. sulph. hypochlor., and that it undergoes no change, either chemically or physically, but I will not be dogmatic on the point.

Vaseline Junior.

[549]. Probably a ℥vj. mixture was intended.

"374."

[549]. In reply to "Cymro," I think the prescription is intended for a ℥vj. mixture, as the quantities are nearer to that quantity than to 8 ounces.

Ferrum.

[550]. The following prescription, when dispensed by a London house, appears as a perfectly bright and clear mixture. Being unable to obtain a like result, I ask the opinion of your correspondents:—

℞ Vini Ferri	℥iss.
Syr. Simplicis	ʒiiss.
Liq. Fowleri	ʒiss.
Aquæ Puræ	℥ij.

M.

"Provincial."

[551]. Which is intended in the following prescription, tinct. ferri acet., B.P., or liq. ferri acet., Ph. Ger.?—

℞ Liq. Ferri Acet.	ʒiij.
Tinct. Nucis Vom.	ʒj.
Æth. Chlor.	ʒij.
Aquæ . . . . ad	℥vj.

M. Coch. mag. j. ter die post cibum.

J. M. J.

[552]. Will someone kindly inform me as to the reason of the following mixture becoming solid on standing for a few minutes, and what product is produced:—

℞ Sol. Mag. Sulph. (1–2)	℥ss.
Spt. Æther. Nit.	℥ss.

M.

H_2O.

Correspondence.

*** ***No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.***

The Election of the Council.

Sir,—As a remedy for the statement made in last week's Journal, "That more than half the voting papers sent out were not returned," I would suggest that the collecting of papers be entrusted to the Local Secretaries, and should they not have sent them in to head-quarters before a few days prior to the election, then let the Secretary apply for them.

This plan would secure a maximum of votes, and, I think, tend to arouse greater interest in the affairs of the Society.

Derby. J. A. Cope.

Sir,—In looking over the record of past years of the Transactions of the Pharmaceutical Society it will be found that attention has more than once been called to the large number of its members who are either too busy, too indifferent, or too idle to exercise the privilege of recording their votes in favour of those whom they believe to be worthy of their confidence. Unfortunately the year 1881 is no exception to the general rule, and once more the Council steps into office with the dead weight of nearly two thousand unrecorded votes to act as an incubus throughout a period which has perhaps never before been equalled for its burden of anxiety, and its promise of real work.

If it were possible that a successful candidate for parliamentary honours could, in the retrospect of his election, remember that considerably more than one half of his constituents refrained from voting he would probably be ready to admit that there was something not altogether sound in the affairs of a constituency so remarkable eccentric at the polling booth; the fact alone would be sufficient to make him dispirited, and to dull the flame of that enthusiasm which but a few days before was burning brightly on behalf of his constituents' interests. To a pharmacist, the constitution of the Government of his country is, at the present time, scarcely of so much moment as the constitution of the Pharmaceutical Society, for the simple reason that whilst the pharmacist may be looking towards the Government for a redress of his wrongs, the Government, in the natural course of things, will turn towards the Pharmaceutical Society for its guidance upon questions concerning which the Council of that body is best able to advise.

If this is a correct interpretation of our position, and I believe it cannot be denied, how is it that so many fail to realize the great necessity of lending to the Council of the Pharmaceutical Society the whole weight of their authority?

Probably, in a short time, we shall be fated to hear, as we have often before heard, that the Council is not a representative body; if it was not representative in 1879, or 1880, it certainly is not representative in 1881; but it must not be forgotten that there are nearly two thousand of its constituents who do not possess the right of saying whether it is representative or not, because they have not stirred a muscle to alter its character. So likewise the general conduct of the Council becomes the text throughout the year for many volumes of argumentative discourse, and, as a rule, in a mixed assembly it is not singular to find those who consider that the Council is the personification of all that is effete, and its component parts, every individual amongst them, not worth their salt. Even indulgence in the luxury of "growling" must be denied to those who refused to bring a single brick to assist in the erection of the temple of their anathemas.

I am fully aware that the truth is not always palatable, and possibly some amongst the dormant two thousand, to whom I more particularly address myself, will awake to feel indignant that they should be challenged in their undisputed right to do just as they please, and I would remind them that if they are content to fold their arms and watch the struggle they can have no claim whatever to rush in and hinder the final *coup de grace*. Some may say "I did not know the candidates; how can I vote for those I know nothing of?" If so, they must remember that many in the list submitted to them were old, tried and trusty friends—men who had done good service to pharmacy, and, if God wills, will yet do more—and to say that they do not know those, and have not years ago formed opinions as to their qualifications and their capabilities, is to confess that they have not rightly understood the duties which devolve upon members of the Pharmaceutical Society. As the strength of a river depends upon its contributory streams and streamlets, I would pray the members of the Society, as thoughtful men, to be more earnest in the vocation to which they, at least, are called, remembering that there is no possibility of sounding the advance till the vanguard is properly supported by the masses in the rear.

Thus once again have we started, upon an arduous mission, a body of our brother pharmacists competent to work out for us that emancipation which we claim, not as a favour, but as a clear, distinct and certain right; the result of their endeavours is scarcely doubtful if (and the little word is here omnipotent) every member of the Society does his utmost towards the furtherance of the same end. Twelve short months will scarcely do it, but it should find us well on the road; our leaders at any rate will pause, even as soon as that, for a new lease of power to urge them forward, and, if needs be, will welcome the workers you may send to help them in their toil; but in granting them the stimulus of your confidence or in sending them others from your ranks, I beseech you, gentlemen, do not add the skeleton of two thousand unrecorded votes.

Kilburn, N.W. CHARLES B. ALLEN.

THE ANNUAL MEETING.

Sir,—Even at the risk of having my letter as usual thrown into your waste paper basket, I write to congratulate the members of the Society on the decision arrived at against the erection of the tablets on which the names of donors to the Benevolent Fund were to be written and indecently exposed to public gaze. I can imagine the anxiety of a company of cheesemongers or greengrocers to have the names of their great ones exposed to the ken of the gaping crowd, but I fail to appreciate the vulgarity of such a proceeding on the parts of educated pharmacists. By all means honour our successful students in the way proposed, but true charity blushes at the suggestion of being emblazoned in such Beaconsfield-like "emblems of vainglory." I doubt not there are many donors of 5*s.* or 10*s.* to whom the sums named mean much more than £5 does to richer men.

Had I been able to attend the Annual Meeting it was my intention to invite attention to the arbitrary exercise of power by the Editor of the Journal over the insertion of letters. If a correspondent dares to criticize the official conduct of certain members of the Council, his letter is cast on one side. I mentioned this matter recently to an influential member of the Society, who agreed with me that the Society's Journal was far from being an impartial medium of communication. Our official organ should steer clear of parties.

Leominster. M. J. ELLWOOD.

ANALYTICAL CERTIFICATES.

Sir,—Mr. Wells, at the recent Annual Meeting, in the course of a "growl," as he termed it, at the Council, my colleague and myself, said he thought it derogatory that I should sign my name, at all events as a Professor of the Society, to what he termed "puffs of proprietary preparations," appending it, for example, to the report on a certain farinaceous food the greater portion of which, he said, was nothing but lentils. I should be sorry to do what is here suggested. Mr. Wells accuses me of signing a puff and of giving a misleading certificate, and then, logically enough, thinks I should not associate the Society's name with my own. The simple answer is a denial of having done anything of the kind. If the food was of the character he has rashly said it is my certificate of it would no doubt be derogatory to me and to the Society. Mr. Wells's premisses are wrong. I have not knowingly and in the offensive sense of the word given a puffing certificate, while I indignantly repudiate the charge of having given a misleading certificate. And as I have done nothing derogatory myself I need not add I have not associated the name of the Society with anything derogatory. My critic, however, means well and therefore deserves something more than a mere denial of his accusation. He has, doubtless, seen questionable reports appended to advertisements, and has not perhaps quite sufficiently distinguished between things different. None know better than analytical chemists themselves, and none more regret that misleading analytical certificates have more than once been published; hence analysts have recently, Mr. Wells and others will be glad to know, taken steps to avoid anything so discreditable to all concerned. A conference on the subject, to which nearly every practising analyst in the country was invited, has recently been held. With scarcely an exception those present were in favour of sound certificates for publication being granted, for the widespread and legitimate demand of the public for them was recognized; the demand, that is, that vended articles of the quality of which consumers cannot easily judge should be certified to be what they are stated to be by an analytical chemist in a public position, or whose reputation suffices for the desired guarantee. Previous disinclination by such men to meet the demand was seen to result in the issue of untrustworthy certificates, the work being liable to fall into incompetent and unworthy hands. And a general understanding was manifested that the giving of certificates for publication should be accompanied by conditions which would prevent abuse. A printed copy of the proceedings was afterwards sent to everyone who had been invited to the Conference. Good men may now, therefore, be expected to give these reports, unless indeed their salaries or their private means allow of them indulging the desire to avoid publicity. Besides my own name, the names of two gentlemen of unquestionable eminence and honour appear in the advertisement columns of the Journal containing Mr. Wells's remarks, the one well known at the University of Edinburgh and Vice President of a learned society, the other not unknown connection with the foundation of the Victoria University and President of a great scientific society, and both, like myself, honorary members of the Pharmaceutical Society of Great Britain. The names also of three chemists in official positions, together with the names of the bodies to the staffs of which they are attached, are there given side by side. When good men give sound certificates surely they may append or omit at pleasure the names of the respective institutions and societies with which they may be connected.

JOHN ATTFIELD.

THE ANNUAL MEETING.

Sir,—I have read with some interest the account of the proceedings at the Annual General Meeting, and shall deem it a favour to be allowed a little space for a few remarks. The ill-humoured and grumbling speech of Mr. Smith, will, I think, be read by most with a feeling of utter disgust. The little loss on getting the Journal out seems to affect him as much as if the cost came out of his personal exchequer. Then he growls because his assistants read his Journal, and pitch their own into the waste paper basket; this certainly is very bad, for to wilfully throw aside the well-written organ of an eminent Society can only be compared to cutting up the New Testament to wrap "pen'n'orths" in. His assistants' journals are an "unmitigated nuisance" because they cost only half what he himself pays. This sort of "schoolboy jealousy" is highly unbecoming in a man who is proprietor of a business capable of keeping one or more assistants. The idea of ventilating a domestic grievance at the Annual Meeting is, I think, childish in the extreme.

His notion of the Minor examination is a queer one. He thinks the apprentice ought to pass this on the expiration of his apprenticeship. I should like to know where the average apprentice in the country is to gain his special and practical knowledge in the subjects required. Mere reading, he must know, is not sufficient to enable one to pass, and experimental chemistry behind the counter to a boy apprentice without the aid of a tutor is so much child's play, especially as the average country chemist know no more of analysis than he does of Greek.

Mr. Urwick, who adopts a very much better tone than Mr. Smith, tells us that the Council did very right in spending the £800 in prosecuting the stores, as they now know where they are. If they had looked a little ahead they would have seen where they now are, for nothing is clearer than the Pharmacy Act on the subject. The stores employ not only a qualified manager for their drug department, but all their assistants are qualified; this compares favourably with the best houses in London in point of efficiency of staff.

He says the public must be protected. What better evidence of protection does he require than the qualification of the whole staff? The amendment to the Pharmacy Act would, if passed, provide an entire remedy; but I am afraid the present Government have too great a load upon their shoulders to enable them to get out of their own difficulties and confusion, to say nothing of introducing our "Amended Act." Perhaps if that "Bradlaugh" was removed, locked up, or something, we might then see just the ghost of a chance.

Mr. Wells's question—that he should like to know whether there was such a firm as Godfrey and Cooke—can be easily answered. The business is the property of a colonel in the army, and is managed by a qualified man and assistants, and as such is no more an evasion of the Act than the stores are, in the present state of the law.

I fear I have trespassed considerably upon your valuable space by the length of this letter, but should you see fit to publish it you have the many thanks of

A QUALIFIED CHEMIST.

THE EXHIBITION.

Sir,—In your report of the discussion which took place at the last Council meeting, relative to the arrangements for the Exhibition, it is stated (page 925) "that the Committee had resolved to admit all articles which had been previously exhibited, as many persons might be present who had not visited the last Exhibition." We observe also that both the President and Mr. Butt were at great pains to point out that the regulations this year had been very much relaxed, and that with the exception of a large dispensing counter no exhibit had been refused.

As our experience is decidedly at variance with these remarks, we trust you will afford us the opportunity of correcting them.

As soon as the Exhibition was advertised, we sent in an application for space to exhibit some large crystals of iodine, and fine specimens of various "scale" compounds of iron. After an interval of some weeks we were informed that the Committee considered that these substances had no claim to novelty, and were therefore inadmissible as exhibits. Although this announcement was counter to the resolution to which we have referred, seeing that we exhibited the same articles last year, when they were stated by the *Pharmaceutical Journal* and other reports to be amongst the most interesting and attractive objects in the section, we should not have raised any protest. We admit that the Exhibition Committee were clearly within their right in determining what class of objects should be admitted and what rejected. But when we find that other firms were allowed to exhibit precisely the same substances which were denied to us, we think we have just cause to complain that the action of the Committee savours of partiality. The chemicals we proposed to send were certainly not "novel," but if the Committee congratulated itself upon having restricted the Exhibition to "novelties," we imagine the majority of visitors were not flattered by the presumption.

Apart from any personal feeling in the matter, we would venture to suggest that on future occasions the Committee might possibly do as much to promote the interests of pharmacy by encouraging the exhibition of pharmaceutical products, and so stimulating manufacturers to aim at perfection, as by further developing the attempt to transform the Society's house into a coffee tavern.

FLETCHER, FLETCHER AND STEVENSON.

THE PROPOSED RECORD OF DONATIONS TO THE BENEVOLENT FUND.

Sir,—When I entered the Society's house in the early morning of Wednesday, the 18th inst., it was with considerable pleasure that I noticed on a black board which had just been placed on the wall at the entrance, amongst others, the name of one who in life, I remember, was looked up to and held in the highest esteem for his generous character and sterling worth; not, indeed, chalked up in the manner that one is accustomed to note symbols and chemical formulæ, but most beautifully emblazoned in golden letters, recording his last act and deed on behalf of the Society he himself had assisted in founding. I was, therefore, a little surprised (as I did not stay for the Annual Meeting) to find that Mr. Carteighe had raised objections, and proposed a resolution to take down this board, on the principle that it is not good to publish such generosity.

In a sense I believe he is right; but in the main I am convinced that the Council have acted very judiciously in carrying out the plan for noting such contributions, and having, moreover, carried it unanimously through Committee, I feel that it deserves the hearty support of all pharmacists.

I like the idea, too, of a board being placed in the laboratories mentioning the names of successful prizemen, not, indeed, to flatter any man's vanity as an advertisement, but rather as a record of attained eminence for the encouragement of others, thus reflecting honour upon the school and the practical nature of the teaching of the professors.

I suppose, sir, that the resolution passed at the last Annual Meeting will lead to a re-consideration of the matter in Council, and if I may venture a suggestion, I would add, let us by all means have a board recording the names of all past and present Presidents and Vice-Presidents, for surely it is a good thing for the younger members to be reminded by those names of men who, in times less favoured than our own, fought and won for the future generation of pharmacists that position which but for their co-operation and goodly services we might not at the present moment occupy.

Things pass on very rapidly indeed now-a-day, and I think it a healthy sign that our Council should desire to do something really practical by way of linking the honoured and respected names of the past with the progress of the future.

35, *Baker Street, W.* A. W. POSTANS.

ASSISTANTS' SALARIES.

Sir,—As I am about to leave the drug trade, having been in it for ten years as an apprentice and assistant, may I be allowed an opportunity of expressing my dissatisfaction at the amount of salary chemists' assistants receive as compared with men in other businesses.

While a boy is at school it is usual for his parents or guardians to decide upon the line of business he is to follow, and he is educated accordingly. Suppose the choice falls upon the drug business. He is prepared for, and passes the Preliminary examination. Then comes his apprenticeship. To effect this in a good house a premium of £80 to £130 or £150 must be laid out.

During his apprenticeship, and immediately it has expired he is expected to prepare himself for and pass the Minor examination.

He then takes a situation as an assistant and receives a salary of say £30 to £40.

Take another case. Let it be that of a youth who goes as an apprentice to a draper. He has during his apprenticeship shorter hours, no Sunday work, and in many cases half-a-day's holiday each week. He completes his apprenticeship and goes as an assistant. He passes no examinations and all that is required of him is a good knowledge of arithmetic and that he be a good salesman. He receives in return for his first year's service a salary equal to that which a chemist can only command after years spent in the prosecution of studies to fit him for the responsible position he holds.

The chemist works from twelve to fourteen hours a day; has to take Sunday work, and does not expect any increase of salary in proportion to his extended knowledge gained by experience. I myself live in the leading suburb of the largest manufacturing town in England. I know scores of men, my own age and younger, who are engaged in the wholesale cotton business. Several were brought up to the retail drapery and have since gone into wholesale warehouses. These men can now obtain from £200 to £350 per annum (outdoor), but we in our calling, which is supposed to be the leading retail business, can never approach near to them, nor can we obtain much more money in the wholesale.

The outside public are, very wrongly, under the impression that chemists pay their assistants in proportion to the profits which accrue from their businesses, and taking into consideration the number of hours they work, it should be so.

This, I need not remark, is certainly not the case. I am fully aware that at the present time chemists in business in some localities have a great deal to contend with, such as opposition from co-operative societies, and the patent medicine question, but speaking of good dispensing businesses, I see no reason why assistants in such should not be paid equally as well as drapers or grocers.

I am at present managing a branch business, I have thirteen hours' work a day, I dispense on an average two-hundred prescriptions a week (I will leave chemists to judge what profit is made from them), I take alternate Sunday duty, and receive in return for this £40 per annum, indoor.

What inducement, I would ask, is there for young men, without good prospects, to enter the trade, and what opportunity is there of saving money out of one's earnings?

If by your giving publicity to this letter (which, I am sure, expresses the opinions of hundreds of men now in the business), it may be the means of bringing about a better state of things for chemists' assistants, I shall be amply repaid for my trouble, although, personally I shall not benefit by it.

Will anyone more capable than myself take the matter up? I feel sure, if assistants would combine and argue for themselves, they might do much to improve the condition, monetarily, of a very underpaid class of servants.

A REVOLUTIONIST.

TESTING OF OLIVE OIL.

Sir,—Previous to the publication of Messrs. F. W. and A. F. Stoddart's letter in your last issue, I was quite unaware of the existence of what they are pleased to call Hanchecorne's "well-known" test, and, I think, sir, that my ignorance on this score is pardonable when I failed to find it mentioned in any English standard work, amongst which I may name Pereira's 'Materia Medica,' Hanbury and Flückiger's 'Pharmacographia,' Watt's 'Dictionary of Chemistry,' including the two completed supplements, Ure's 'Dictionary,' Gmelin's 'Handbook of Chemistry,' the 'Year-Books of Pharmacy'; also the *Journal of the Chemical Society*, the *Pharmaceutical Journal*, and *Chemical News* for many years past.

Since their letter appeared, I have asked chemists who are specialists in the analysis of oil, and they one and all tell me that they have never heard of the test. So much, therefore, for it being "well-known."

However, after a careful and diligent search of over two hours, in a well-stocked chemical library, I found it *mentioned* in the 'Chemisches Central-Blat,' 1873, in an article by G. Glässner, where it is given under the name of Hauchecorne (not Hanchecorne) as follows:—"Three parts nitric acid, 40° (? Baume) is mixed with 1 part of distilled water, and heated in a water-bath, with 3 parts of the oil to be tested. Olive oil remains yellow, while seed oils become red."

How, therefore, my test can be termed a "slightly modified form" of this, I quite fail to see; but whatever the Messrs. Stoddarts' opinion may be on this point, I am quite satisfied that they will find it a very great improvement on Hanchecorne's, if they will have the goodness to give it a trial.

In reference to the latter part of their letter, which is extremely vague, I may say that I have been unable to discover any published scheme or remarks by the Messrs. Stoddart on the adulteration of oils.

31, Fleet Street, Liverpool. MICHAEL CONROY.

T. Deighton.—The editorial department is not responsible for the despatch of Journals. In case of any irregularity occurring application should be made to the Secretary.

Peter MacEwen.—We fail to perceive any such irregularity as you imagine in the proceeding referred to in your letter, and cannot concur with you in the assumption upon which your opinion is based.

A.B.C.—The two forms sent are the common oxlip and the cowslip. See Sowerby's 'Botany,' where both are figured. The true Jacquin's or Bardwell oxlip is an eastern species in England.

Elgina.—The dispensing of creasote in pills has been fully discussed in the "Dispensing Memoranda." See the index of vol. viii., under the head "Creasote in Pills."

Lux.—We know of no such solvent.

W. B. Stonham.—We have not the works mentioned in our possession, but we believe there are copies in the Society's library, which you might borrow upon application to the Librarian.

H. Heale.—We do not know the name and address of the maker referred to.

T. Weaver.—The initials appear to belong to the class of things that "no fellow can understand."

G.T.B., Grimsby.—*Phosphorus Paste.*—The following is said by Cooley to have the sanction of the Prussian Government: phosphorus, 8 parts; water (lukewarm), 180 parts; mix in a mortar and add of rye meal, 180 parts: when cold add, further, butter or lard, 120 parts; sugar, 125 parts: mix the whole thoroughly.

"*Quercus*" should have sent his name and address.

Bulbosa.—An aqueous solution of perchloride of platinum, used with a quill pen, has been recommended. Several other recipes are to be found in Cooley and Beasley.

G. H. Jones.—Membership of the United Society of Chemists and Druggists in 1867 would not, in itself, confer any right in respect to registration under the Pharmacy Act, 1868.

G. Hicking.—Attfield's 'Chemistry.'

"*Puzzled.*"—Information respecting Professor Lister's Boracic Acid Ointment will be found in vol. viii., pp. 74 782, 822, and other places.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Bush and Co., Wilford, Reynolds, Hutchinson, Jones, Heale, H. C. H., Chemicus, Inquirer, Aurum, Annual.

PHARMACEUTICAL EDUCATION IN RUSSIA.

BY HENRY G. GREENISH.

One of the most important questions at present under discussion in pharmaceutical circles is that of the education required by a pharmacist. Is this to be attained in special schools of pharmacy, or in the universities; and should the instruction in the latter be received in specially arranged pharmaceutical laboratories from men who have themselves been educated as pharmacists, or do the professors of chemistry, botany, etc., and the chemical laboratories as at present existing suffice for the object in view?

Some years ago the subject was under consideration in this country (Russia). So early as 1842, when the conviction presented itself that the education of the pharmacist did not meet the requirements of the times, it was determined to try the matter experimentally, and it is to this determination that the Pharmaceutical Institute of the Dorpat University owes its foundation.

The reason for choosing the University of Dorpat for this experiment is to be found in the fact that at that time at least two thirds of the pharmacists of the Russian Empire were of German nationality, mostly belonging to the Baltic Provinces, and the University of Dorpat is the one university of Russia in which the German language is spoken throughout.

The following were the considerations which guided the formation of this Pharmaceutical Institute:—

1. That the students of pharmacy (although they may not have completed the entire course of instruction in the gymnasium*) should possess all the rights of students.

The candidate for the matriculation examination (who must have completed the whole course of study in the gymnasium) must be able to express his thoughts in Latin, German, and Russian, verbally and in writing, without serious blunders. He must be able to translate Tacitus, Horace, Livy, Homer (Iliad), and Sophocles without difficulty. In mathematics he must be acquainted with plane and solid geometry, plane trigonometry and indeterminate equations.

The "Quarta" of the gymnasium is the standard for the apprentice about to enter a pharmacy. He must be acquainted in Latin with the conjugations, declensions, etc., and the principles of syntax; in Greek with the elements of Greek grammar; and with the more important part of German and Russian grammar; in mathematics, calculations with whole indices, the relations of the polygon to its sides, special forms of quadrilateral figures, etc.

It was the conviction that the student after entering the pharmacy at the age of about fifteen would have opportunity in three or four years as an apprentice, and three years as an assistant to fill up as fully as necessary the gaps in his education. Moreover when, at the end of his apprenticeship, he had given evidence in the assistants' examination (Gehülfen-exam) of scientific ability, it was considered after the expiration of his time as apprentice and assistant he would have reached that time of life which may be assumed to possess a certain mental maturity, and to stimulate him to an earnest and conscientious use of the advantages offered by the University.

2. That the students of pharmacy should have access to all lectures delivered in the University, and that they should be especially directed to attend those on pharmacy, chemistry, botany, zoology, and mineralogy.

3. In addition to these lectures, which they would attend in common with students of medicine, physico-mathematics and natural history, special opportunity should be afforded them of receiving instruction in pharmacy, pharmaceutical chemistry, and materia medica, and of carrying out practically such analytical work as might be required of a pharmacist.

On this account a special pharmaceutical institute was added as an integral part of the University, and a professorship of pharmacy founded. Of this professor it was required that he should have received the practical as well as theoretical education of a pharmacist.

After the lapse of thirty-eight years since the foundation of this Institute, after it has been under the management of four separate directors, after many hundreds of pharmacists have here completed their education, it would be quite possible on the basis of experience so acquired to give an answer to the question under discussion. In point of fact, in Russia, not only pharmacists in general but also the higher "medicinal Behörde" have declared themselves in favour of a university course of study for a pharmacist. Lately, too, with reference to the reform of the universities, the highest "Medicinalrath" has declared itself in favour of their being remodelled on the type of that at present existing at Dorpat,

In reference to this it might be proper here to notice more closely the Dorpat University as suited for the education of a pharmacist. It must first be remarked that the classes from which the majority of the students of pharmacy spring are not the more well-to-do. Most young men who embrace the career of a pharmacist are the sons of tradesmen, etc., who have not the means to devote a large sum to their study. This being so, and as the three or four years as apprentice and three years as assistant should be made use of to acquire a scientific groundwork, the endeavour has been made to offer students the opportunity to acquire in the shortest possible time the greatest possible amount of scientific knowledge. On this account the plan of study (Studienplan) for a student of pharmacy embraces only three semesters, or a year and a half, after the lapse of which the student may present himself for his Provisor examination, which confers upon him the privilege of being entitled to undertake the management of a pharmacy. I say "may" present himself, not "must." The student, who at the end of this period is not prepared to present himself, or whose means allow of it, can study two or three years.

Formerly the plan of study was fixed in conjunction with the other faculties, and evidence was required of the candidate that he had attended lectures and received practical instruction as prescribed. Sixteen years ago, however, freedom of study was introduced into the Dorpat University, in consequence of which it is optional to the student which lectures he shall attend, and it is only required of him that he shall have attended lectures or worked practically in the laboratory during at least six hours weekly. This principle has been retained by the students of pharmacy also. The result has been, almost without exception, that not only those lectures recommended in the plan of study have been attended, but also lectures on other subjects interesting to the student.

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* A "Gymnasium" is a school recognized by Government as affording suitable education, especially for such as intend passing the matriculation examination and studying at a university. The teachers may or may not be paid by Government.

Opportunity to attend such lectures has been afforded them by another introduction into the University which has existed for sixteen years, that of "freedom of instruction." The professor of a subject is required to deliver within a specified time all the lectures of the subject he represents appearing in the plan of study; but he has also the right to deliver such lectures as may appear to him likely to be of use to his students.

In addition to professorships there exist (as in Germany) also "Docenturen" and "Privatdocenturen." The occupants of these positions either participate with the professor in delivering lectures on the general subject or deliver lectures on special branches of it. In pharmacy, for instance, lectures are delivered by one "Docent" and one "Privatdocent," in addition to the professor. The plan of study for the students of pharmacy embraces the following subjects:—

I. SEMESTER.

		Hours. weekly.
Pharmaceutical Propadeutik . .	Docent Masing . .	2
Pharmacy and Pharmaceutical Chemistry I.	Prof. Dragendorff .	5
Inorganic Chemistry	" C. Schmidt .	5
Physics I.	" A. von Oettingen . . .	4
General Botany	" Russow . . .	5
Practical Instruction in Pharmaceutical Institute	" Dragendorff .	4

II. SEMESTER.

Pharmacy and Pharmaceutical Chemistry II.	Prof. Dragendorff .	5
Organic Chemistry	" C. Schmidt .	5
Physics II.	" A. von Oettingen . . .	3
Pharmaceutical Potany	" Russow . . .	3
Mineralogy	" Grewingk . .	3
Practical Instruction in the Pharmaceutical Institute. . .	" Dragendorff .	4
Pharmacy and Pharmaceutical Chemistry III.	" Dragendorff .	5
Analytical Chemistry	" C. Schmidt .	6
Materia Medica	" Dragendorff .	3
Zoology	" Flor	3
The Rendering of Prompt Assistance till the Arrival of the Physician	Docent Dr Beyher.	1
Practical Instruction in the Chemical Laboratory	Prof. C. Schmidt .	6

In addition to the above most important branches the following are also recommended to the student:—

		Hours weekly.
History of Pharmacy	Prof. Dragendorff .	2
Practical Instruction in the Use of the Microscope, and Botanical Excursions	" Russow.	

But, in addition to these, other lectures are delivered, and are attended by the majority of students.

For instance, in 1878:—

		Hours. weekly.
Toxicological Chemistry	Prof. Dragendorff .	3
Practical Stoichiometry	Docent Masing	
The Relations between the Physical and Chemical Properties of Bodies	"	
Chemical and Volumetric Analysis	"	
Chemical Estimation of Organic and Inorganic Medicaments .	Privatdocent Johanson.	

It is hardly necessary to remark that the student can also attend lectures on technical, physiological, and agricultural chemistry, etc., etc. The time for practical work in the laboratory (four hours weekly) is not limited, and permission is readily given to the student who wishes to work beyond this time. The only reason for stating a time is that the payment is regulated thereby, and it was desirable to make this as moderate as possible. The payment is one rouble per semester for every hour per week, to the professor or docent. For practical instruction, a similar sum has also to be paid to the good of the laboratory. A student in his first semester attending all the lectures in the studienplan would have 29 roubles (equivalent at the present rate of exchange to about £2 18*s*.), and in addition to this 5 roubles (10*s*.) to the good of the University. The Council or Senate of the University undertakes the receipt of all these payments.

The examinations are entered for in the University, and take place after the completion of the period of study at special times, usually once a month. The professor and docent of pharmacy, the professors of chemistry, physics, botany, zoology, and mineralogy, with the docent who lectures on the "Rendering of Prompt Assistance," act as examiners. The practical part of the examination (the preparation of several chemicals, qualitative, quantitative and toxicological analysis) takes place in the Pharmaceutical Institute. A fee for the examination is not required; 5 roubles only have to be paid by the candidate to the Institute for material used.

The number of students has, of late, much increased. Whilst at the time when the present professor of pharmacy first entered upon office there were in the semester on the average thirty-five matriculated students of pharmacy, the number is now over a hundred. As this has taken place at a period when the press of students to pharmacy has diminished, and notwithstanding that the examinations at Dorpat are notably more severe than elsewhere, the students of pharmacy appear to have recognized the fact that the curriculum at Dorpat is of advantage to them inasmuch they are thoroughly educated in their special department, and by communication with professors of all sciences and students of all faculties their general education is also advanced. For the state, which, as in general is the case upon the continent, feels itself bound to provide for scientific education, the arrangement of this University has the advantage that only a professor of pharmacy and a pharmaceutical institute have to be added to the means requisite to every university to ensure a thorough scientific education for the pharmacist.

The small means here available would hardly allow of the institution of a special pharmaceutical school.

As I have above remarked, the introduction of the arrangements existing in Dorpat into the other Russian Universities has been already assented to, and in this matter the opinions of the Professor of Pharmacy and of the Council of the University in Dorpat had, of course, been taken into consideration. Nevertheless the following alterations appeared judicious.

In the first instance it has been generally recognized as desirable that the student of pharma[illegible] should possesses the knowledge required by [illegible] "Secunda" in the gymnasium, and that the ti[illegible] study should be prolonged from three [illegible] semesters (two years). The following plan for this prolonged course of study has been proposed by Professor Dragendorff, and met with the approval of all authorities.

I. Semester.

	Hours Weekly.
General Botany	5
General (Inorganic) Chemistry	5
Physics (first part)	3—4
Practical Pharmaceutical Chemistry	10
Botanical Excursions.	

II. Semester.

Pharmaceutical Botany	4
General (Organic) Chemistry	5
Physics (second part)	3—4
Pharmacy and Pharmaceutical Chemistry (I.)	5
Qualitative Chemical Analysis, practically in the Chemical Laboratory	12

III. Semester.

Pharmacy and Pharmaceutical Chemistry (II.)	5
Analytical Chemistry	4
Toxicological Chemistry	3
Quantitative Chemical and Toxicological Analysis, practically	10

IV. Semester.

Pharmacy and Pharmaceutical Chemistry (III.)	5
Materia Medica	3
Botanical Histology (practically)	2
Mineralogy	3
Zoology	2—3
The Rendering of Prompt Assistance in cases of Accidents	1
History of Pharmacy	1

Professor Dragendorff has also proposed the extension of the subjects for the Provisor examination (which confers the right of possessing or managing a pharmacy) as follows:—

The candidate must show a knowledge (I.) of the elements of mineralogy and zoology, and be able to recognize and describe the official animals; (II.) of botany, and especially the elements of morphology, physiology, and histology, and the more important systems. He must also be able to recognize and describe the official plants. (III.) He must show a general acquaintance with the principal laws in physics and natural philosophy, as also in chemistry, in addition to a knowledge of the characteristic properties of the elements and the more important groups of compounds. (IV.) In pharmacy, pharmaceutical chemistry and materia medica, a general knowledge of the whole subject. Further, he must be acquainted with the posology of the official medicaments, and be in a position in case of sudden accidents to render assistance until the arrival of a medical man. He must be able to solve a problem in stoïchiometry, to make a qualitative, quantitative and toxicological analysis, and to prepare two chemicals.

For the Magister examination, by which the provisor acquires the right to higher Government situations, was proposed, (I.) a more thorough scientific knowledge of botany, zoology, physics, general and pharmaceutical chemistry, materia medica, and stoïchiometry. Further, an acquaintance with the pharmaceutical laws in Russia, and in the more important European States, the elements of crystallography, and finally more difficult qualitative, quantitative and toxicological analyses, and the microscopic examination of some object.

The introduction of the degree of Doctor of Pharmacy has been likewise proposed. Should the prolongation of the course of study and the raising of the standard of school education be introduced, the apprenticeship would be shortened to two years, and the time to be spent as assistant to one and a half.

Much of the foregoing information has been supplied to me by Professor Dragendorff, and I take this opportunity of thanking him for his kindness.

BOTTLING WAX PREPARED FROM A BYE-PRODUCT.[*]

BY J. F. BROWN.

The balsam of Tolu, which has been used for preparing the syrup, has hitherto been utilized only in making a varnish for pills, and it therefore accumulates in course of time to a considerable extent.

A composition useful as bottling wax may be prepared by stirring into the melted balsam one tenth its weight of levigated bole. It sets quickly, with a fine glossy surface, and is less brittle than the wax generally employed.

A mixture of residual balsam, amber resin, of each 4 parts; Venice turpentine, vermilion, of each 1 part; melted together and well stirred, forms sealing-wax of very fair quality.

LACTATE OF ZINC.[†]

BY J. F. BROWN.

Having had occasion to prepare this salt during the Easter holidays, when the usual sources of supply were not available, I thought the formula employed might be of service to others in a similar emergency.

A quarter of an ounce, by weight, of syrupy lactic acid was neutralized with strong solution of ammonia, exactly 1 fluid drachm of the latter being required. This was poured into a solution of 287 grains of pure sulphate of zinc in ½ an ounce of water and stirred for a few seconds.

Crystals began to form at once: after standing for twelve hours they were washed twice with an ounce of water, drained, and dried upon a porous tile.

The yield was 90 grains, and in colour and odour it was superior to that supplied me by my wholesale druggists.

Since a fluid drachm of strong solution of ammonia should neutralize 45 grains of $H_2C_3H_4O_3$, the syrupy acid employed appears to contain 41 per cent. of real acid. If the formula for lactate of zinc be correct, $ZnC_3H_4O_3 3H_2O$, the 90 grains contained nearly 40 grains of acid, and the loss sustained in washing the product was a little over 10 per cent.

CONTRIBUTIONS TO A CLOSER KNOWLEDGE OF SOME LITTLE KNOWN LEAVES.[‡]

BY DR. HEINRICH PASCHKIS.

IV. LEAVES OF LIATRIS ODORATISSIMA, *Willd.*

The *Liatris odoratissima* is a Composite plant, occurring very abundantly in the moist lowlands of North America, especially Florida. The specimen examined was one in the possession of the Vienna Pharmaceutical Institute, which had been imported direct. The leaves are exported in large quantity and used as a perfume for snuff. In the native country of the plant the leaves are employed as a protection against moth.[§]

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[*] Read before the Dover Chemists' Association.

[†] Read before the Dover Chemists' Association.

[‡] Translated from the "Zeitschrift" of the Austrian Pharmaceutical Association, and communicated by the author, to whose courtesy we are indebted for the use of the wood engravings illustrating the paper.

[§] *Pharm. Journ.* [3], vol. v., p. 489.

The drug consists principally of well preserved entire leaves, occasionally with fragments of leaf stalks or stalks with leaves attached. These are bluish-green to brown. When softened in water and dried they feel very smooth, as if they were greasy or soapy, and become a beautiful dark green colour. They smell agreeably and strongly of coumarin. They reach a length of 25 centimetres and a breadth of 2½ centimetres and are perfectly naked on both sides. The surface on both sides is densely covered with small pits and furrows and when the leaves are viewed by transmitted light these spots appear brighter. Here and there upon the upper surface of the leaf, and very plentifully upon the petiole, occur glistening scales, which under the microscope are seen to be crystals of coumarin. The margin of the leaf is very delicately undulated. The leaves are oval, almost oblanceolate with the upper end truncate, and at the base diminishing very gradually into the long winged petiole. The brownish mid-rib, of considerable thickness, stands out very prominently on the under side; the lateral nerves leave it at very acute angles and anastomose in the form of double nooses near the margin.

A microscopic examination shows that the epidermis of the upper side consists of almost polygonal only slightly indented flat cells; those of the under sides are rather more indented. They attain a size of 0·06 mm. in length and breadth (Fig. 19). Some among the epidermis cells appear to be double the length and the same breadth. In the epidermis of the upper and under side occur very numerous stomata, 0·04 : 0·03 mm. in dimensions. Besides these there occur in the epidermis numerous yellow points about 0·015 mm. in size, which are very elegantly and symmetrically surrounded by somewhat smaller cells; these are the glands which will be referred to subsequently, seen from above. The epidermis cells themselves appear finely striated. A transverse section shows the very regular structure as follows:—Under the thick cuticle (0·008 mm.) lie the epidermal cells, of which the above-mentioned larger ones are disposed irregularly among the others (Fig. 20). Then follows, on both sides a layer of palisade cells, only somewhat less densely arranged on the under side, and finally several layers of almost rectangular cells. Distributed irregularly in the mesophyll occur roundish or oblong cavities (0·033 mm. in diameter, or 0·135 long and 0·03 broad or more), which are filled with a greenish to a golden-yellow contents, consisting of a homogeneous substance (oil) in which separate smaller stronger refracting drops are enclosed. In strong alcohol, ether, etc., the yellow substance dissolves clear; with tincture of alkanet it is coloured a beautiful orange-red; in potash solution it forms large yellow-brown scales. Smaller and larger drops of greenish essential oil and prismatic or six-sided tabular crystals of coumarin occur in the cells of the mesophyll and upon the epidermis.

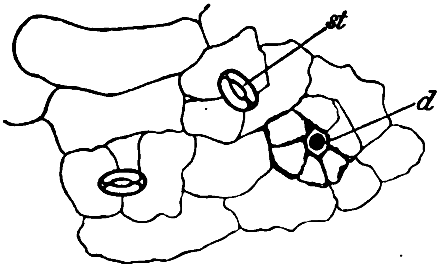

Fig. 19.—*Liatris odoratissima.*—Epidermis:—*d*, gland; *st*, stoma.

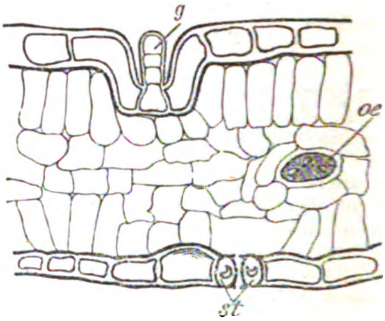

Fig. 20.—*Liatris odoratissima.* Transverse section:—*g*, gland; *oe*, oil space; *st*, stoma.

The epidermis of the upper as well as the under side is in many places indented with funnel-shaped depressions (0·064 to 0·072 mm.) (Fig. 21). In these glands are sunk in the following manner:—The stalk-cell is wedged in, like the keystone of an arch, between the epidermis cells lying next to it; the head of the gland is divided by two, three, or more transverse walls. The delicate cuticle turns up before reaching the stalk-cell and passes over the head. In this occur as contents molecular granules and small drops of essential oil (becoming coloured with tincture of alkanet and turned brown by potash solution). Similar substances occur outside the gland in the depressions of the cuticle. The head of the gland lies below the level of the epidermis. Seen from the surface, and consequently also in the aspect of the epidermis, it appears to be surrounded by a tolerably regular polygonal contour, to which six small epidermal cells contribute. In other places the walls of the glandules are less or scarcely perceptible, the whole having broken up into a coarse granular (crystalline?) detritus, which is not soluble in ether, alcohol or sulphuric acid (Fig. 22).

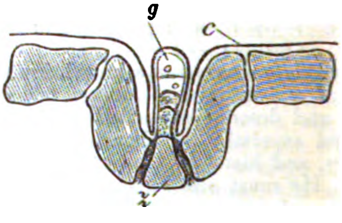

Fig. 21.—*L. odoratissima.*—*g*, gland; *c*, cuticle; *z*, stalk-cell.

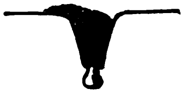

Fig. 22.—*L. odoratissima.*—Gland with transverse walls broken down.

I found the same structure and the same spaces and glands in the leaves of a *Liatris* which was kindly supplied to me by Herr Kerner, Direc of the Vienna Botanical Gardens. They were described as *L. spicata*, but they did not correspond, on account of the hairs along the nerves, with the description of this species which is found in De Candolle.* A specimen of *L. spicata* in the herbarium of the Pharmaceutical Institute also shows the hairy character of the leaf. The smell is similar to that of *L. odoratissima*, but it comes considerably short of this in intensity.

In the Appendix to the United States Dispensatory† there is only a superficial description of *Liatris spicata*, the roots of which, as well as those of other species of *Liatris*, are used in medicine as a diuretic and in catarrh of the mucous membrane. *L. odoratissima* is not mentioned in that work. The golden yellow infusion of *L. odorata* smells very agreeably and tastes strongly aromatic, somewhat bitter, and heating.

In the distillation of 250 grams of leaves with water I obtained from the repeated distillate about ten drops of a green essential oil having a very strong agreeable smell. This dissolved in ether, chloroform and absolute alcohol, and upon evaporation separated again in a liquid non-crystalline form.

V. EUPATORIUM AYAPANA, *Vent.*

This plant occurs in Tropical America, the East and West Indies, the Mauritius, and Java. The specimens examined belonged to the Vienna Pharmaceutical Institute, and were partly from the Paris Exposition and partly purchased direct. They consisted of greenish yellow to reddish coloured well preserved leaves and leafy stalks, having an agreeable odour. The leaves are lanceolate, but gradually acuminate, and diminish slowly at the base into the short petiole; they are of the thickness of paper. Under a magnifying-glass or lens only they appear hairy, with fine hairs, somewhat more so on the under side than on the upper. They attain a length of 9 centimetres and a breadth of 2. The lowest two lateral nerves spring at a very acute angle from the principal nerve and each anastomoses in the form of a noose not far from the margin.

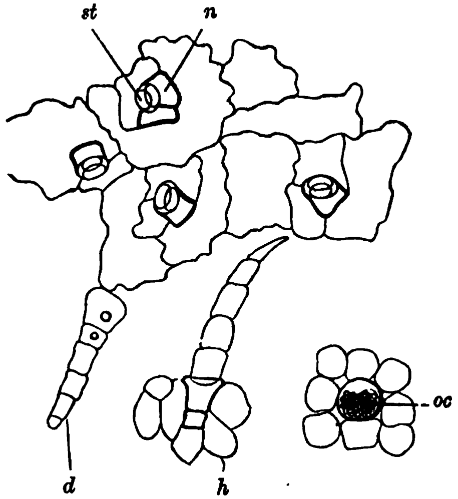

Fig. 23. *Eupatorium Ayapana.*—Under side of the Epidermis.—*st*, stoma; *n*, contiguous cell; *d*, glandular hair; *h*, hair; *oc*, oil cell.

The finer structure of the leaf is very simple. The epidermis of the upper side consists of polygonal flat cells (0·039 : 0·030 : 0·008) which enclose only very few almost circular stomata, occurring only in the immediate neighbourhood of the nerves (Fig. 23). The epidermis cells of the under side are larger than those of the upper side, and are either about equal in length and breadth (0·045 : 0·035) or are elongated in the direction of the axis of the leaf (0·088 : 0·019); but all are nearly double as high as the epidermis cells of the upper side. Upon the under side occur numerous stomata, which with the guard cells appear almost circular (0·019) and are provided with one or two contiguous cells scarcely larger than a guard cell. Upon the upper and under side are implanted numerous hairs, which are always several-celled. These appear either as ordinary pointed hairs or as glandular hairs provided with small club-shaped heads. All the hairs contain a granular yellow substance, becoming darker with potash solution, but the former contain besides strongly refracting drops (essential oil). The mesophyll consists of several layers (7 to 8) of isodiametric roundish cells, in which also, here and there, a small drop of oil is to be found. Only occasionally is a cell met with in the mesophyll filled with a granular strongly refracting mass, which oil cell is not distinguished from the others either in size or form.

NOTES ON THE XANTHORRHŒA RESINS.*

BY JOHN M. MAISCH.

At a recent pharmaceutical meeting in Philadelphia a resin was exhibited under the name of gum acroides, and it was stated to be a new Australian product. Shortly afterwards, during a visit to New York, I made some inquiries in relation to this supposed new commercial article, and was surprised to learn that at one wholesale drug house it had been in stock fully ten years ago, and subsequently I learned from Mr. Charles Bullock that a quantity of the same article had been on hand at the store formerly kept by Mr. Daniel B. Smith more than a quarter of a century ago. It was evident from the information received that the resin was not a new article in this country, and on examination numerous notices of it were found, from which it became evident that the appellation *acroides* is a corruption of acaroides, and that the resin is identical with Botany Bay resin, which name is better known, at least to the writer. Dunglison's 'Dictionary' says of the genus Xanthorrhœa:—"There are several species. Two resins are obtained from them; one, the *yellow resin of Xanthorrhœa*, or *of New Holland*, *resina lutea Novi Belgii*, *Botany Bay resin* or *gum*, *ac'aroid resin* or *gum*, *resina* vel *gummi acaroï'des*, which probably resembles tolu and storax in medicinal properties; the other, the *red resin of Xanthorrhœa* or *black boy gum*."

This quotation gives the various synonyms of the substance in question, and points also to its origin. A tolerably full account of it and the allied resin or resins may be found in Pereira's 'Materia Medica,' in Guibourt's 'Drogues Simples,' etc. The following notes are compiled from these and other sources:—

The genus Xanthorrhœa belongs to the natural order of Liliaceæ, is confined to Australia, and consists of shrubby or arborescent plants, somewhat palm-like in appearance, and having at the summit dense tufts of very long, wiry, narrow, two-edged or somewhat triangular leaves, resembling grass leaves; hence the name *grasstrees*, by which the species are known in Australia. The leaves are used as fodder for cattle, and the somewhat sheathing base of the inner leaves and the buds are eatable, and form, particularly when roasted, an agreeable article of food. From the centre of the leaf tuft there rises a long cylindrical scape, which terminates with a long spike of small white flowers, situated in the axils of the imbricate bracts, and producing triangular three-celled capsules, containing flattish, hard, black seeds.

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* De Candolle, v. 130: *L. spicata*, Willd.

† 'United States Dispensatory' (Wood and Bache), p. 12.

* Read at the Philadelphia Pharmaceutical Meeting, April 19. From the *American Journal of Pharmacy*, May, 1881

R. Brown (1810) described seven species, viz., *X. arborea*, *australis*, *hastilis*, *media*, *minor*, *bracteata* and *pumilio*. The two first-named species are arborescent, while the third and fourth have short stems, that of *X. hastilis* being about 4 feet high, and is said to sometimes attain a diameter of 1 foot, and then to be probably more than a century old, owing to its slow growth. The last three species named before are stemless, *i.e.*, the stems remain buried in the soil or rise scarcely above ground.

All the species abound in a resinous juice, which, on exposure, hardens, and as obtained from the different species undoubtedly differs in appearance and also in composition. Guibourt distinguishes three xanthorrhœa resins—one yellow, one brown and one red. The dark-coloured resin is still ascribed by some authors to *X. hastilis*, but Drummond (1840) pointed out that an arborescent species, probably *X. arborea*, is in Australia called *black boy*, and the Pharmaceutical Society of Victoria state that *X. australis* (which is arborescent) yields a large quantity of a brilliant ruby-coloured resin. On the other hand, the botanist Smith refers the yellow resin to *X. hastilis* and some other species. The last named is the *X. resinosa* of Persoon, and of it *Acaroides resinifera* is quoted as a synonym in Gray's 'Supplement.' The name acaroid resin is thus explained. The different xanthorrhœa resins have been described more especially in regard to their uses in papers by Mr. Redford as a polishing material in *American Journal of Pharmacy*, 1863, p. 453, 454, and by Mr. P. L. Simmonds, in the same journal, 1857, p. 226 to 228, and in 1866, p. 465 to 468; the papers last quoted refer chiefly to the use of the resin in the manufacture of illuminating gas. The resins seem to be obtained as natural exudations, the subterraneous portions of the plant producing them in some species, at least, apparently in great abundance; but resin is also found covering the base of the leaves, and it is secreted in such quantity in the woody stems that after crushing the latter it may be sifted from the chips to the extent of a hundredweight per diem by one labourer.

The *acaroid resin*, which was first noticed in 1789 by Governor Phillips ('Voyage to Botany Bay') is met with in tears and in large masses usually, on account of its brittleness, broken into irregular pieces. It is intermixed with portions of wood, stalks, earth, etc., and when fractured has a speckled or granitic character. The *pure* resin is reddish yellow; the commercial article is externally brownish yellow, and internally opaque and of a pure yellow colour, resembling that of gamboge, but always much lighter. This colour description by Guibourt agrees with the sample presented here; but since the resin is described by some authors as being of a deeper yellow than gamboge, it is evident that it must be sometimes collected from different species. Triturated with water it does not form an emulsion. When fresh it has an odour analogous to that of poplar buds, but much more agreeable (Guibourt); to us the odour appears to approach very nearly that of benzoin mixed with a little storax. By age the odour becomes weaker, and gradually disappears, but it is always developed on powdering or by fusion. The resin dissolves in alcohol, leaving only 0·07 of a gum insoluble in water and analogous to bassorin. When heated it gives off white vapours, condensing into brilliant small laminæ, which Laugier regarded as benzoic acid, but which Stenhouse (1848) found to consist largely of cinnamic acid.

The *brown resin* has a more balsamic odour than the preceding; the tears are roundish, externally deep red-brown, and resembling dragon's blood; but the fracture is shining, glass-like, and in thin splinters it is perfectly transparent and of a hyacinth-red colour. It is completely soluble in alcohol, and contains more volatile oil, rendering it viscous and somewhat adhesive.

The *red resin* is in distinct tears of a deep brown-red, and sometimes externally bright red; its fracture is glass-like; thin splinters are transparent and ruby-red; it is completely soluble in alcohol, the ligneous intermixtures excepted, and its balsamic odour becomes always apparent on heating.

Regarding the composition of the xanthorrhœa resins, Pereira quotes the analyses of Lichtenstein (1799), Schrader, Laugier, Widman (1825), Trommsdorff (1826), and Stenhouse (1848). Heated with manganic binoxide and sulphuric acid acaroid resin evolves the odour of oil of bitter almonds, and by the action of nitric acid it yields a large proportion of carbazotic (picric) acid with little nitrobenzoic and oxalic acid (Stenhouse). Trommsdorff found the volatile oil to be colourless, fragrant, and of a pungent aromatic taste. The resin is soluble in solutions of the alkalies and alkaline earths. On dry distillation much carbolic acid is obtained, with a small quantity of a light oil, but, according to Sommer, no umbelliferon. In 1866, Hlasiwetz and Barth ascertained that acaroid resin on being treated with fusing potassa yields large quantities of paraoxybenzoic acid, and from the mother-liquor of the ethereal solution a little resorcin and pyrocatechin was obtained, together with the double compound of protocatechuic and paraoxybenzoic acids = $C_{14}H_{12}O_7 . 2H_2O$, which had been previously obtained from benzoin.

Three different xanthorrhœa resins were found by Hirschsohn (1877) to be incompletely soluble in chloroform and ether, but to dissolve completely in alcohol, the solutions acquiring a brown-black colour with ferric chloride. The solution of the acaroid resin is yellow, and yields with lead acetate a precipitate, while the solutions of the other two resins are red, that of *X. quadrangulare* being not disturbed by acetate of lead, while that of *X. arborea* produces with the same reagent a turbidity; the chloroformic solution of the latter is yellow, that of the former colourless.

The xanthorrhœa resins have been repeatedly suggested as possessing some value in perfumery; but they appear to be inferior for this purpose to benzoin, storax and the balsams of Peru and Tolu. Their medicinal properties appear to be likewise not well marked. As early as 1795 acaroid resin was said by Kite to neither vomit, purge, nor bind the belly, nor to act materially as a diuretic or diaphoretic. Dr. Fish (*Boston Journal*, x., p. 94) employed it in the form of tincture with opium in fluxus hepaticus and the colliquative diarrhœa of phthisis, and it has been recommended in chronic catarrhs. A *tincture of acaroid resin*, which has been given in doses of ʒi. to ij. mixed with milk or a mucilaginous liquid, has been recommended to be made of equal weights of the resin and alcohol, and, according to another formula, of resin ʒij. to alcohol Oj. If used at all, the latter formula would appear to furnish a preparation of proper strength.

AMMONIUM BITARTRATE.

It is well known that when a strong solution of tartaric acid is added either to the stronger solution of ammonia or to a saturated solution of ammonium carbonate, so that there will be an excess of acid, a white crystalline precipitate is produced corresponding in appearance and taste to cream of tartar. This salt, which may also be prepared by mixing concentrated solutions of 1 part of ammonium chloride and 3 parts of tartaric acid, may possibly find a place either commercially or medicinally amongst the useful articles of trade or medicine.—R. FAIRTHORNE, in *Amer. Journ. of Pharmacy*.

The Pharmaceutical Journal.

SATURDAY, JUNE 4, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

ARE WE PROGRESSING?

THE question propounded in the above terms by Mr. BOTTLE at the late meeting of Council is one that we hope will naturally suggest itself to many others who take a deep interest in the welfare of the Society. That the loss which the Society has suffered by the death of Mr. MACKAY, and by the retirement of Mr. HILLS and Mr. SANDFORD, furnishes occasion for considering this question need not, we think, be insisted upon at much length, especially when we bear in mind the circumstance that there seems to be so little disposition among the members of the Society to take an active part in the performance of such duties as fall upon the executive body.

On former occasions we have protested against the outcry that the Council of the Pharmaceutical Society did not represent the trade at large, and the utmost that we have been able to constrain ourselves to confess in regard to that outcry has been to say "So much the worse for those who are not represented." At the late Annual Meeting, however, we were told that the Council has no sympathy with the members of the Society, and as a justification of this view it was asserted that the late Council had given a slap in the face to the chemists of the country by the election of a successor to Mr. SHAW last August. We cannot admit that there is any reason for the opinion thus expressed. Valuing it at the very utmost, it appears to have been stored up till it became stale and good for nothing, since the voting at the last election affords the best possible evidence that the action of the Council last August in electing Mr. BUTT, rather than Mr. SPINK, to fill the vacancy occasioned by Mr. SHAW's retirement was judicious in itself and in accord with sound regard for the interests as well as for the opinions of those entitled to be considered.

When, therefore, in conjunction with the expression of such opinions, we are told that the Council has no sympathy with the members of the Society, we are unable to avoid the conclusion that such a dictum is to be regarded more as a satire upon the members of the Society than as a reproach to the Council. If those who have the right to be represented and the power to secure representation fail to make their influence constitutionally of account in the conduct of the Society's affairs, they forfeit the privilege of criticism or complaint which they might otherwise have been entitled to exercise. The fact we referred to quite recently, that so many members of the Society neglected to record their votes in favour of any one of the few candidates at the late election, and the further fact that on that occasion so few of the large number of persons eligible as members of Council signified their willingness to do duty in that capacity, sufficiently indicate the existence of an apathetic state of mind among pharmacists which might be ground for apprehension if it were not that we know there are a few who may be trusted to serve the part of sheet anchors for securing the general safety of the craft.

On looking back to the past history of the Society it will be seen at a glance that the work has always been done by a few individuals, and that year after year the direction of pharmaceutical affairs has rested in the same hands. There are indeed many reasons why this should be the case, but at the same time the knowledge that it must be so and that men are willing to apply their time and energies in this way ought to act as an incentive to provincial activity in support of the Society. The successful working of the North British Branch might well be emulated by many a Local Secretary with advantage on all sides, and our Annual Meeting might be made an opportunity for recording provincial progress and adding to the stability of our central institution rather than an occasion for expressing dissatisfaction upon imaginary grounds.

In view of such considerations it may well be that the question put by Mr. BOTTLE to reflective minds will suggest a certain sense of misgiving. We are glad, therefore, to have power to refer to occurrences which show not only that pharmacy is progressing in this country, but that the Pharmaceutical Society is also progressing and gradually gaining recognition as the representative of a cultivated and important class. On more than one occasion lately, the Council has been applied to by certain departments of the Government for guidance and advice on legislative matters in which the interests of the public and of pharmacists were jointly concerned, and such official recognition is fitted to serve as a large compensation for the disappointment which has been experienced in the attempt to make the existing law a safeguard against improper encroachment on the pharmacist's province.

But, however satisfactory we may think the manifestation of such marks of recognition towards the Society which represents British Pharmacy, it must not be forgotten that the promotion and even the maintenance of such a position as is thus indicated depends in some degree upon the support afforded by every member of the class which the Pharmaceutical Society is supposed to represent, and we say supposed to represent, because in point of fact such representation is unfortunately but nominal as regards the greater portion of those engaged in the business of pharmacy. It is unnecessary that we should here dilate upon the weakness in this respect, which is so much to be lamented, but we may at least remind our readers, as being probably more amenable than others to such admonition, that as the strength of any structure is to be measured by its weakest point, so the influence of the Pharmaceutical Society as a representative of pharmaceutical interests must be limited by the extent to which it is supported by the general body of those engaged in the business, and if the interests of pharmacy be not actively promoted in the provinces there must be a corresponding deficiency of strength in the action of the metropolitan executive.

At the late Annual Meeting there was too much evidence of looking to the Council for everything and the prevailing tone of the speakers betrayed far too little appreciation of the benefits of self-help. We find some lamenting the absence of subsidies to provincial schools that are unable to support themselves; others complaining that there was a want of warmth in certain remote quarters waiting for consolation from the Society's funds; but in no instance was there any indication given that a provincial association was zealously and actively endeavouring to promote the objects of the Pharmaceutical Society by adding to the number of its members, by enforcing scientific study on the part of apprentices or by supporting the Benevolent Fund.

By a strange inconsistency, moreover, the complaint that so little was given in support of provincial schools was coupled with a question as to the propriety of endowing the metropolitan school, and a suggestion that the result produced in that way might not be worth the outlay.

One member of the Society, without apparently having taken the trouble to inform himself of easily ascertainable details, occupied some time in raising a presumption of mismanagement respecting the Journal, which it will be evident from the President's statement to the Council last Wednesday had no real foundation.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A MEETING of this Association will be held on Thursday, June 9, at 8.30 p.m., when a paper will be read on "BORNTRÄGER'S Test for Aloes," by Mr. R. H. GROVES. A Report on Inorganic Chemistry will be made by Mr. C. H. HUTCHINSON, F.C.S., on "The Hydrochlorides of the Metallic Chlorides."

IT is announced that the Lord Chancellor has been pleased to place the name of Mr. ARKAS SAPP, Chemist and Druggist, and a Member of the Pharmaceutical Society, upon the Commission of the Peace for the Borough of Basingstoke.

Transactions of the Pharmaceutical Society.

MEETING OF THE COUNCIL.

Wednesday, June 1, 1881.

Present—Messrs. Andrews, Atkins, Bottle, Butt, M. Carteighe, Churchill, Frazer, Gostling, Greenish, Hampson, Walter Hills, Radley, Richardson, Robbins, Savage, P. W. Squire, Symes, Williams, Woolley and Young.

Mr. GREENISH having taken the chair, the minutes of the Council meetings of May 4 and 18 were read and confirmed.

THE LATE MR. JOHN MACKAY.

The SECRETARY read a letter from Mr. George D. Mackay, thanking the Council, on behalf of Mrs. Mackay and the other members of the family, for the resolution passed last month with regard to the late Mr. Mackay.

The SECRETARY also read letters received from Dr. Lyon Playfair, Professor Michael Foster and Professor Attfield, thanking the Council for the honour done them in electing them Honorary and Corresponding Members of the Society.

The PRESIDENT read a letter to the same effect from Professor Russow, stating also that he intended shortly forwarding a paper to the Journal.

ELECTION OF PRESIDENT.

A ballot being taken in the usual way,

MR. THOMAS GREENISH

was unanimously re-elected President.

Mr. GREENISH, on taking the chair, thanked his colleagues for the honour they had done him, and also for the kindness and consideration they had shown him during his previous year of office. He hoped he might in the ensuing year continue to receive the same confidence and support, and with that assistance he trusted to be able to discharge his duties satisfactorily.

ELECTION OF VICE-PRESIDENT.

On a ballot being taken,

MR. GEORGE FREDERICK SCHACHT

was re-elected Vice-President.

The PRESIDENT said that he regretted that Mr. Schacht was absent on the Continent on account of the state of his wife's health.

ELECTION OF TREASURER.

On a ballot being taken,

MR. JOHN ROBBINS

was re-elected Treasurer.

Mr. ROBBINS, in thanking the Council for the honour conferred on him for the second time, said the duties of the Treasurer, when there was an ample balance at the bankers, were not very arduous; but when he looked at the roll of eminent pharmacists who had preceded him in the office, he could not but feel gratified to find his name so closely associated with theirs.

STANDING ORDERS.

The Standing Orders were then read and unanimously adopted for the ensuing year.

SECRETARY TO THE BOARD OF EXAMINERS IN SCOTLAND.

The PRESIDENT said in consequence of the death of Mr. Mackay, who had acted as Secretary to the Board of Examiners in Scotland, he would move:—

> "That the Chairman of the Board of Examiners in Scotland be requested to undertake the duties of Secretary to that Board in future, and to be the medium of communication between that Board and the Council.

> "That this Council desires to record its sense of the

value of the services rendered to this Society by the late Mr. Mackay in connection with the Board of Examiners in Scotland."

Mr. **Bottle** seconded the motion, which was carried unanimously.

Secretary and Registrar.

Mr. **Elias Bremridge** was unanimously appointed Secretary and Registrar.

Assistant-Secretary and Deputy-Registrar.

Mr. **Richard Bremridge** was also unanimously appointed Assistant-Secretary and Deputy-Registrar.

Appointment of Examiners.

The **Secretary** reported that in consequence of Mr. Young having been elected a member of the Council, he had vacated the office of Examiner in Scotland. He also reported that Mr. Carteighe, having been elected a member of the Council, had vacated the office of Examiner for England and Wales.

The Council went into committee to consider the filling up of the vacancies, the reporters being requested to withdraw.

The Council having resumed,

Mr. Henry Bellyse Baildon, of Edinburgh,
was appointed an Examiner for Scotland, and
Mr. John Clough Thresh, of Buxton,
was appointed an Examiner for England and Wales.

The above appointments are subject to the approval of the Privy Council.

Elections.

Members.

Pharmaceutical Chemists.

The following, having passed the Major examination and tendered their subscriptions for the current year, were elected "Members" of the Society:—

Clayton, John William	Blackburn.
Rheeder, Thomas	Great Ouseburn.

Associates in Business.

The following, having passed their respective examinations, being in business on their own account, and having tendered their subscriptions for the current year, were elected "Associates in Business" of the Society:—

Minor.

Cooper, Henry	London.
Ellis, John William	Abergele.
Leithead, Robert	West Hartlepool.
Martin, John Wesley	Penge.
Mitchell, Andrew	Dursley.
Moore, Albert	London.
Palmer, Edwin Thomas	Aylesbury.
Rowland, Edward Edisbury	Manchester.
Torbitt, Charles	Oldbury.

Modified.

Still, David Usborne	New Charlton.

Associates.

The following having passed their respective examinations, and tendered (or paid as Apprentices or Students) their subscriptions for the current year, were elected "Associates" of the Society:—

Minor.

Beck, Albert Neve	St. Leonards.
Bull, E. John	Cambridge.
Broad, Henry James	Stourbridge.
Portway, Arthur Cyril	Southwark.
Wilkinson, William	Whittlesea.

Modified.

Crocker, George	Weston-super-Mare.

Apprentices or Students.

The following, having passed the Preliminary examination and tendered their subscriptions for the current year, were elected "Apprentices or Students" of the Society:—

Adams, Amos	Barnstaple.
Barnes, James Burden	London.
Burn, Barnabas Pearson	Durham.
Coates, Samuel William	Ilkeston.
Cockerill, Thomas	Lynn.
Davies, Llewellyn Henry	Llanidloes.
Farr, Edward Henry	Monmouth.
Farthing, George Thompson	Spennymoor.
Griffiths, Richard Lloyd	Llanidloes.
Guthrie, Thomas	Musselburgh.
Haward, Edgar	Lowestoft.
Heaton, Simon Wood	Leeds.
Hindle, William Henry	Darwen.
Hughes, Thomas Griffith	London.
Johnson, William	Stoke-on-Trent.
King, James Hewlett	Bath.
McGregor, James	Edinburgh.
Mackenzie, Robert Young	Nairn.
Nott, Arthur Holbrook	Devizes.
Palmer, Richard Mason	Swaffham.
Smithson, Frederick William	Thirsk.
Wells, Gerald Ernest	Notting Hill.
Williamson, Theophilus R. W.	Cardiff.
Willows, Herbert George	Doncaster.
Wincott, Robert Thomas	Warwick.

Several persons were restored to their former status in the Society upon payment of the current year's subscription and a fine.

The names of the following persons, who had severally made the required declarations and paid a fine of one guinea, were restored to the Register of Chemists and Druggists:—

Charles Morgan, 19, Oxford Street, New Clee, Grimsby.
Robert Roberts, 143, Northernden Road, Sale, Cheshire

Addition to the Register.

The Registrar reported that—

Charles Jackson, South Street, Chesterfield,
having made the statutory declaration that he was in business before the passing of the Pharmacy Act, 1868, and this declaration having been supported by a duly qualified medical practitioner, his name had been placed on the Register.

Appointment of Committees.

The Council then proceeded to appoint the Committees for the ensuing year, the following being the result of the discussion:—

General Purposes.—The whole of the Council; four to form a quorum. To meet at six o'clock on the evening before the Council meeting, and at such other times as may be required.

Finance.—Messrs. Andrews, Gostling, Walter Hills, Savage, P. W. Squire and Symes. To meet at half-past four on the afternoon preceding the Council meeting.

Benevolent Fund.—Messrs. Bottle, Butt, M. Carteighe, Churchill, Hampson, Radley, Richardson, Robbins, Williams, Woolley and Young. To meet at half-past three on the day preceding the Council.

Library, Museum, Laboratory and House. — Mr. **Williams** suggested that the Library, Museum and Laboratory Committee and the House Committee should be amalgamated. This was agreed to, and the following gentlemen were appointed to act on the combined Committee:—Messrs. Andrews, Bottle, Butt, M. Carteighe, Gostling, Hampson, Walter Hills, Richardson, Robbins, P. W. Squire and Williams. To meet at eleven o'clock on the second Wednesday in each month, excepting in August and September.

Pharmacy Act Amendment.—Messrs. Andrews, Bottle, Butt, M. Carteighe, Hampson, Walter Hills, Symes, Williams and Woolley. To meet as occasion may require.

Evening Meetings.—The three Professors, the Editor, and the Curator of the Museum. To meet at twelve o'clock on the Wednesday preceding the Evening Meetings, and at such other times as may be found desirable.

International Pharmaceutical Congress.—Messrs. Bottle, Butt, M. Carteighe, Hampson, Robbins and P. W. Squire, with power to add to their number.*

APPOINTMENT OF EDITOR AND SUB-EDITOR OF THE JOURNAL.

Dr. Paul was re-appointed Editor of the Society's Journal for the ensuing year, and Mr. F. Passmore the Sub-Editor.

APPOINTMENT OF CURATOR.

Mr. Holmes was re-appointed Curator for the ensuing year.

LOCAL SECRETARIES.

The appointment of Local Secretaries was deferred for a month, in order that the Library, Museum, Laboratory and House Committee might recommend a list of names.

The SECRETARY said there were now three hundred and seven towns eligible to have Local Secretaries, and votes had been received from two hundred and eleven, ninety-seven not having made any return.

REPORTS OF COMMITTEES.

FINANCE.

Messrs. Andrews, Atkins and Savage, having acted as a Finance Committee, and examined the accounts presented during the month, recommended them for payment.

The report and recommendations were received and adopted.

Mr. ROBBINS said there was now a considerable balance on the current accounts, and he suggested that £1500 should for a time be placed on deposit account, until an opportunity is found for investment.

Mr. WOOLLEY asked if a better investment could not be effected than 1½ per cent.

Mr. RICHARDSON said there were many companies and local authorities which gave 3½ or 4 per cent. for money borrowed, and it was practically as safe as Consols.

Mr. BUTT said the Council only had power to invest in Government or real securities.

It was unanimously resolved that £1500 should be placed on deposit.

HOUSE.

This Committee reported that it had settled the list of prizemen, and ordered the names to be written on the tablets. It had also superintended the painting of the outside of the premises, and ordered some necessary repairs in the basement.

Mr. HAMPSON drew attention to the annoyance experienced in the Council room from the noise of traffic in the street, which had been already considered on more than one occasion.

Mr. WILLIAMS said the Committee had discussed this matter several times. It had considered the advisability of putting double windows, but it was felt that this would affect the architectural appearance of the building. It had been hoped that the parish authorities would lay down wood pavement in Great Russell Street, as had been done in Bloomsbury Square, and he should like to know if the Secretary had heard anything lately on the subject.

Mr. BUTT thought it was not desirable to put double windows; it would be just as well to contribute to the expense of the wood pavement.

The SECRETARY said the Committee had brought all the pressure it could, both directly and indirectly, to bear on the parish authorities. He had got up a strong memorial, signed by all the neighbours. It was graciously received; but the authorities said they had recently laid down new stone pavement, and when it wanted repairing they would consider the matter. The application to pay part of the expense was put on one side altogether. He believed that in the course of time the wood pavement would be laid down.

The report and recommendations of the Committee were then received and adopted.

LIBRARY, MUSEUM AND LABORATORY.

Librarian's Report.

The Librarian's report had been received, and included the following particulars:—

Attendance.		Total.	Highest.	Lowest.	Average.
April . .	Day . .	346	25	6	15
	Evening .	126	11	2	7

Circulation of books.	Town.	Country.	Total.
April	162	114	276

Carriage paid . . £2 13s. 8d.

The under-mentioned donations to the Library had been received:—

Meyer (A.), Über Smilax China L., und über die Sarsaparillwurzeln. From the AUTHOR.

Pharmaceutische Zeitung, 1881, No. 34. From Professor FLÜCKIGER.

Biefel (R.) und T. Poleck, Über Kohlendunst- und Leuchtgasvergiftung.

Poleck (T.), Über das pharmaceutische Studium und sein Institut an der Universität zu Breslau.

The Committee recommended that thanks be sent to the respective donors. It had also been resolved that certain pharmaceutical and other works offered as a present by Dr. Jul. Morel, of Ghent, be accepted.

The regulations for the use of the microscopes recently placed in the Library had been considered.

The Committee had ordered that the Library be closed in the evening of May 18.

Curator's Report.

Attendance.	Total.	Highest.	Lowest.	Average
Morning .	331	33	5	15
Evening .	58	9	0	3

The following donations had been received and letters of thanks were ordered to be sent to the respective donors:—

Fruit of *Strychnos Ignatii.* From Professor FLÜCKIGER.

Model of Stirring Apparatus. From Mr. R. REYNOLDS, Leeds.

Specimen of the stem of *Strychnos M'Boundou*, and some other native medicines from the Gaboon. From Messrs. THOMAS CHRISTY and Co.

Specimens of the plant of *Cytinus Hypocistis* From Mrs. MARSH.

A letter of thanks for duplicate specimens had been received from the Director of the Royal Gardens, Kew.

The Professors had attended and reported satisfactorily of their respective classes.

EXHIBITION.

The reports of two meetings of this Committee, relating to the arrangements made for the recent Exhibition, were received and adopted.

INTERNATIONAL PHARMACEUTICAL CONGRESS.

This Committee had held several meetings and had received several replies to the invitations which had been sent out. The subscriptions already promised towards the expenses of the Congress were £302, including the £100 voted by the Council. Arrangements were in contemplation for reporting and interpreting the proceedings.

The report and recommendations of the Committee were received and adopted.

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* [A meeting of this Committee was held on Wednesday, when the following resolution was passed:—

"That the following be added to the Committee:—Professor Redwood, Dr. Paul, Messrs. Barclay, Brady, Ekin, T. H. Hills, Reynolds, and Sandford, and that Mr. Richard Bremridge be appointed Secretary and Treasurer to the Executive Committee."]

BENEVOLENT FUND.

Four members of the Council had held a meeting to consider applications for aid from the Benevolent Fund and they recommended that the following grants be made:—

£10 to the widow, aged 64, of a registered chemist and druggist.

£20 to the widow of a pharmaceutical member of the Society from 1842 to 1879, when he died.

£10 to the widow of a member, aged 61.

The report and recommendations were received and adopted.

THE INAUGURAL SESSIONAL ADDRESS.

The Council went into committee for the purpose of nominating a member to deliver the Sessional Address in October next. After some conversation, it was unanimously resolved that Mr. Symes, of Liverpool, be invited to deliver the address.

Mr. **Symes** said he was much obliged for the honour, which was entirely unanticipated, and though he felt some diffidence in undertaking the duty, as it was the unanimous wish of his colleagues, he would do his best.

Mr. **Richardson** suggested that this matter should in future be decided earlier in the year, say in January or February.

Mr. **Williams** said this was the first meeting of the new Council, and it was not competent for a Council to make any arrangements beyond the current year.

THE SALE OF POISONS.

The **President** said that having noticed in the Journal of last week a report of a case of poisoning by oxalic acid, and some remarks made by the coroner, Dr. Danford Thomas, he thought it only right to address a letter to that gentleman pointing out that he had not correctly interpreted the law.

The **Secretary** read the letter which had been forwarded and also the reply from Dr. Danford Thomas, acknowledging the receipt, and saying that he had been guided in his interpretation of the Act by what had been stated by one of the witnesses, who, he concluded, understood the matter, rather than by his own reading of the Act. He was much obliged for the information which had been afforded him.

Mr. **Andrews** said he had noticed the report of the case, and should himself have written to the coroner, but that he felt sure some notice would be taken of it officially. He was very glad that the President's letter had been received so satisfactorily.

THE CIRCULATION OF THE JOURNAL.

The **President** said that questions were asked by two members, at the Annual Meeting, with regard to what became of the 6000 or 7000 Journals which Messrs. Churchill stated were published weekly, as there were only a little over 5000 subscribing members of the Society. He had asked the Secretary to get out the figures from the books, and he thought it would be satisfactory to mention them; they were as follows:—

Members, Associates and Apprentices	5471
Life Members	239
Sold by Messrs. Churchill—average	750
To the Pharmaceutical Society of Ireland	80
Free issue, Exchanges, Honorary Members and others	254
Advertisers	120
Public Libraries	5
Total	6919

It appeared, therefore, that the actual number disposed of immediately after publication was very close upon 7000. This was the ordinary issue, but there were other copies sold in the office, and subsequently occasionally sent to persons not on the permanent free list, so that absolutely there were often over 7000 copies distributed.

The **Secretary** added that it was not an unfrequent occurrence to have to print an extra number of copies.

THE SALE OF DRUGS AND POISONS LAW (JAMAICA).

The following communication, a copy of which had been previously placed in the hands of each member of the Council, was taken as read:—

"Colonial Office,
"Downing Street,
"16 *May*, 1881.

"Sir,—I am directed by the Earl of Kimberley to transmit to you, to be laid before the Council of the Pharmaceutical Society, a copy of a despatch from the Governor of Jamaica, enclosing Law No. 10 of 1881 of the Legislature of Jamaica, entitled 'The Sale of Drugs and Poisons Law, 1881,' together with the Colonial Attorney-General's report thereon.

"Lord Kimberley would be glad to be favoured with any observations which the Council of the Pharmaceutical Society may have to offer upon this Law before it receives Her Majesty's sanction.

"I am, Sir,
"Your obedient servant,
(Signed) "EDWARD WINGFIELD.

"The Secretary,
"Pharmaceutical Society."

"Sir A. Musgrave to the Earl of Kimberley,
"Jamaica. "King's House,
"4*th April*, 1881.

"My Lord,—I have the honour to forward to your Lordship, for the gracious signification of Her Majesty's pleasure, the accompanying duly authenticated copy of Law 10 of 1881, passed by the Legislature of Jamaica, entitled 'The Sale of Drugs and Poisons Law, 1881.'

"2. This Law was introduced in consequence of repeated representations made by Dr. Mosse, Superintending Medical Officer, of the great injury sustained by the community from the absence of any system of registration of persons engaged in the sale of drugs.

"3. Your lordship was pleased to observe, in the ninth paragraph of despatch No. 41 of 25th October last, that Dr. Mosse's observations in his Annual Report on his department for the year 1878-79, pointed to the necessity for legislation to restrain the unlicensed sale of drugs and poisons, and your lordship asked to be furnished with my views on the question; but the matter being already under consideration by the Attorney-General with the view to the introduction of a law, I thought it unnecessary to trouble your lordship with any remarks, until I could transmit this measure, which has been delayed somewhat longer than I expected.

"4. I beg leave to enclose the Attorney-General's report on the Law.

"I have, etc.,
(Signed) "A. MUSGRAVE.

"The Right Honourable
"The Earl of Kimberley, K.P.,
"etc., etc., etc."

"The Attorney-General's Report on Law 10 of 1881.
"Attorney-General's Office,
"26*th March*, 1881.
"Report on Law 10 of 1881.

"I have examined the accompanying Law, entitled 'The Sale of Drugs and Poisons Law, 1881,' and I am of opinion that the Law is one which is not contrary to the Governor's Instructions.

"Sections 2 to 13 of this Law provide for a system of licensing for persons desirous of selling drugs and enact that no unlicensed person shall sell drugs or poisons, except such as are mentioned in section 5, under a penalty.

"Sections 14 to 17 make provision with a view as far as possible to protect the public against stale and unwholesome drugs.

"Sections 18 to 20 provide that on a sale of poisons precautions, similar to those enforced by the English law on this subject, shall be observed.

(Signed) "HENRY H. HOCKING,
Attorney-General."

Jamaica—Law 10 of 1881.

The Sale of Drugs and Poisons Law, 1881.

16th March, 1881.

Preamble.—Whereas it is expedient to regulate the sale of drugs and poisons in this Island:—

Be it therefore enacted by the Governor and Legislative Council of the Island of Jamaica, as follows:—

1. *15 Vict. c. 7 repealed.*—The Act of 15 Vict., chap. 7, is hereby repealed; but such repeal shall not affect the past operation of the said Law, or any consequences, penalty or proceeding, in respect of any offence committed against the said Law.

2. *Commencement of Law.*—This Law shall come into operation on the 1st day of July, 1881.

3. *Interpretation Clause.*—In this Law, unless the context otherwise requires, the following words and expressions shall have the following meanings assigned to them (that is to say):—

"Poison" shall include poisonous substance, poisonous drug or preparation containing a poison, and includes the articles contained in schedule A to this Law.

"Drug" shall include medicine, compound medicine, or medicinal preparation.

"Licence" shall mean a licence granted under this Law.

4. *Prohibition of sale, etc., of drugs or poisons without licence.*—From and after the coming into operation of this Law it shall be unlawful for any person to sell or keep open shop for retailing, dispensing or compounding any drug or poison, unless such person has first obtained a licence under the provisions of this Law.

Penalty.—Any person offending against the provisions of this section shall, on conviction thereof before any two justices in a summary manner, forfeit and pay a sum not exceeding £10.

5. *Reservation of rights to sell certain medicines, drugs, etc., and to sell generally to licensed persons.*—Nothing herein contained shall be taken to extend or apply to the sale by any person of any drug or poison to a person licensed under this Law, or to the right of any person in this Island to sell the following articles (that is to say):

1. Patent or proprietary or homœopathic medicines, if sold in any box, bottle, vessel or parcel, and under wrapper or cover as imported into this Island, or as prepared by any person having a licence in this Island; provided that such box, bottle, vessel or parcel is properly secured, and bears the seal, name or trade mark of the proprietor, inventor or manufacturer thereof, and directions for its use.
2. Mineral or artificial waters, or the salts or other material employed in their preparation.
3. Single medicinal substances enumerated in schedule B.
4. Any herb, vegetable, gum, oil or seed, except poisons, in its natural state, though the same may be employed in medicine.
5. Substances which though poisons are required for artistic, industrial, manufacturing or scientific purposes, subject however in this case to the regulations hereinafter contained concerning poisons.

6. *Procedure to obtain Licence.—Examination.*—Any person desiring to obtain a licence under this Law may apply in writing for that purpose to the superintending medical officer for the same; and such officer shall thereupon either personally examine such applicant as to his knowledge of drugs and poisons, and his ability to prepare and make up prescriptions and medicines, and as to his fitness to be entrusted with the sale of drugs and poisons, or shall depute any one or more persons licensed under this Law to conduct such examination.

Rules as to same.—In this last-mentioned case the examination shall be conducted in accordance with rules to be made by the superintending medical officer and approved of by the Governor.

7. *Preliminary Fee.*—Before proceeding to examine any such applicant as aforesaid, it shall be lawful for the superintending medical officer to demand and receive such sum not exceeding £2, as may be approved by the Governor. Such sum shall be carried to the credit of the general revenues, which shall be liable for the cost of carrying out this Law.

8. *Grant of Licence.*—The superintending medical officer, if satisfied with the result of any such examination as aforesaid, shall grant a licence under this Law to the applicant.

Its Form—Schedule C.—Such licence shall be in the form given in schedule C to this Act or to the like effect.

9. *Registered Medical Practitioner deemed to be Licensed.*—Medical practitioners registered under the medical laws of this island shall be deemed to be duly licensed under this law, without the necessity of their applying for or obtaining a licence.

10. *Who are entitled to a licence without fee, and how same to be obtained.*—Any person possessing a diploma or certificate, entitling him to practise as a pharmaceutical chemist, or as a chemist and druggist, or as an apothecary, in any part of the United Kingdom, shall be entitled to receive a licence under this Law without payment of any fee, on applying to the superintending medical officer, and producing to him, or to some person deputed by him for that purpose, his diploma or certificate, and satisfying him, or such person as aforesaid, that he is the person named in such diploma or certificate.

Any person who, on the coming into operation of this Law, shall hold a certificate signed by two fellows of the College of Physicians and Surgeons of Jamaica, in pursuance of and accordance with the provisions of section 17 of the Act 6 Victoria, cap 33, shall also be entitled, on application to the superintending medical officer, to receive a licence under this Law without payment of any fee.

11. *Register of Licences, and public notification thereof.*—The superintending medical officer shall keep a register of every licence granted under this Law, and shall cause to be published in the *Jamaica Gazette* notification of every licence so granted within fourteen days after granting the same, and shall also, from time to time, at least once in every year, cause to be therein published a list of all persons holding such licences.

12. *Onus probandi of certain facts, on accused.*—In any proceeding against any person for any offence against this Law, the burden of proving any licence shall lie upon the person accused, and any person shown to have delivered to any other person any drug or poison shall be deemed to have sold the same, unless the contrary be proved.

13. *Drug department of store to be closed in absence of licensed person.*—No person having a licence under this Law shall leave his shop or store, or that part thereof and that may be kept for the sale and dispensing of drugs and poisons, open during his absence without leaving some person having a licence under this Law in charge thereof, and actually in attendance therein, and any person offending against the provisions of this section shall be liable, on summary conviction of such offence, to a penalty not exceeding five pounds.

14. *Prohibition as to stale, unwholesome or adulterated drugs, etc.*—No person having or keeping open shop for the sale of drugs or medicines shall sell, or have or keep in his possession, any drug or medicine in a stale or unwholesome state, or in a state unfit for use, and no person

shall sell or expose or offer for sale as unadulterated any drug or medicine that is adulterated.

Penalty.—Any person offending against the provisions of this section shall, on conviction thereof in a summary way before two justices, forfeit and pay any sum not exceeding ten pounds, in addition to and irrespectively of any penalty to which he may be liable in case he shall not have a licence under this Law.

15. *Power to seize and destroy such drugs, etc.*—It shall be lawful for the justices by whom any person is convicted under the last preceding section to order the seizure and destruction of the stale, unwholesome, unfit or adulterated drugs or medicines, in respect of the selling or having or keeping of which in his possession such person has been convicted.

16. *Power to enter, search for, inspect and analyse drugs, etc.*—The superintending medical officer, or any registered medical practitioner authorized by him in writing in any case, may at all reasonable times, either by himself, or attended by one or more police constables, enter the shop, store or house, of any person having a licence under this Law, and inspect and search the same, and survey, prove, and determine whether the drugs and medicines therein are or are not stale, unwholesome, or unfit for use as such, and may take samples for further examination or analysis of any drugs or medicines that he may see reason to believe are not fresh, wholesome or fit for use, paying a fair price for the same.

Proceedings on taking samples for analysis.—When any sample is so taken as aforesaid, it shall be lawful for the licensed person aforesaid to require the superintending medical officer, or practitioner authorized by him as aforesaid, to put two other samples of any such drug or medicine as aforesaid into secure bottles or vessels, and to seal up or otherwise secure the same in such manner as the person having a licence as aforesaid shall desire, and to have one of such samples sent to the Island chemist for examination and report, and the other sample shall be left securely sealed as aforesaid with the person licensed as aforesaid, in order that he may have the same subjected to such independent examination or analysis as he may see fit, and the said superintending medical officer or medical practitioner, as aforesaid, shall thereupon comply with such request.

The said Island chemist shall make such examination or analysis of the sample sent to him as aforesaid, as may be necessary to enable him to determine whether or not the same are stale, unwholesome, adulterated, or unfit for use as aforesaid, and shall send a certificate under his hand of the result of such examination or analysis to the superintending medical officer or medical practitioner, as aforesaid from whom he has received the same: and in such certificate he shall describe the state of the bottle or vessel containing the sample aforesaid, and of the seals thereon or other fastenings thereto.

17. *Certificate of Island chemist.—Evidence.*—In any proceeding taken under this Act, the certificate of the Island chemist, duly signed by him, shall, if it appear therefrom that the bottle or vessel containing the sample aforesaid, had its seals or other fastenings uninjured at the time that he received the same, be *primâ facie* evidence before the Justices, or in any Court of Justice, of the matters therein specified, and in the absence of any evidence to the contrary shall be sufficient evidence thereof.

18. *Restrictions on sale of poisons.*—No person shall dispense, sell, or deliver any poison unless it be—

1. In pursuance of the written order or prescription of some registered medical practitioner, or in pursuance of the written order of some person licensed under this Law: or
2. In the presence of a witness who knows the purchaser, and who signs his name and address as witness to the sale in "The Sale of Poisons Book" (hereinafter mentioned) before delivery.

And no person shall sell, dispense, or deliver, to any person any poison, unless he distinctly marks and labels the box, bottle, wrapper, or cover, in which such poison is contained, with the word "poison" and with his name and address written or printed on such label.

19. *The Sale of Poisons. Book to be kept. Entries to be made therein.*—Every person selling or disposing of any poison, or keeping any poison for the purpose of sale, shall keep a book for the sole purpose of making the entries hereinafter mentioned: such book shall be called "The Sale of Poisons Book;" and every such person shall on any sale or delivery of any poison, before delivery thereof, make or cause to be made an entry of the name, address and calling of the person to whom such delivery is made, and the name and quantity of the article delivered, and the date of such delivery, and either the name of the medical practitioner in pursuance of whose order or prescription the same has been delivered as aforesaid, or the signature and address of the witness to the sale as aforesaid, in accordance with the provisions of the last preceding section.

20. *Penalty on offences against sections* 18 *and* 19.—Every person who contravenes or negligently suffers or allows any assistant or servant to contravene, any of the provisions of the two preceding sections shall be guilty of an offence against this Law, and shall be liable, on conviction thereof in a summary manner before two justices of the peace, to a penalty not exceeding £10.

21. *Suspension of Licence.*—When any person having a licence under this Law is convicted of any offence under this Law it shall be lawful for the justices by whom such person is convicted, at the time of such conviction, by writing under their hands, to order the licence of such person to be suspended for any period not exceeding six calendar months, and shall cause such suspension to be notified in the *Jamaica Gazette.*

Effect of suspension.—During the period that any licence has been ordered to be suspended as aforesaid the holder of such licence shall, to all intents and purposes, be deemed not to have a licence under this Law.

SCHEDULE A.

Arsenic, and its preparations.
Prussic acid.
Cyanides of potassium, and all metallic cyanides.
Strychnine and all poisonous vegetable alkaloids and their salts.
Aconite, and its preparations.
Emetic tartar.
Corrosive sublimate.
Cantharides.
Savin and its oil.
Ergot of rye, and its preparations.
Oxalic acid.
Chloroform.
Belladonna, and its preparations.
Essential oil of almonds, unless deprived of its prussic acid.
Opium, and all preparations of opium or of poppies.
Antimony and its salts.
Opium, and its preparations including morphia and its salts.
Hydrate of chloral, and preparations.
Sulphate of copper.
Sub-acetate of copper (Verdigris).
Carbolic acid.
Croton oil.
Elaterium.
Laurel water.
Conium.

SCHEDULE B.

Assafœtida.
Camphor.
Castor oil.
Epsom salts.
Linseed meal.

Senna.
Rhubarb.
Carbonate of magnesia.

SCHEDULE C.

Jamaica Ss.

This is to certify that A. B. of   is duly licensed under the Sale of Drugs and Poisons Law, 1881.

Given under my hand this   day of   A.D., 18   .

(Signed)   A. B.,
Superintending Medical Officer.

The **PRESIDENT** suggested that the communication should be referred to the Pharmacy Act Amendment Committee.

Mr. **SYMES** said the law was awaiting the Royal Assent. It was to come into force on July 1, so that there was no time to be lost.

The **PRESIDENT** said he thought the matter must be referred to a committee. The receipt of the communication had been acknowledged, and it must wait the due course of business. It was a very important subject, and care must be taken to answer the communication fully and properly.

Mr. **HAMPSON** thought there could be scarcely two opinions as to the desirability of the subject being referred to the Committee; but as time was an object, it was a question whether the Council might not authorize the Committee to send a reply, without waiting to report to the Council.

Mr. **RICHARDSON** thought this was going too far. The Council had already given the Committee great powers; the thin edge of the wedge had evidently been got in, and now Mr. Hampson was driving it up to the very hilt. He did not see that there was any need for such hurry, but agreed that the communication should be sent to the Committee for thorough sifting, and then it should be brought before the Council.

Mr. **FRAZER** said he must refuse absolutely to delegate to any Committee the power to represent him.

Mr. **M. CARTEIGHE** thought if the Council did not send Lord Kimberley an answer in a reasonable time, he would act on his own judgment, and it would be a great pity this opportunity of consulting with him should be lost. He should be very sorry to do anything which would hurt Mr. Frazer's feelings, but really it was a matter of business; either the Council ought to proceed at once to frame a reply or should authorise the Committee to send one in a short time.

Mr. **ANDREWS** supported the same view; if the Council did not send an answer at once it would be quite useless.

Mr. **SAVAGE** agreed with the last two speakers. This was an important occasion; it seemed to him a long time even now since the communication was received.

The **PRESIDENT** said the letter was only dated May 20. As soon as it arrived he had ordered a printed copy to be sent to every member of the Council, and also to the Solicitor, so that if the Committee required his assistance he would be in a position to give it at once.

Mr. **FRAZER** thought the Council might consider it and dispose of it at once.

Mr. **WILLIAMS** reminded the Council that it was not called upon in any way to alter the law; it had not to legislate or pretend to do so; but its advice was simply asked as to the propriety of this law. If it could see, or if the Committee could see, any obvious impropriety in any of the clauses it would be its duty to point it out. There was, unfortunately, an anomaly in one part of the Bill which had been, no doubt, overlooked by those who drafted it. There were registered persons who were to have the privilege of selling poisons under certain restrictions, but there were clauses which also gave the privilege of selling articles in the second schedule to those who were not on the Register, and they would be able to do so without complying with the restrictions which were imposed upon those who were registered. No doubt this would be altered if it were pointed out: but he thought the proper thing would be to refer the Bill to the Committee, and give the Committee power to reply to the Government as soon as possible.

Mr. **ATKINS** was of opinion that this would be the best course, although he shared Mr. Frazer's feelings with regard to the undesirability of deputing any undue authority to a committee in a general way; but this was an exceptional circumstance and time was pressing. To reply after the date at which the Act was proposed to take effect would be absurd.

Mr. **YOUNG** remarked that one of the items of business on the agenda paper was to consider this matter, and if the Council delayed too long, the Secretary of State would no doubt act without waiting for its advice. It would be better for those who objected to remit the matter to a committee, to state what objections they had, and perhaps they might be met. It was very desirable that the Council should manifest its appreciation of the courtesy shown it by communicating with the Secretary of State in proper time.

Mr. **SYMES** said it was only a question of half-an-hour or an hour at the utmost, and that the Council might dispose of the matter at once. The Bill had been in the hands of the members of Council, and if they did not peruse it, it was their own fault. He thought the Council could arrive at a satisfactory opinion within an hour, and it would be far more courteous to send a reply at once.

Mr. **ATKINS** said a matter of that kind could not be satisfactorily discussed in a large meeting; it could be much better done by a committee.

Mr. **RICHARDSON** said he would withdraw his opposition to the course suggested.

The **PRESIDENT** thought the matter should receive full consideration and that the assistance of the Solicitor should be obtained. He did not think the request of Lord Kimberley could be properly complied with without the advice of the Solicitor.

It was then resolved, *nem. con.*, that the matter be referred to the Committee to consider and to frame and forward to the Colonial Office a report on the same.

Mr. **BOTTLE** said he hoped the Committee would be summoned at an early date to dispose of this matter.

RETIREMENT OF MR. SANDFORD AND MR. HILLS.

Mr. **SAVAGE** then moved, pursuant to notice, that—

> "The members of the Council desire to express their sincere regret at the retirement of their esteemed colleagues, Mr. Sandford and Mr. Hills, and to record their appreciation of the services they have rendered to the Society for so many years. The Council ventures to hope that the Society in its efforts to promote the best interests of pharmacy, may still continue to receive their valued advice and assistance."

He said he brought this motion forward both with regret and with pleasure,—with regret that such a resolution should have to be moved, and with pleasure that the Council should be able to record its estimate of those two gentlemen who had thought proper to retire from its midst. After the manifest expression of opinion which had already been given by the Council on a previous occasion and at the Annual Meeting, it would seem almost unnecessary to say anything in addition of the gentlemen who had left the Council. But at the same time it might be well to refer to a few particulars in connection with those gentlemen. He found that Mr. Sandford was elected in 1854, so that in reality his first appearance on the Council was twenty-seven years ago. In 1855 and 1856, however, he vacated his place, for the purpose of fulfilling the important office of overseer in his parish. He was asked to stand for one year, and then his services were found so valuable that he was enlisted for the next year and the succeeding one. For two years, therefore, he resigned his position at that Council, but he came on again in 1857. At that time the President was Mr. Bell, and Mr. W. L. Bird was Vice-President; and when he looked to the list of the Council elected at that time, he found that out of eight, there were no less than six now dead, namely, Mr. Bell, Mr. Deane, Mr. George Edwards, Mr. Meggeson, Mr. Morson and Mr. Waugh. Mr. Davenport and Mr. Peter Squire were the only ones now living of the number. Mr. Daniel Bell Hanbury was at the time Treasurer. In 1861 Mr. Sandford was appointed Vice-President, Mr. Squire having been elected President. In 1863 Mr. Sandford was elected President, and continued so until 1868, being actively engaged the whole of that time in the service of the Society. In the following year a public dinner was given to him, and as an evidence of the appreciation in which he was held by his friends on the Council and others, reference might be made to the portrait which hung on the wall of that room and to the presentation of plate which was then made to him. All those things spoke volumes as to his merits. The year 1870 was a memorable one, when there were two scrutinies of voting papers for Council, in consequence of one scrutineer having taken liberties with, at any rate, two names, Mr. Evans being cheated of 103 votes, and it being his own privilege to be deprived of 28. Accountants were then called in and a second scrutiny took place. In 1870 Mr. Sandford was again President, Mr. Haselden being Vice-President; but he resigned in the following April, and on that occasion a vote of regret was passed at the loss of his services as President. Mr. Haselden became President, and Mr. Bourdas was then elected Vice-President, an office in which he had been followed by Mr. George Edwards, Mr. W. Scott Brown, Mr. Bottle and himself. With regard to Mr. Hills, all knew him so well that it was not necessary to say much. He was elected in 1861. On that occasion there were three members elected, Mr. Mackay, Mr. Hills, and himself. So that Mr. Hills had been a member of the Council twenty years, which was a long period in a man's life. He was first elected Vice-President 1867, and in 1868 succeeded Mr. Hanbury as Treasurer. In 1873 Mr. Hills was President and Mr. Bottle Vice-President. Mr. Hills, though a very different man to Mr. Sandford, would be equally missed from the Council. The Conference knew well the liberality which he always manifested, for there was no place at which it had met which had not tangible recollections of his benevolence. It was quite unnecessary to enumerate the many advantages which had resulted to the Society from the benevolent and kindly feelings Mr. Hills possessed. Although Messrs. Sandford and Hills had retired from the Council, it was not from inability to perform the duties, but from a natural inclination to take a little more rest; they were just as efficient as they always had been, and he was sure would be as ready as ever to take part in anything where their services would be of use. This was shown by their action in connection with the International Congress. In conclusion he would only say, whilst regretting their absence, they had the best wishes of the Council for their future.

Mr. **Bottle**, in seconding the motion, said that he did not know that he had much to add to what had been so ably expressed by Mr. Savage. With reference to the services of their late colleagues on the Council, it had been his privilege to sit at that table many years with those and other esteemed members, some of whom had passed away. But these two gentlemen had merely retired into a more quiet course of life. Mr. Sandford had been working there for twenty-six or twenty-seven years, and twelve years ago, when a portrait and a service of plate had been presented to him, it was felt that as much had been taken out of him as could be expected of any reasonable man; since then, however, Mr. Sandford had gone in for another twelve years of active service in the promotion of the best interests of pharmacy. The Queen only asked for twelve years' service from a young recruit; but in this case the Society had had the same length of service from one who was already a veteran. It had been his privilege to serve as Vice-President to Mr. Hills, and it had been a great pleasure to be associated with him, and to assist him in every way he could to carry out what was necessary in the interests of the Society. He extremely regretted the retirement of those two gentlemen, and it rather brought to his mind that the time was approaching when, from one cause or another, he himself must follow their example. However, he did hope to be able, for another year, at least, to give the Council the best advice he was able. In expressing the regret the members of Council all felt at the loss of their two colleagues, he was induced to repeat a question which had been put not long ago, "Are we progressing?" Since then a good deal had been heard of want of progress in pharmacy; but he might express his own opinion that pharmacy was progressing, that the Society was progressing, and that at the present moment it stood in a position it had never occupied at any former period. That very day the Council had under consideration a communication sent from the Government, asking its advice. He believed that a great future was before the Council and the Society, and that it was only in the ordinary nature of things that the Society should increase in itself, in its wealth and importance; whilst it was equally in the course of nature that individual men must depart.

Mr. **Robbins**, having been associated for several years with Mr. Sandford and Mr. Hills, felt that by their retirement the Council had lost two of its most valuable members. Mr. Sandford had spent a great number of years in the service of the Society, almost half a life-time. The members of Council always looked up to him when they wanted information, and his knowledge of the law on all matters affecting pharmacy was so great, that he was often jocosely styled the Attorney-General. On all difficult questions they sought his counsel, and his opinions carried great weight. In Mr. Hills also the Council lost one who had the welfare of the Society truly at heart, one who spared neither time nor money to carry out the work which was commenced by his friend and predecessor, Mr. Jacob Bell. His kind and genial manner tended in a high degree to the *esprit de corps* which was necessary to the good working of any society. The Council could only express regret at the retirement of those gentlemen, and he hoped that they had a great many years before them to enjoy the repose which they had so well earned.

Mr. **Hampson** wished to add just a word or two, as one of the younger and less experienced members of the Council, in support of the motion. All the members of Council must endorse what had been said by previous speakers; he shared those feelings most sincerely and deeply. In the absence of Mr. Sandford and Mr. Hills, they should miss not only a pleasant and genial face, but the wise counsel which Mr. Sandford especially was able to give. It had been his misfortune to disagree on certain occasions with Mr. Sandford, but he always felt in doing so that he was disagreeing with an honest and able opponent, who stated his views not only with great force, but with the utmost sincerity. He therefore always felt, if he disagreed with him, that it would be well to reconsider his position. He congratulated the members of the Council on possessing the memento of Mr. Sandford which had been alluded to, and he only wished they had a similar reminder of Mr. Hills, at the opposite end of the room. He hoped some steps would be taken to obtain a similar portrait.

Mr. **Atkins** said a divided feeling always occupied his mind on such occasions as the present. On the one hand he felt some hesitation in obtruding himself to add anything to what had been so well expressed; but, on the other hand, if he did not speak, he felt that afterwards it might be supposed that he did not actively share in the sentiments which had been uttered. At the danger of obtruding himself, therefore, he must say he endorsed every word which had been spoken in the way of affection and of commendation of the two retired members. From the first moment he entered the Council room, as a comparatively unknown man hailing from the country, he received from those two gentlemen nothing but the kindest possible consideration, courtesy, and gentlemanly demeanour. They showed a willingness to listen to opinions crudely expressed, and a kindly consideration for the ignorance of a new member, which he could never forget, and he took this opportunity of warmly acknowledging. When he considered Mr. Sandford's perfect knowledge of the working of the Society from the very first, he had been often surprised at the gentlemanliness and patience with which he had listened to those who were feeling their way into a more practical acquaintance with it. With regard to Mr. Hills, everyone knew his kindly, genial face, and they had all participated in his hospitality. The Council had lost two men, whom it would be exceedingly difficult to replace. There was often talk about a crisis, but it seemed to him pharmacists were always passing through crises, and in the times through which they were now passing, they certainly did want the administrative power, the patient skill, and the knowledge of details which those two gentlemen pre-eminently possessed. His only feeling of satisfaction on that point was that they did not reside in the country, but in London; and he was thankful that they would be, in a sense, still unattached members of the Council, and able to give the benefit of their advice if occasion required.

Mr. **Frazer** said he only rose in order to prevent any possible misapprehension arising from his silence; because he had the impression that this matter, having been discussed a month ago, when every member of the Council expressed his views regarding Mr. Sandford and Mr. Hills, nothing would have been said on that occasion, except by the mover and seconder of the motion. He probably represented others who would not speak, but who thoroughly endorsed all that had been said. He confessed that he envied Mr. Hills some of his qualities; he was a solid, sagacious man, and able to give sound advice on every question which came before him. It had been said that speech was silver and silence gold; and Mr. Hills professed that golden quality, for which he often envied him. He knew that all the members of the Council felt the same, and it was not necessary to reiterate the same sentiments all round the table. All felt the loss of those two gentlemen, and cordially wished them many years of happiness.

The **President**, in putting the motion, said he had on two or three previous occasions lately expressed his views with regard to the retirement of Mr. Sandford and Mr. Hills, and it was unnecessary to repeat them. It had always been a pleasure to meet Mr. Sandford and obtain his advice on any matter affecting the course of the Society's buisness. Mr. Hills also had those business qualities which were of very great value to the Council, and he hoped the younger members, and the older ones also, would profit by their advice.

The motion was then put and carried unanimously.

Mr. **Richardson** said he hoped the suggestion which had been thrown out by Mr. Hampson, that the Council should obtain a portrait of Mr. Hills, would not be lost sight of. He thought it might be carried out if a proper method were employed.

The British Pharmaceutical Conference.

On the motion of Mr. **Butt**, seconded by Mr. **Atkins**, it was resolved—

> "That the Executive Committee of the British Pharmaceutical Conference be allowed the use of one of the rooms in the Society's house for the purpose of meeting, at such time as may be convenient to the Society."

The Pharmaceutical Exhibition.

Mr. **Symes** rose to move a resolution of which he had given notice—

"That an Exhibition Committee be appointed."

The **President** said he thought it would be necessary before that was carried, that the Council should decide whether an Exhibition should take place.

Mr. **Symes** said he was quite prepared to move this, but he thought it would be better to appoint the Committee, which Committee should consider the desirability or otherwise of holding an Exhibition next year. Two or three weeks ago, he should have been inclined to advocate a triennial Exhibition, not an annual one, especially when he heard the lamentations and fears uttered that this year's Exhibition would be a failure, but when he saw that it was again a success, when he found that many members of the Society had come long distances to see it, and had expressed their satisfaction that they had done so, it occurred to him that it was worth considering whether it should not be made annual. He thought, however, that that could be better dealt with by a committee, and if the Council thought fit to appoint a small committee, that it should consider first whether it was desirable that an Exhibition should be held every year. Mr. Richardson was good enough to call his attention to the subject earlier this year, which was a great advantage, but it would be better if the Committee had had the whole year before it. If the manufacturers knew the Exhibition was to be a regular thing, they would be better prepared, and the members of the Committee also would be on the alert, and looking out for articles suitable to be exhibited. There had been some few complaints, but he held that on the whole the Exhibition had been a great success. Something had been learnt by the experience of the last two years, and no doubt this would enable them to make future exhibitions more successful.

Mr. **Richardson** seconded the motion, and was rather astonished that any opposition should be made to it. It seemed to him it was quite as much in order to appoint this Committee, as to appoint a Parliamentary Committee, or Pharmacy Act Amendment, or any other Committee. He agreed with Mr. Symes that an Exhibition held either annually or every two or three years would be of great advantage to the country members. It gave them an additional inducement to come to London, which the speeches at the Annual Meeting did not offer. A well organized Exhibition every year, or every alternate year, would be an immense boon to many. He was afraid that the Committee who had hitherto acted in this matter had not had the success of the affair at heart, but had rather done it from necessity than as a labour of love. He thought Mr. Symes was quite right in moving for a Committee, and he hoped that the Council would select as members of it those who would take an active, and not a mere passive part in it.

Mr. **Hampson** agreed with the President in thinking that bringing forward this motion was rather putting the cart before the horse. There was no doubt the Exhibition was a fair success, and he was anxious there should be another; but to move that an Exhibition Committee should sit to consider something indefinite, without deciding that an Exhibition should be held, seemed to him altogether absurd. Let the Council first decide to have an Exhibition, and then appoint a Committee. There were twelve months before the next Annual Meeting, and there was no possible hurry in the matter. He thought it was rather unfortunate that this subject should be opened by an attack on the former Committee, and the throwing out of inuendoes that that Committee had not been hearty in its work.

Mr. **Richardson** said he did not say so.

Mr. **Hampson** said Mr. Richardson certainly threw out the insinuation that the Committee had not done justice to the will of the Council.

Mr. **Richardson** said it was unfortunate that Mr. Hampson was continually misrepresenting what he said.

The **President** said he must remind Mr. Richardson that he had remarked that the late Committee had not the affair at heart, and he did not think that there was any ground whatever for such a remark.

Mr. **Hampson** said he did not at all wish to misrepresent Mr. Richardson, and if he thought the former Committee had not done its duty, he was perfectly right in saying so. On the other hand he should say that he believed it had, and it seemed to him rather unfortunate to appoint another committee, ignoring those gentlemen altogether. It was also unwise to ask the Council to appoint a committee when it had not yet decided that an Exhibition should take place.

Mr. **Frazer** suggested that a notice of motion should be given that an Exhibition be held next year.

Mr. **Williams** said it would have been time enough to consider whether there should be an Exhibition or not when the time was approaching to hold it. He agreed that it was most irregular to move a resolution of this sort, that an Exhibition Committee be appointed, before the Council had decided whether there should be an Exhibition at all. He had no doubt when the proper time came, which would be about February next, the Council would decide to hold another Exhibition, and then would be the time to appoint the best men and the most active men on the Committee, to carry out the wish of the Council. He supposed it was intended as a kind of reflection on the members of the late Committee, who, he thought, did their duty very well, that their names were entirely left out. Not having been on that Committee himself, he could speak without any prejudice.

Mr. **Symes** said there was no Committee.

Mr. **Williams** said there certainly was a Committee, and a Committee of that description, when it had to work, had to sit nearly day by day. There must be men upon it who would come day by day and look after little details; it was no use appointing a Committee to sit once a month for six months, because that meant doing nothing at first, and then not having time to do what was necessary at last. The last Committee met every week, and several times twice a week. This was not the right time to decide whether there should be a Committee or not; it was a great trouble and a great expense to manufacturers to exhibit, and when an exhibitor went out of his way to send things he should not be reflected upon because he did not exhibit so well as he did for a great international exhibition, which remained open a considerable time.

Mr. **Savage** said the last Exhibition was so good that no doubt it was an inducement to Mr. Symes to bring the subject forward again. He knew many who came up from the country the other day, who would not have come but for the Exhibition; but he thought this motion was rather premature. He saw no objection to coming to a determination as to whether an Exhibition should take place, for which purpose the appointment of the Committee could be deferred.

Mr. **Atkins** said if the illustration of putting the cart before the horse were objected to, it was certainly begging the question to appoint a Committee to deal with that which after all might not be done. Suppose later on in the year the Council decided not to have an Exhibition, then the work of the Committee would be thrown away. He thought the Exhibition had been fairly successful, but he did not think it would be so every year. It might be so for another year perhaps, but still he believed before long it would be found desirable to only hold these Exhibitions triennially. It ought also to be distinctly understood that trade interests should be kept entirely on one side, and the Exhibition should be in the interests of the development of Pharmacy and inventive genius.

Mr. **Andrews** said he would move as an amendment that a Committee be appointed to consider the desirability of having an annual exhibition of pharmaceutical apparatus and appliances, and to report to the Council. He should urge having one next year, for he believed the great success of the Annual Meeting this year was due entirely to the fact that there was an Exhibition. He had received several letters from gentlemen speaking in high terms of it, and others from gentlemen who regretted that they could not attend.

Mr. **Symes** said unless the amendment was pressed he would, with Mr. Richardson's sanction, withdraw his motion, and give notice of a motion for next month, that an Exhibition be held next year. On the question of order, however, as he was challenged for suggesting that a Committee be appointed to do some indefinite kind of work, his understanding certainly was that the first business before the Committee would be to consider the desirability or otherwise of holding an Exhibition next year. It had been said earlier in the day that it was very desirable to change about and have fresh members on other Committees, and he thought the same thing would apply in this case. He certainly did not mean in any way to reflect on the character of those gentlemen who formed—not the Committee last year, for there really was no Committee last year—but a Sub-Committee appointed by the Library, Museum and Laboratory Committee.

The **President** said there was a Special Committee which reported to the Council.

Mr. **Symes** said he had looked at the book, and it appeared that there never was a Committee appointed by the Council, but a Sub-Committee had been appointed by the Library, Museum and Laboratory Committee. He meant no reflection whatever on the members of the Sub-Committee, but he would withdraw this motion and give notice for next month.

Mr. **Andrews** then withdrew his amendment.

The **Secretary** read a letter from the authorities at Kew, thanking the Council for the use of certain wood engravings to be used in the official catalogue of the Kew Museum.

The **Secretary** also reported that he had received a letter from Dr. Hogg, of Paris, asking for certain information with regard to pharmaceutical education in Great Britain.

The **Secretary** also reported that he had received a communication from the Secretary to the British Association, stating that an Exhibition, illustrating the progress which has been made during the last fifty years in the construction of instruments of scientific research, will be held, in conjunction with the meeting of the Association, at York, in September next, and asking for the support of the Pharmaceutical Society.

Provincial Transactions.

NOTTINGHAM AND NOTTS CHEMISTS' ASSOCIATION.

The annual meeting of the above Association was held at the Flying Horse Hotel, on Tuesday, May 31. The President, Mr. R. Fitzhugh, F.C.S., in the chair. There was only a moderate attendance of members.

The minutes of the last meeting having been read and confirmed, the meeting appointed Mr. A. Smith to act as Auditor with Mr. F. Cohite, in the absence of Mr. J. Lewis.

The President then called upon the Secretary, Mr. C. W. Warriner, to read the Annual Report, which stated that the Council had great pleasure in congratulating the members upon the steady increase of the Association, there being now upon the rolls of the Association 55 members, including country ones, and 29 associates, as against 55 members and 25 associates the previous session; showing an increase of 4 associates. During the past session several members had resigned and one old and valued member has been removed by death in the person of the late esteemed Treasurer, Mr. John Rayner, who had worked assiduously for upwards of thirteen years in that post, and who was one of the founders of the Association. Immediately after his decease the Council forwarded a letter of sympathy and condolence to his widow and family, to which they received a very courteous reply. Financially the Association was in a more prosperous state than it had ever been before, the Treasurer's account showing a balance in hand of £67 17*s.* 2*d.* For this the thanks of the Association were due to several donors, amongst whom might be mentioned Mr. E. Harvey, Messrs. Evans, Lescher and Webb, Mr. Taylor (of Clarke, Bleasdale and Co)., and Messrs. Oldfield, Pattinsons and Co. The thanks of the Association were also due to the Pharmaceutical Society for the Journal, Calendar and Catalogue of Library; the British Pharmaceutical Conference for the 'Year-Book of Pharmacy;' to Messrs. Evans, Sons and Co., of Liverpool, for refitting and arranging specimens in their materia medica cabinet; and to the following gentlemen for donations of prizes to classes:—Mr. R. Fitzhugh, Mr. W. H. Parker, Mr. J. H. Haywood and Mr. H. Cowley. During the sessions several meeting had been held, including one to consider the Thursday half-holiday closing movement and others to discuss the proposed new Pharmacy Act. The Council had still to report with regret that as a rule the attendance of the members at the meetings, especially the non-social ones, had been very limited. At the special meeting of the trade, called on February 8, to discuss the proposed new Pharmacy Act, it was decided, in consequence of it not being a representative meeting, and considering the smallness of the attendance of members and the apathy and general want of interest shown on the subject, that no discussion on the proposed new Act take place. The Act was afterwards discussed clause by clause at a social meeting held on March 22, when it was decided to support the Act as it stood, which decision was communicated by the Secretary to the Registrar of the Pharmaceutical Society. The Council had been in communication with the Town Clerk for some time past respecting a room in the new University buildings, but as yet no definite answer has been received, and from inquiries made it is thought that little or nothing can be done until after the buildings are opened, when the Council hopes to be successful. The Sub-Librarian had reported to the Council that 21 books had been borrowed during the session. The examiners appointed to examine the papers in connection with the materia medica and chemistry class conducted by Mr. R. Widdowson, adjudicated as follows:—1st. Mr. W. W. Talbot; 2nd. Mr. W. F. Savage; 3rd. Mr. W. Gill, and in accordance with the above, suitable prizes were given by the Council and teacher, and presented at the inaugural meeting of the session. During the past session the Council secured the services of Mr. John Quinton Bown, to give a course of thirty lectures upon "The British Pharmacopœia," its materia medica, chemistry, botany and preparations, with practical illustrations and examinations of the different roots, barks, etc. This class had been most successful. In connection with this class the President had offered a prize for practical dispensing, and the Vice-President offered a second, providing a sufficient number of candidates presented themselves. Early in May, therefore, an examination was held at the President's establishment, when eight candidates presented themselves. The results were afterwards examined by your President and Secretary, and were found to be fairly well up to the standard. The first prize was awarded to Mr. E. H. Judge, and the second to Mr. John H. Potter.

The Treasurer then presented his balance sheet, it having been found correct by the Auditors. Upon the motion of Mr. Ward, seconded by Mr. C. Fletcher, both reports were received and adopted.

The meeting then proceeded to the election of officers and Council the voting taking place by ballot with the following result:—President, Mr. R. Fitzhugh, F.C.S. (re-elected); Vice-President, Mr. T. B. Fletcher; Treasurer, Mr. W. H. Parker; Honorary Secretary, Mr. C. W. Warriner (re-elected); Council, Messrs. R. Jackson, J. Wilford, M. Humphreys, W. Widdowson, F. White, C. A. Bolton, R. H. Beverley and J. Lewis; Auditors, Messrs. C. Fletcher and A. Beilby.

A discussion then took place upon the best means of carrying on the work of the Association for the ensuing session, and further enlisting the sympathies of the members and trade generally.

Mr. W. H. Parker suggested that exhibitions of various chemical apparatus and appliances should be held from time to time, at the monthly meetings. This idea met with general approval.

Mr. Bolton suggested that new blood should be brought into the Council in order to give members more personal interest in the Association, and that some of the older members should make way for fresh ones.

Mr. Warriner hoped that new life would be thrown into the society when it obtained rooms worthy of it in the new University buildings, and hoped that then a good *soirée* would be held, at which exhibitions of various scientific instruments, etc., might be given, in order to inaugurate a new era in the work of the Association.

Mr. R. Widdowson suggested that the *soirée* be held before, and that the town authorities be invited to be present at it.

After some further discussion, the meeting terminated by a vote of thanks to the President.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, May 26, Mr. D. Hooper, Vice-President, in the chair.

A report on Materia Medica was made by Mr. R. H. Parker, "Notes on Eclectic Remedies," which will be published in a future number of this Journal.

After a discussion upon the paper, which was illustrated by specimens, a vote of thanks was passed to Mr. Parker.

Parliamentary and Law Proceedings.

Death after Drinking Condy's Fluid.

An inquest was held at Harwich, on Thursday, May 26, before Mr. Codd, coroner, touching the death of Mrs. Blanch. It appeared from the evidence that deceased had been under medical treatment for jaundice, and early on the previous Sunday morning she went to a table in her bedroom with the intention of taking a dose. In mistake, however, she took a draught of the Condy's fluid, used in the bedroom as a disinfectant, but discovering the error she had committed, immediately called for assistance, and a medical man was summoned.

Mr. Samuel Evans, physician and surgeon, said he had been in attendance upon the deceased for about three days previous to Sunday. She was suffering from yellow jaundice, and was progressing very favourably up to that time. At about a quarter to seven o'clock that morning he was asked to go and see the deceased as he was informed she had taken some wrong medicine. He requested the messenger to run back and give some mustard and water, as an emetic. This was done, and as soon as he was dressed he went to the house and administered another emetic of sulphate of zinc. He found deceased had vomited freely before he arrived. The Condy's fluid had of itself acted as an irritant. The deceased was conscious then and for some hours afterwards. He again saw her about eleven o'clock the same morning, and found her quite as well as he could expect, if not better. A good deal of diarrhœa had ensued from the irritation caused by Condy's fluid. That, however, was rather beneficial than otherwise, and deceased expressed herself as better. The Condy's fluid had produced a burning of the throat and irritation which brought on vomiting. He would not go so far as to say that it was not poison. Garrod in his work had laid it down that from two to eight drachms might be taken without injury to the system, but he (witness) calculated that in this instance deceased had taken 16 drachms. (This Miss Blanch explained was not the case, as, although about an ounce had been taken out of the bottle, some of it had been used before her mother had taken the draught.) Witness continuing, said the action of Condy's fluid was certainly poisonous, otherwise the stomach would not have rejected it. It was never used internally, It was not a violent poison, however, but an irritant. He considered it poisonous if taken in sufficient quantity. There was always a certain amount of stupor attending jaundice, and on getting up the deceased was, no doubt, in a somewhat sleepy state, and took up the first bottle she met with. Death was not absolutely due to the draught of Condy's fluid. When he went to see deceased on Sunday evening, much to his astonishment, he found a certain amount of coma going on. This was about ten p.m., and deceased was then more or less comatose. He could not get her to make any reply to his questions further than "Yes." She could, however, be aroused to take nourishment in the shape of milk. Next morning he found her still more insensible, the coma having increased. He succeeded in getting her to take some castor oil, which during the day operated, but when he saw her at night she was still more comatose with stertorous breathing, showing to his mind unmistakable symptoms of apoplexy, which he attributed to the rupture of a blood vessel within the brain, caused by excessive straining by vomiting. He was in hopes up till Monday that she would rally. General paralysis took place at the last. Deceased was 65 years of age. He attributed the cause of death primarily to the Condy's fluid, but the immediate cause was the vomiting.

A verdict that the deceased lost her life from the bursting of a blood vessel on the brain, caused by her having taken Condy's fluid in mistake for medicine, was returned.—*Harwich and Dovercourt Free Press.*

ALLEGED THEFT BY AN EMPLOYÉ AT A CO-OPERATIVE STORES.

At Westminster Police Court, on Friday, May 27, William Burton, an assistant and manager in the drug department at the Army and Navy Co-operative Stores, Victoria Street, was charged with stealing a box of phosphorus pills, of the value of 2*s.* 3*d.*, the property of the society. On Thursday afternoon the prisoner was searched as he went out of the place, and a bottle of phosphorus pills was found in his pocket. He at once said that he had intended to pay for them on the following day. The defence was that there had really only been a mistake in taking away the medicine and forgetting to pay for it in the ordinary way.

Mr. D'Eyncourt remanded the prisoner, and agreed to accept bail.—*Times.*

POISONING BY CARBOLIC ACID.

An inquest was held at Warrington, on Monday, May 30, by Mr. Driffield, on the body of William Longshaw, a partner in the firm of W. Longshaw and Sons, chemical manufacturers, who met with his death on Saturday through inadvertently drinking crude carbolic acid. The evidence showed that a sample bottle of acid was standing in the office, and deceased, going in a hurry, picked up the bottle, which was without label, and drank some of the contents before the mistake was discovered, thinking it was herb beer. Oil was at once administered, but he died in a very short time. Verdict, "Death by misadventure."—*Liverpool Echo.*

VINEGAR ADULTERATION.

In Glasgow, on Monday, May 30, Sheriff Balfour gave decision in a case under the Food and Drugs Act recently heard before his Lordship. The accused, George Lindsay, grocer and provision merchant, 197, Dalmarnock Road, was charged with having, on March 11, sold to Robert Inglis, sanitary inspector, a bottle of malt vinegar, which on analysis was found did not contain any of the constituents of malt vinegar, with the exception of 5·48 per cent. of glacial acetic acid, water, and a trace of saccharine matter. Sheriff Balfour, in passing sentence, said the question in the case was simply this, whether it was malt vinegar that was sold, or acetic-acid and water. Malt vinegar was asked for, but he held it was not malt vinegar that was sold. If he did not convict, the result would simply be that people would go on defying the Act of Parliament and deliver to parties asking for malt vinegar an article which was not malt vinegar. The practice was one that ought clearly to be put a stop to. The mere fact of the practice having crept into the trade in Glasgow was certainly no reason why he should not convict in this case, but rather a reason that the practice, which was a bad one, should be put a stop to. The practice simply amounted to this, it was sailing under false colours, and selling an article under a misleading name. The case was one for a nominal penalty, the accused being merely a retail dealer and not a manufacturer. His Lordship then imposed a penalty of £1.—*Glasgow Herald.*

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE EXHIBITION.

Sir,—It is generally accepted that one of the main objects of repeated exhibitions, whether annual, biennial, or triennial, is to indicate by the exhibits the extent and character of the progress made within the interval of time which has elapsed, otherwise the name, in its general acceptation, is misapplied, and the exhibition becomes changed in its character to that of a shop.

It may reasonably be assumed it was somewhat with this view that the Council in February last determined that an exhibition should take place at the time of the Annual Meeting in May, and the subject was referred to the Library, Museum and Laboratory Committee, from which a smaller working Committee was formed to carry out the details; this latter Sub-Committee being composed of two London members with the Curator, the President and Vice-President being *ex-officio* members of every Committee.

That there would be an exhibition was announced by advertisement, which was continued without interruption up to the time of the Exhibition being opened. Its character and scope were pretty clearly defined as "An exhibition of chemical and pharmaceutical apparatus, and other objects of special interest to pharmacists"; so that by intending exhibitors it could scarcely be misunderstood, and on March 16 the Committee issued and freely distributed a circular, one paragraph of which I will quote here, "Preference will be given to new and improved apparatus and appliances, also to drugs and chemicals of recent introduction, and other articles not previously exhibited." The Committee met every week, and the successive steps and documents printed were inserted in the minutes, and those minutes read at the meetings of Council.

But Messrs. Fletcher have a grievance, and to illustrate their exceptional position they profess in their letter of last week to quote from the *Pharmaceutical Journal*; the quotation being within inverted commas there is no excuse for mis-statement "that the Committee had resolved to admit *all* articles." Now the paragraph in question runs thus (*Pharmaceutical Journal*, p. 925):—"And that the Committee had resolved to admit articles which had been previously exhibited." The difference needs no comment from me. The resolution passed in committee really was:—"The Committee resolved that as many articles as possible be admitted, as probably many of those who would be present had not previously seen them." It is further a mis-statement on the part of Messrs. Fletcher that an "interval of some weeks" elapsed before they were informed that their exhibits were inadmissible.

But I have not yet finished with Messrs. Fletcher's mis-statements in this letter. In the third paragraph Messrs. Fletcher state that they sent in an application for space to exhibit some "*large* crystals of iodine." They did no such thing; they stated in their application simply "crystals of iodine," and, as no chemist and druggist can conduct his business without iodine in crystals, according to the B.P. definition, this substance, as described by them, could not be considered as new or rare.

A correction of these mis-statements in Messrs. Fletcher's letter puts a very different complexion on their case, and if the Committee has erred in the discharge of a very difficult duty,—as has been more than once asserted, but has not in *any one single instance* been satisfactorily proved,—the Messrs. Fletcher have failed to show themselves qualified to undertake it.

That the President and Mr. Butt were perfectly correct in stating that the regulations had been relaxed, the following minute of April 21 (up to which time thirteen applications only had been received) will show:—"Resolved that the applications for space being less numerous than was expected, it is deemed desirable that the rules regarding exhibits should be somewhat relaxed."

Even on May 12, "the Curator stated that he had received further applications for space, which the Committee recommended should be granted." This was beyond the time named for applications to be received.

It is also a fact that no exhibit sent in *accordance with the printed regulations* forwarded to every applicant was refused, and this remark applies equally to those of Messrs. Fletcher; but these gentlemen seem to be afflicted with that obscure, but not uncommon disease, "mental obliquity or an inward squint."

If Messrs. Fletcher's preparations are as carelessly prepared as their letter on the Exhibition, in your last week's issue, they might be "uniform and economical," but such uniformity would neither conduce to the advancement of pharmacy nor the success of an exhibition.

ONE OF THE COMMITTEE.

PROFESSORIAL CERTIFICATES.

Sir,—Professor Attfield has, I think, unwisely rushed into print, because in seeking to defend the procedure to which I took objection at the Annual Meeting he has now made the world acquainted with the fact that the system of publishing misleading analytical certificates has assumed such a form that analysts have recently taken steps to avoid such discreditable proceedings. It appears, however, that on the occasion referred to the resolution to grant sound certificates was not unanimous, for Professor Attfield uses the words "with scarcely an exception," when referring to the views of those present at the meeting. When I made the remarks about the two Professors of the Pharmaceutical Society, at the meeting on the 18th ult., they met with the approbation of the majority of those present, that is, if I may judge from the way in which my utterances were received. Quack medicines or nostrums, or call them by whatever name you will, are admitted to be a perfect bane to the pharmaceutical chemist in his legitimate calling, and I therefore thought and said that I did not think it right for a Professor of the Pharmaceutical Society to append his name, as such, to puff, if you will, any proprietary article, of the composition of which the public were in ignorance.

I hope I have not drawn too much attention to the article I named accidentally.

The Pharmaceutical Society's Council ought in pursuance of the principles of the Society's charter to do all in its power to protect the chemists of Great Britain, and in my opinion one way of doing so is to get every chemist to advise his customers not to buy patent medicines, proprietary foods, or other such things of that class; but as a preliminary the Professors of the Society must discontinue giving certificates; they should take higher ground than this, considering the position they hold. PERCY WELLS.

THE ANNUAL MEETING.

Sir,—"Qualified Chemist" is pleased to call Mr. Smith's remarks at the Annual Meeting "ill-humoured and grumbling," and adds, "they will be read by most with a feeling of utter disgust."

Speaking for myself, I can only say that I read them with much pleasure, and considered them manly and outspoken, and I certainly agree also with Mr. Smith when he says that an apprentice ought to be able to pass the Minor on the expiration of his apprenticeship. I quite fail to see that Mr. Smith ventilated a domestic grievance at the said Annual Meeting.

I am also able to give an emphatic denial to a "Qualified Chemist" when he says, "the assistants are all qualified at the stores." I can give him name and address of some who are not.

Since he appears so fond of calling Mr. Smith "childish in the extreme," allow me to say that is just what I think with regard to his allusion to Bradlaugh, etc.

Shepherd's Bush, W. W. C. TAYLOR.

Sir,—I observe in your issue of the 28th May that Mr. Ellwood, in a letter anent the Benevolent Fund tablets, goes out of his way to refer to the late Earl of Beaconsfield in a fashion which is in very bad taste, and quite out of place in the pages of the *Pharmaceutical Journal*. I protest against the Journal being used to express political feeling.

If Mr. Ellwood wishes to air his political opinions, let him betake himself to a political paper and not to a scientific one; in which he gives pain to the readers of this Journal who view the late statesman from a different standpoint.

One of the latest acts of the deceased earl was to leave directions in his will of his desire to be buried in an unostentatious manner in the quiet churchyard of Hughenden, when the pomp and pageant of a state funeral were open to him in another place. I wonder where the "emblems of vainglory" are here.

I would suggest that Mr. Ellwood should take that advice to himself which he tenders to the *Pharmaceutical Journal* in the last sentence of his letter and "steer clear of parties."

Glasgow. ASSOCIATE.

F. E. J. Cridland.—We are not acquainted with the process followed in making the homœopathic preparation to which you refer.

Mr. A. Kinninmont and *Mr. J. H. Wood* are thanked for their communications.

C. T. Weary.—Probably *Ranunculus Flammula.* A specimen should be sent in flower.

M. P. S.—We should have thought hot water would have been sufficient.

Insecticide.—Perhaps as your customer has tried so many reputed insecticides without success, the best way to meet so sad a case would be to stimulate the chamber-maid to a little extra exertion.

J. Smith.—There is no provision for registering a medicine as such, but a distinctive trade mark used in connection with it could be registered under the Trade Marks Act.

A. Dyson.—Neither licence nor stamp is required for the sale of quinine wine made according to the formula of the B.P., if the wine be not sold as a special or proprietary medicine, or recommended for the relief of disease.

J. Miller.—The recipe has been asked for recently in this Journal without success.

Chemicus.—We do not think a formula for a tincture has been published. See vol. vi., p. 566, of the present series of this Journal.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Nicholson, Townson, Dodd, Wells, Warden, Taylor, Brown, Evans, Woods, Stoddart, Smith, Civitas, Equity, Minor, Associate, Assistant M. P. S., Fair Play, F. E. G., P., N., 374.

JAPANESE AND CHINESE ACONITE ROOTS.*

BY DR. ALEXANDER LANGGAARD,

Academy of Medicine, Tokio, Japan.

Among the riches of the Chinese and Japanese materia medica aconite roots take a prominent position. In vol. xvii. of the 'Honzo-Komoku'† (the Pun-tsaou-kang-mŭh of the Chinese), aconite is without reservation described as the best of all medicines, and in accordance with this we find in the works named, besides the sketch of its action and use in the most diverse diseases, pages of considerations and reflections upon the origin of the different aconites used in medicine, as well as detailed instructions as to the cultivation, collection and preparation of the tubers for medicinal use.

Before I pass to the description of the tubers which I have in my possession, I will briefly notice the species referred to in the 'Honzo-Komoku,' for notwithstanding that that work, being of Chinese origin, takes into consideration only Chinese relations, yet until recently it also affected Japanese physicians and druggists, and the latter were bound to regulate their medical stores upon the basis of that book.

The following list gives the kinds mentioned in the Honzo-Komoku, with their names in Chinese letters; and next to these the Japanese pronunciation (jap.), and the Chinese rendering (chin.) so far as I am in a position to give the latter.‡

1. 附子 "Bushi" (jap.), "Fú-tsze" (chin.); also called

黒附子 "Koku-bushi" (jap.), "Heh-fu-tsze" (chin.).

2. 烏頭 "Uzu" (jap.), "Wú t'u" (chin.); or

川烏頭 "Sen-uzu" (jap.), "Ch'uen-wú-t'u" (chin.).

3. 天雄 "Tenyu" (jap.), "Tien-hiung" (chin.).

4. 側子 "So bushi" (jap.), "Tseh-tsze" (chin.).

5. 漏籃子 "Roranshi" (jap.).

6. 烏喙 "Utaku" (jap.).

7. 草烏頭 "Kŭsa-uzu" (jap.), "Ts'au-wú-t'u" (chin.).

From the frequently confused and obscure statements in the 'Honzo-Komoku' only so much is certainly apparent, that these names by no means describe the tubers of an equal number of different species of *Aconite*; the classification appears rather to depend principally upon definitions of the form and appearance.

With the exception of the last-mentioned kind, "Kusa-uzu," which is described as the tubers of wild growing species of *Aconite*, the others are derived from cultivated plants. Through careful cultivation, and abundant manuring with pigs' dung, the tubers appear to be obtained not only of special size, but also numerous secondary tubers. By maceration for some days in vinegar or child's urine, salting, drying or burying they lose considerably of their original toxic properties, but they are thereby rendered suitable for medical use.

"Bushi" designates the secondary tubers; "Uzu" the primary tubers. Under "Tenyu" are described long tubers, originating from the "Bushi," which give off no further adventitious tubers. "Sokushi" are smaller tubers growing out from "Bushi," whilst by "Roranshi" the smallest adventitious tubers, and by Utaku the twice divided tubers are described.

"Uzu" is the name applied to the head of the cormorant occurring in Japan, and on account of the great resemblance of many aconite tubers to a bird's head, the Japanese call aconite familiarly "Uzu." For precisely distinguishing them, the secondary tubers are further called "Bushi" and the primary tubers "Uzu." But these designations are by no means exactly maintained and observed in the commercial varieties of tubers, so that sometimes a mixture of primary and secondary tubers figure as "Uzu;" sometimes the primary tubers are described as "Bushi" and sometimes, the secondary tubers as "Uzu." A similar inexactitude in nomenclature seems also to obtain in China. "Wú-t'u" and "Fú-tsze," therefore, disclose equally as little as "Uzu" and "Bushi" as to the age of the tubers.

Smith, in his work, previously quoted, does not mention the distinctions given in the 'Pun-tsaou' between "Wú-t'u" and "Fú-tsze." "Wú-tu" and "Ch'uen-wú-t'u" are there referred to as tubers of *Aconitum Sinense*. Of "Wú-t'u" he only says, "The Chinese name here given refers to the resemblance of the flower to the beak or head of the crow;" which according to information given to me is so far incorrect that the comparison to a bird's head refers not to the flower but to the tuber. The same author refers "Fú-tsze" to *Aconitum variegatum*, and says further, "The plant is said to be identical with the 'Ch'uen-wú-t'u' just named. As found in the drug shops they are rather larger than the roots to be directly described, but otherwise precisely similar in appearance." Under "Tien-hiung" the tubers are described of a "staminiferous, sterile variety of the *Aconitum variegatum*," 1¾ inch long and 1½ inch broad, of blackish colour and often covered with a crust of salt. In agreement with the statements of the 'Pun-tsaou,' the "Tseh-tsze" are further described as small secondary tubers of *Aconitum variegatum*, and "Ts'au-wú-t'u" as the mixed tubers of different very poisonous species of aconite which are used in the preparation of arrow-poison. Smith does not mention any tubers corresponding to those referred to under Nos. 5 and 6, with the Japanese names "Roranshi" and "Utaku;" they appear to have disappeared from drug commerce in China.

I now turn to the description of the tubers which are found with Japanese druggists. Of the five sorts one is imported from China; the other four are

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* Translated from the *Archiv der Pharmacie* (vol. xv., p. 161), to the Editor of which Journal we are indebted for *clichés* of the original engravings.

† In the Japanese names the vowels are sounded as in German, the consonants as in English.

‡ The Chinese names are taken from F. Porter Smith's 'Contributions towards the Materia Medica and Natural History of China' (Shanghai and London, 1871).

Japanese, and are used in Japan in the place of Chinese.

1. 大附子 "Daibushi" (jap.). (Fig. I. *a* to *e*). The name indicates "larger Bushi." This kind is imported from China in the salted condition, appearing as large heavy napiform tubers, of a dirty grey or grey-brown colour, strongly wrinkled, mostly having dried up buds and bearing scars of adventitious tubers that have been cut off and small warty excrescences. They are from 35 to 55 (average 45) millimetres long, 30 millimetres in the greatest diameter, and weigh from 6·7 to 16·6 (average 9·7) grams. In the air they become moist. They are tough to cut, and have a saline taste, with a burning after-taste. The transverse section, of a dirty brown-yellow colour, exhibits a very irregular figure, as in fig. 1 *d*, which by the Japanese is compared to brain convolutions. Generally the transverse section is characterized by groups of vascular bundles arranged in a circle, which are separated from one another by a somewhat denser darker coloured tissue (fig. 1 *c*). Each of these groups represents, as it were, a system complete in itself. Under the microscope can be seen in each a circular cambium, four or five vascular bundles, and a pith. The fundamental tissue consists of thin-walled polyhedral cells, which are completely stuffed with starch granules.

In the immediate neighbourhood of the system the cells are somewhat thick-walled, elongated, and arranged to correspond with the circular figure. The outer layer of the bark consists of a few rows of dark brown thick-walled compressed tabular cells. Next to these inwards follows a layer consisting of from 5 to 7 rows of tangentially elongated cells, which is marked off from the remaining tissue by a cellular sheath. The cells of the cellular sheath are square and yellow in colour. Stone cells do not occur.

25 grams of tubers yielded 3·75 grams = 15 per cent. of alcoholic extract.

These are probably the tubers to which F. Porter Smith[*] refers under Fú-tsze, but of which he then further remarks that they are said to come from the same plant as yields the "Ch'uen-wú-t'u," which latter tubers he derives from *Aconitum chinense*. This statement is in agreement with the statement of the 'Honzo-Komoku,' and according to what has been said before upon the relation of "Bushi" and "Uzu," and respectively of "Fú-tsze" and "Wú-t'u," the "Daibushi" would be the secondary tubers to "Ch'uen-wú-t'u" or "Sen-uzu." But this is, in fact, not the case. Among the aconite which is cultivated in the gardens as an ornamental plant, which I consider to be *Aconitum chinense*, Sieb., I have frequently met with plants having a primary tuber similar in form and showing a transverse section exactly resembling that of the "Daibushi," whilst the secondary tubers in their transverse section present a form which is met with in some tubers of "Sen-uzu." According to this, at all events, "Sen-uzu" would not be primary tubers. On the other hand, however, it would not be correct to represent the "Daibushi" simply as primary tubers. In the description of them I have mentioned that most tubers at their upper end bear withered buds. But I have never met with stem remains; consequently they cannot yet have borne any secondary tubers. I consider them therefore to be certainly secondary tubers, but secondary tubers which are again on the point of growth, after the tuber from which they sprang has already died off. It can also be demonstrated by experiment that decided changes in the appearance of the tuber commence at the moment it begins to grow, and that at a certain time the transverse section

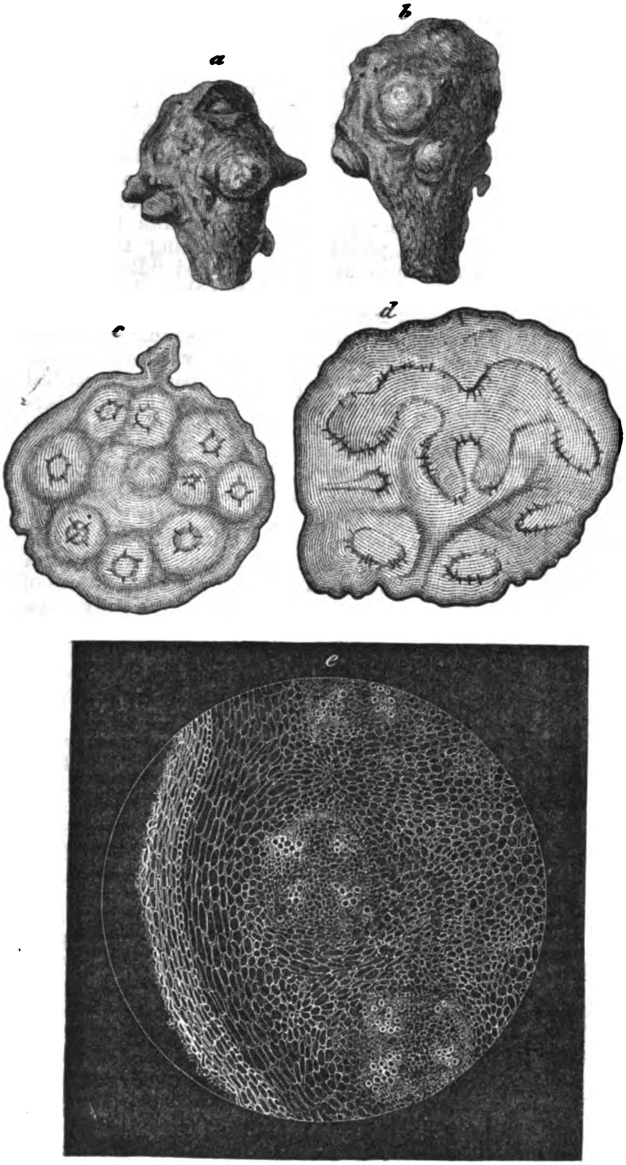

Fig. I. *a* and *b*. "Daibushi," ½ nat. size. *c* and *d*. Transverse sections soaked in water, 1⅓ times magnified. *e*. Microscopical transverse section, with starch removed by treatment with potassium hydrate.

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[*] *Loc. cit.*, p. 2.

shows a similar formation to that which appears subsequently on the developed stalk.

The tubers as they now come into commerce and are used by the physicians bear evidence that they have been submitted to some preparation.

It may be permitted here to make a short reference to the preparation of powerfully acting substances for medicinal use in general. Chinese medicine makes a sharp distinction between poisons and remedies, which is not known with us. Whilst many of our most valuable remedies must be reckoned among the strongest poisons, with the Chinese physician a poison always remains a poison; it is always pernicious and cannot be a remedy. Notwithstanding this we find in the materia medica a large number of substances with strongly poisonous properties, which would appear to be contradictory to what has been stated. But almost all these substances have been prepared for medicinal use by roasting, extraction with water, or with "sake" (the alcoholic drink of the Japanese, prepared from rice), or vinegar, in such a way that the active principle must be partially or almost entirely removed or decomposed. According to theory such substances contain in their original condition, besides the remedial principle, a poison,—for instance, "Kusa-uzu" contains the poison of cinnabar and arsenic acid,—which must be removed before they are used medicinally. The art of the preparation consists in removing the poison without injuring the remedial action, and it is upon this ground we find such a countless number of instructions upon the preparation of medicaments proceeding from the greatest authorities in Chinese medicine. I must not, however, be understood as saying that the Chinese and Japanese reduce all poisonous substances to a condition of inactivity,—which, indeed, occasionally occurs, — but the substances are so weakened in their action that relatively large doses can be borne without injury. Some action is produced, but not a dangerous condition or death. The theory says then that the poison is removed and the remedy is preserved. I have made this interpolation because we are often astonished at the enormous doses of powerfully acting substances which are given by Chinese physicians, and because, as far as I know, this preparation of medicinal substances has been nowhere adequately set forth.

Some instructions for the preparation of "Bushi" are of a nature that it would be impossible that the smallest trace of aconitine would be left. Experiments upon rabbits with the tubers that I have obtained showed always an aconite action.

In the physiological examination, in order to allow of a comparison being made between the toxical properties of the different tubers, the extracts were dissolved in as many cubic centimetres of water as grams of the tuber had been used, so that 1 c.c. of the solution contained the active constituent from 1 gram of the tuber.

Experiments with Daibushi Solution of Extract.—A white and brown rabbit, weighing 1700 grams, received subcutaneously 1·7 c.c. of the solution, corresponding to 0·15 gram of extract to the kilogram of the rabbit. At the end of seventeen minutes the respiration became very slow with some dyspnœa, and then movement of the jaws and salivation commenced. The respiration fell to seventeen in a minute; the pulse was slow, irregular, and marked. Thirty-six minutes after the injection the animal lay upon its stomach; the fore paws were slipped forward sideways, showing that the sensibility was not essentially injured. One hour and fifty minutes after the poisoning the motions were still somewhat uncertain; the respiration was regular, and the heart pulsated regularly at thirty-eight contractions in the minute. The next day the animal was quite lively. It follows that in this case we have to do with tubers which probably through a short maceration in vinegar and salting have lost a part of their activity, but have not been completely exhausted.

By Japanese physicians these "Daibushi" are preferred before all other tubers, and should properly be always used in Japan when the prescription orders "Bushi." On account of their high price—they are about ten times the price of Japanese tubers—Japanese tubers are frequently used in their stead.

2. "Sen-uzu." (Fig. II. *a* to *f*.) These are tubers grown in Japan, and are said to come into commerce from the northern part of Nippon. In appearance they correspond perfectly with the tubers figured by Hanbury in his 'Notes on Chinese Materia Medica,'[*]

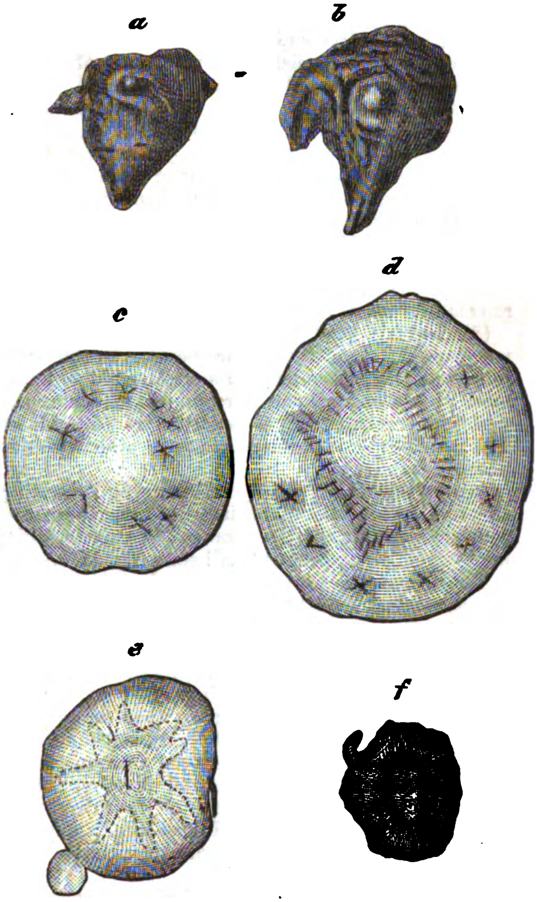

Fig. II. *a* and *b*, "Sen-uzu," ½ nat. size. *c* and *d*, transverse sections, soaked in water, 1½ times magnified. *e*, transverse section of the upper part of a tuber, ½ nat. size. *f*, transverse of the lower part of the same tuber.

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[*] *Pharmaceutical Journal*, [2], vol. iii., p. 263; 'Science Papers,' p. 258.

under the name "Chuen-woo,"* and referred by v. Schroff to *Aconitum chinense*, Sieb. Smith refers the "Ch'uen-wú-t'u" also to *Aconitum Sinense*.

The tubers are smaller than the previous ones, more roundish or conical, of a grey colour, dusty, smooth or only finely wrinkled, seldom worm-eaten, pressed in at the top, frequently bearing the remains of a bud, and with small warty excrescences on the sides. The point as well as the secondary tubers are removed. They are from 15 to 40 mm. long, attain a thickness of 30 mm. in the greatest diameter, and weigh from 2·5 to 7·4 grams (average 4·5 grams). They are very hard and difficult to cut, pure white and mealy at the transverse section, after soaking in water becoming grey white or yellow brown (fig. II. *a* and *b*). By means of the transverse section three different kinds may be distinguished.

(1). With a closed clearly defined cambium ring, drawn out in the upper part of the tuber into a five- to seven-angular more or less star shape; in the lower part elliptical or annular; enclosing a large pith equalling or exceeding the bark in breadth (fig. II. *e* and *f*).

Examined microscopically the outer layer of bark appears to consist of a few rows of brown, pressed together, tabular cells. The middle layer consisting of seven to twelve rows of tangentially elongated cells, and enclosing dispersed stone-cells, is separated from the inner layer by a cellular sheath of square yellow cells. The cells of the inner layer are tangentially elongated at the circumference, but become polyhedral towards the centre. The medulla consists of large roundish polyhedral cells, which, as well as the inner layer cells, are filled with starch-granules. The vessels stand either arranged in rows, or they form a bow opening outwards.

(2). In this kind the cambium ring is angular, not star-shaped. But there are besides, in the broad inner bark layer, arranged in a circle, eight to ten or more groups of fibro-vascular bundles, which appear under the microscope as small stars (fig. II. *d*). The microscopic structure resembles otherwise that described under (1).

(3). In this kind a closed cambium ring is wanting. In a fundamental tissue consisting of parenchymatous cells are vascular bundles arranged in a circle, which microscopically appear as small stars (fig. II. *c*.)

The transverse sections described under (2) and (3) correspond exactly with the transverse sections of the secondary tubers of the species which I have described as the mother-plant of the "Daibushi." I have never in Japan met with wild growing species of *Aconitum* with similar tubers, and accordingly, as I have further remarked above upon the origin of "Daibushi," I consider them to be tubers of a species originally Chinese, which has been introduced into Japan as an ornamental plant and in some districts (Oshu) cultivated on account of its tubers. In agreement with this, in the 'Honzo-Zufu,' a Japanese botanical work, some species are described as probably derived from China.

The Japanese name "Sen-uzu" characterizes them as primary tubers. This, if we understand "Uzu" in the same sense as our words "primary tuber," is not correct; it appears, therefore, that the word "Uzu" has a wider signification. In one place in the 'Honzo-Komoku' it says, "If 'Sen-uzu' be planted, they produce 'Bushi,' therefore 'Uzu' is the mother of 'Bushi.'" The designation consequently does not refer here to the relation already existing between two tubers; it represents rather the order in which the tuber becomes productive.

50 grams of the tubers yielded 2·46 of alcoholic extract = 4·92 per cent.

The following experiment shows the enormous toxic power of the tubers:—A black rabbit, weighing 1700 grams, received at 11.20 1·7 c.c. of solution of the extract, corresponding to 1 c.c. of solution, or 0·049 gram of extract to the kilogram of rabbit. At 11.27, jaw movements; salivation; acute dyspnœa; inspiration wheezing. 11.30, dyspnœa increased. 11.33, respiration stopped frequently for several seconds; this condition continued until 11.55, when the animal lay upon its side. 11.57, slight convulsions. 11.58, stronger convulsions; respiration ceased; heart ceased to be heard; death.

The experiment shows the stronger poisonous property as compared with the "Daibushi" tubers. But the appearance of the tubers explains this, and shows that they are only dried and submitted to no other operation, so that the considerable difference in the toxic power does not argue against the acceptance of a common origin.

For the chemical examination the tubers were powdered and extracted with alcohol containing tartaric acid. The alcohol was distilled off, the residue taken up with water and filtered for the removal of fat. The filtrate was precipitated with sugar of lead, the liquid separated from the precipitate was freed from lead with sulphuretted hydrogen, concentrated, decomposed with caustic soda, and repeatedly shaken with chloroform. After evaporation the chloroform left a yellow amorphous varnish and a crystalline body. The two could easily be separated from one another. The varnish was dissolved in water containing sulphuric acid and precipitated with iodide of mercury and potassium, the precipitate suspended in water and decomposed with sulphuretted hydrogen, and the liquid after being separated from sulphide of mercury by filtration was concentrated at a low temperature. As after standing some time no crystals were deposited, the liquid was made alkaline with caustic soda and shaken with ether, which upon evaporation left a colourless varnish that after drying was brittle. Both the substances so obtained possessed alkaloidal properties, were thrown down by reagents precipitating aconitine, and differed from one another chiefly in one being crystalline and the other, which predominated quantitatively in the tubers, not.

The latter has topically only a weakly irritant action. Subcutaneously injected it produces movements of the jaw and salivation. Chiefly the respiration is affected, whilst the heart pulsates rapidly and powerfully. Death takes place after several hours under the symptoms of general adynamia. In dissection the trachea is found filled with a bloody froth, the lungs strongly hyperhæmic. The heart and left ventricle are contracted, the right mostly filled with bloody coagulum. The lethal dose lies between 0·003 and 0·005 gram per kilogram of rabbit. An exact estimate of the lethal power of German aconitine does not lie within my knowledge, but it appears to have a weaker action than that prepared from "Sen-uzu." I am occupied with a more exact investigation of the action of the different alkaloids obtained by me from Japanese tubers and hope to be able shortly to bring it to a conclusion.

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* v. Schroff, jun., 'Beitrag zur Kenntniss des Aconit,' p. 60.

These tubers are only seldom administered internally by Japanese physicians. What has been stated by von Schroff* as to the internal administration applies to "Daibushi" and other tubers used in the place of "Daibushi."

(*To be Continued*)

CULTIVATION OF CINCHONA IN THE UNITED STATES.†

Consul General Adams, of La Paz, Bolivia, states that he has no doubt but that the cinchona may be cultivated in some parts of the Southern portion of the United States, where the soil and climate are favourable to its culture. After a full investigation into the cultivation of the *Cinchona Calisaya* in Bolivia, he gives the following information to those wishing to make the experiment of growing the tree in the United States:—

"The seed is sown broadcast upon a hot-bed, such as gardeners prepare in the spring for their early vegetables. The manure of the llama, for which in the United States sheep manure might be substituted, is freely mixed with the surface soil of the hot-bed, and as the seed is very high it should be slightly raked under and the surface kept moist. As soon as the sprouts appear a shade should be constructed over the bed covered simply with leaves, straw or branches of trees, which, while it protects the tender plants from the hot sun, may allow the rain to penetrate and fall gently upon them, and it is advisable to locate such hot-beds on a hill-side, so that the water may quickly run off, continuous and limited moisture being required rather than quantities of water and heavy falls of rain. As soon as the plant is grown to a height of from 6 to 8 inches it is ready for transplanting. The ground chosen for a quina plantation should also be sloping, if possible on the south side of hill or mountain, as experience has shown here that those located on level land do not prosper, and steep mountain sides are here preferred. The plants are set at regular intervals eight feet apart, and it is only necessary, if not better, to prepare the soil within a foot of where each plant is placed, as I am assured that by ploughing the whole field too much moisture would be retained in the soil. The plants are then slightly covered with fallen leaves or other rubbish to protect them from the hot sun a while longer, until they show a strong and healthy growth, after which all further care seems to be unnecessary, in Bolivia at least, where even the weeds are but superficially removed. A damp, warm climate, with heavy dews at night and cloudy sky during the days, rather than a hot burning sun,—such as may be found in the mountainous regions of some of the Southern States, like Alabama and Georgia, where mists and threatening clouds hang over the mountains in summer and still no severe frosts occur in winter—this seems to be what is required for the cultivation of this plant; and I should not be surprised if the experiment should, under such conditions, prove successful, a result which would undoubtedly add greatly to the wealth and prosperity of the South. Bolivia being in the southern hemisphere, the seasons for sowing and transplanting in the United States will have to be changed; the former, instead of October here, should be done in April, and the latter in July, instead of January here. From these intervals it will be seen that the seeds require a long period to germinate and attain their first growth, but from all accounts, if the above directions are followed and a little patience shown in the beginning, very little, if any, cultivation and trouble is necessary after the plant is transplanted and becomes firmly rooted and shows a healthy growth. In from five to six years the tree grows to a height of about 10 feet, and 5 to 6 inches in diameter, and at that age the bark contains the greatest percentage of quinine, and is worth in Bolivia from 180 dollars to 200 dollars per quintal of 100 pounds. When the tree has attained this size and age it is cut down close to the roots, the bark stripped entirely from the trunk and branches, and one of the new shoots from the root is allowed to grow into a new tree. In India, I am told, the custom prevails to strip only half of the tree and allow this to grow again before the other half is taken off; but by this process, I am assured, the percentage of the sulphate contained in the second growth is much smaller than that gained by the method practised here. The seed which I have transmitted I have procured from one of the best plantations, and is warranted to be of the calisaya species—the best of the cinchonas. Lately, since the cultivation of this tree has assumed such large proportions in Bolivia, this seed has become an article of local commerce; so that should the experiments in the United States prove successful there would seem to be no difficulty in obtaining the necessary seed in larger quantities."

NOTES ON PHARMACOPŒIAL PREPARATIONS FOR THE NEW EDITION OF THE GERMAN PHARMACOPŒIA.*

AMMONIUM BROMIDE.

Biltz has had repeated occasion to prepare this salt, and considers all of the hitherto published processes defective. Among these are: 1. Decomposition of bromide of potassium by chloride of calcium and carbonate of ammonium in presence of alcohol; 2. Decomposition of bromide of potassium by sulphate of ammonium in presence of alcohol; 3. Saturation of hydrobromic acid with ammonia; 4. Preparation from ferrous bromide and carbonate of ammonium. He prefers the following process—

Cover the bromine with twice its weight of water in an open flask, and add cautiously, under constant swinging and occasional cooling with cold water, water of ammonia in portions, until all the bromine is just dissolved to a colourless liquid. Now and then the flask will have to be covered with a glass plate. The solution is accompanied by the escape of nitrogen, and it is asserted that only bromide of ammonium is formed. But even in this case, there is formed an oxidized product, bromic or hypobromous acid, just as iodic, etc., acid is formed when dissolving iodine in solution of potassa. For, if a portion of the liquid is acidified, it turns strongly yellow, and chloroform, on being shaken with the liquid, extracts from it free bromine. Now, to reduce the bromate and hypobromite of ammonium to bromide, it is necessary to treat the liquid with hydrosulphuric acid; but, before doing so, enough bromine should be added to render it slightly yellow, or the previous addition of ammonia to the bromine and water is so regulated that a trifling excess of bromine remains uncombined. This is done for the reason that the colourless solution first obtained contains a little free ammonia, which would form sulphide of ammonium on passing the gas, and this compound is much more difficult to remove by boiling than free hydrosulphuric acid. After the current of the gas has converted the bromate, hypobromite, and free bromine into bromide, the liquid, which is cloudy from suspended sulphur, is boiled until the excess of the gas is completely driven off, and, when entirely cold, filtered through a double filter. The perfectly clear filtrate, which contains some free hydrobromic acid, is now supersaturated with ammonia, and evaporated to dryness.

The resulting product is entirely pure, excepting that it contains such small percentages of chlorine as may have been present in the bromine used.

ARTIFICIAL CARLSBAD SALT (Sal Thermarum Carolinensium artificiale).

The formula proposed by the German Apothecaries' Society is as follows:—

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* *Loc. cit.*, p. 63.

† From the *Oil and Drug News*, May 17, 1881.

* Extracts from the official proposals for alterations of the first edition of the 'Pharmacopœa Germanica.' From *New Remedies*, April, 1881.

Chloride of Sodium, pure, powd.	115 parts.
Sulphate of Potassium, powd.	125 „
Sulphate of Sodium, dried	200 „
Bicarbonate of Sodium, powd.	205 „

A white, dry powder. A solution of 6 grams (93 grains) of the above mixture in a litre of distilled water yields a solution corresponding to the natural Carlsbad water.

COLOGNE (Spiritus Coloniensis).

1. *Schneider's Formula.*

Oil of Bergamot	90·0 gm.
„ Lemon	30·0
„ Lavender	15·0
„ Clove	40 gutt.
„ Rosemary	48 „
„ Thyme	24 „
„ Cinnamon	40 „
Musk	0·06 gm.
Alcohol	3780·0 „
Rose Water	180·0 „
Orange-flower Water	180·0 „

The oils are dissolved in the alcohol, the musk added, and the mixture allowed to macerate for eight days. Then the rose and orange-flower water are added, and after the lapse of another eight days, the mixture is distilled from the water-bath until 4000 gm. of product are obtained.

2. *Wilm's Formula.*

Oil of Neroli	4 parts.
„ Lavender	4 „
„ Rosemary	8 „
„ Lemon	8 „
„ Bergamot	15 „
Alcohol	1000 „

Macerate a few days and filter.—*German Apothecaries' Society.*

PRECIPITATED SULPHATE OF IRON.

100 parts of coarsely crystalline pure sulphate of iron (ferrous) are dissolved in 160 parts of hot water and 20 parts of diluted sulphuric acid, the solution filtered, and, after cooling, poured into 250 parts of alcohol of 0·832, stirring constantly during the mixing, and for a short time afterwards. The liquid is then left at rest for a few minutes, the acid solution poured off, and the precipitate immediately transferred to a filter moistened with alcohol (0·832), or to a funnel loosely stopped with cotton, and washed with alcohol (0·832) until litmus paper is no longer reddened. The magma is then strongly pressed between litmus paper and dried by exposure to air, frequently turning it, and renewing the blotting paper, until the odour of alcohol has disappeared, and the salt is so far dry that it neither adheres to the fingers nor to dry blotting paper. It is necessary to be extremely careful in drying this salt, since the loss of water of crystallization is not recognizable by the eye, though this is readily seen in the case of the crystallized salt. It is sufficient to expose the precipitated salt, at ordinary temperature (not over 20° C.), to the air for one day, changing the paper frequently. This causes no loss of water of crystallization. On the other hand, if the salt is dried under a glass globe over caustic lime, the water of crystallization is abstracted rapidly, only 3 molecules of it having been found remaining after the third day in one experiment.

Precipitated sulphate of iron, prepared by the foregoing process, contains fully 7 molecules of water of crystallization. By faulty operation, such as using absolute alcohol for precipitation and washing, the amount of water of crystallization is rendered defective. The salt keeps extremely well, provided the vessels in which it is preserved are kept well closed.

It is not necessary to have free acid adhering to the product, as is the case with the crystals. The salt crystallizes, not in single crystals, but in very minute grains of rhombic tables built upon each other. It is easy to remove the intralamellary moisture by drying. On the other hand, if the precipitate is allowed to remain for some time undisturbed below the alcohol, it compacts itself to larger crystalline lumps, which it is difficult to wash out. Some pharmacists believe that the salt is best preserved in an atmosphere impregnated with alcohol; but, under these circumstances, it acquires, after a few months, an odour of aldehyde, and becomes oxidized.

(*To be continued.*)

THE CONNECTION OF THE MOLECULAR PROPERTIES OF INORGANIC COMPOUNDS WITH THEIR ACTION UPON THE LIVING ANIMAL ORGANISM.*

BY JAMES BLAKE, M.D., F.R.C.S.

During my prolonged reseaches on the phenomena elicited by the direct introduction of inorganic matter into the circulation of living animals, I have arrived at results which, as I believe, open a new path to the solution of certain riddles of molecular chemistry. The researches were begun with the intention of applying these simpler and better known substances for the analysis of physiological facts, but in the course of my experiments it became clear that living matter might serve as a means for giving a clue to the molecular principles of inorganic matter. In a discourse delivered in 1839 before the Academy of Sciences of Paris, I showed that when solutions of different salts are introduced into the blood of living animals the physiological action depends on the electro-positive component of the salt, and little upon the acid with which it is combined. A communication which I read at a meeting of the Royal Society in June, 1841, proved that the action of inorganic bodies introduced directly into the blood of living animals depends on their isomorphous relations; and in a memoir communicated to the California Academy of Sciences in 1873, I showed that among the compounds of the metallic bodies, strictly speaking, the physiological efficacy of substances belonging to one and the same isomorphous group was proportionate to their atomic weight; the greater the atomic weight the more intense the physiological action. This is not the place to enter closely into the physiological action of the bodies employed in these experiments. They included salts in forty-one elements, and their action was tested upon horses, dogs, cats, rabbits, geese, and hens with identical results. Aqueous solutions of the different salts were injected into the blood-vessels of the living animals. Among those of the monatomic metals were salts of lithium, sodium, rubidium, thallium, calcium, and silver. They all agree exactly in their physiological action. The fatal quantity of lithium sulphate for a rabbit is 1 grm. per kilo. of the animal's weight; whilst of silver nitrate, 0·06 grm. was fatal. Among the diatomic metals tried were salts of magnesium, iron, manganese, cobalt, nickel, copper, zinc, and cadmium, as also calcium, strontium, and barium. In the salts of the magnesium series, the analogy of physiological action is very manifest, and their activity is enhanced with the increase of the atomic weight, rising from 0·97 gram per kilo. for magnesium sulphate to 0·08 gram for cadmium sulphate. The salts of calcium, strontium, and barium form likewise a group in which the increasing physiological action is very distinct, being 0·47 per kilo. in calcium chloride and 0·043 gram per kilo. for barium chloride. The physiological reactions of the lead salts resemble those of the barium group, though agreeing in certain reactions with the salts of silver. (Similar transition-reactions were observed in the salts of magnesium, calcium, silver, and gold.)

Among the tetratomic metals, the salts of thorium, palladium, platinum, osmium, and gold were examined, All showed great similarity in their physiological action, ranging from 0·029 gram per kilo. in thorium sulphate to 0·003 gram per kilo. in gold chloride. The decided and characteristic effect of this class of substances upon the action of the heart was shown in the most surprising manner by the compounds of gold, which even in the minute dose of 0·003 gram per kilo. kept up the action of the heart for several hours after death, though the temperature of the body had sunk 13° below the normal heat of the animal.

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* From the *Berichte der Deutsch. Chem. Gesellschaft.* Reprinted from the *Chemical News*, April 29, 1881.

Among the hexatomic metals, the salts of glucinum, aluminium, and iron (ferricum) agree perfectly in their physiological reactions. The fatal dose per kilo. ranges from 0·323 in glucinum, 0·007 for aluminium, and 0·004 gram in ferricum, all in the state of sulphates. The physiological action of glucinum confirms the view that glucinum is a hexatomic metal.

Among the rarer earths, experiments were tried with ytterbium, cerium, didymium, lanthanium, and erbium. There was found a marked difference between the cerous and ceric salts as in those of iron. The difference is, however, less, being 1 : 3 in cerium and 1 : 28 in iron. Among the non-metallic elements, compounds of chlorine, bromine, iodine, phosphorus, arsenic, antimony, sulphur, and selenium were examined. Chlorine, bromine, and iodine agree closely in their physiological reaction, but instead of an increase there is here a decrease in intensity. Phosphorus, arsenic, and antimony do not induce any immediately perceptible physiological reaction. Arsenious acid, injected in the proportion of 0·560 gram per kilo., checks the pulmonary circulation. Sulphur and selenium are similar in their action, the latter being the more powerful. The only exceptions to the rule, that isomorphous substances act in an analogous manner, are the salts of potassium and ammonium. The latter produce results resembling those of certain nitrogenous alkaloids. If the carbon compounds exhibit similar phenomena in their manner of action upon the living animal body, researches concerning molecular relations will be greatly facilitated. Dujardin has already demonstrated in this direction, that in alcohols of one and the same series the intensity of the physiological action is directly as the atomic weight.

STEEL FOR THE MANUFACTURE OF DIES.[*]

I have referred in former Reports[†] to the question of steel for the manufacture of dies, and attention has frequently been drawn to the difficulty experienced in obtaining metal of suitable quality. Our knowledge of the relation between the chemical composition and the mechanical properties of steel may almost be said to have been created since 1849, when the late Professor Brande stated, in evidence before the Royal Commission on the Mint, that he had analysed numerous varieties of steel, but ascribed its peculiarities more to mechanical texture than to chemical composition. Not long since the appearance of the fracture of a sample of metal was considered to afford trustworthy and sufficient evidence as to its nature and properties; but such rough methods have now given place to the rigorous physical, chemical, and mechanical investigations to which metals must be submitted as a matter of ordinary routine.

Although the steel at present supplied to the Mint appears to show a marked improvement in the number of coins struck per pair of dies, the difficulty involved in the production of a suitable quality of steel demands careful attention, and it appears probable that an examination of the many advances in the metallurgy of steel that have been made in recent years cannot fail both to indicate the chemical and physical conditions which a die steel should satisfy, and to show the direction in which advance in its manufacture should be sought.

In regard to the first of these points it must be admitted that the information to be gathered is but limited, for, notwithstanding the elaborate system of tests above referred to, eminent authorities on the subject hold that the recognized tests should be supplemented by experiments in which the metal is actually employed for the purpose for which it is required.

It will be well first to briefly examine the chemical conditions which influence the resistance of metal to mechanical strain. Carbon, it is well known, gives to iron fusibility and renders it capable of being cast in moulds. The result of very many experiments appears to show that the presence of 0·15 per cent. of carbon converts wrought iron into steel, rendering it capable of being slightly hardened; beyond 1·5 per cent. of carbon the metal ceases to be malleable, and is known as cast iron. The influence of this metalloid on the tensile strength is, moreover, very remarkable. Thus an increase from 0·15 to 0·18 per cent. of carbon will suffice to increase the breaking strain by several tons per square inch. Manganese is generally considered to act in a similar manner to carbon,[*] but in certain cases it is found to be specially beneficial in that it makes the metal forge more readily.

Silicon appears to render steel fragile under impact and diminishes its resistance to traction. A small quantity of this element is, however, serviceable in rendering the material known as "ingot-metal" free from blow-holes. With regard to sulphur and phosphorus it is admitted that the presence of these metalloids is on the whole prejudicial, but their influence need not be specially dwelt upon here, as they do not occur in sensible quantities in the high qualities of steel which can alone be used for the manufacture of dies.

The effect of the simultaneous presence of two or more of the above-mentioned elements in steel is extremely complex, and often uncertain, so that it must be long before we can hope for a complete solution of the question. It therefore becomes necessary to consider specific cases.

The following analyses of typical samples of steel employed in the Mint for dies were made by Mr. W. F. Ward, my assistant in the Metallurgical Laboratory of the Royal School of Mines.

	A.	B.	C.		D.
Iron . .	98·93	98·63	98·64	by difference	98·07
Carbon . .	0·82	1·07	0·79		1·19
Manganese	0·10	0·12	0·24		0·45
Silicon . .	0·05	0·06	0·18		0·29
Sulphur .	trace.	trace.	0·01		trace.
Phosphorus	„	„	0·01		„
Copper . .	„	„	0·02		„
	99·90	99·88	99·89		100·00

The sample marked A. was a die of exceptional quality, having struck no less than 200,000 florins, the normal out-turn of a florin die not exceeding 50,000 pieces. B. is the steel now employed, which, during the past year, has been found to yield an average out-turn of 54,000 pieces per pair of dies. C. proved in practice to be of unsatisfactory quality, owing to the frequency with which it cracks during the operation of hardening, and this fault was still more marked in the sample D. Their use has therefore been discontinued.

It is unquestionable that the variations in the amounts of the constituent elements indicated by the above analyses to some extent explain the relative merits of the samples. As has already been stated, the property of hardening is mainly due to the presence of carbon; indeed Chernoff, Siemens, and many others are of opinion that true steel is a mixture or combination of carbon and pure iron alone, and that all other substances are impurities necessarily injurious in pure steel, though sometimes apparently beneficial if they exclude or neutralize more injurious substances. Deshayes has shown that the broad groupings into which steels may be divided (on the basis of their tensile strength) are characterized by marked, although gradual, differences in the amount of carbon they contain. This metalloid is the one on which the mechanical properties centre, and the elaborate researches of the distinguished engineer whom I have just mentioned seem to point to the fact that a steel containing from 0·6 to 0·75 per cent. of carbon will be found best suited for the manufacture of dies, providing the amount of other metalloids present is satisfactory. Bearing in mind the fact already alluded to, that a difference of only 0·03 per cent. in the carbon is known to materially alter the tensile strength, it seems reasonable to conclude that the inferiority of sample B. as compared with A. may be mainly attributed to the amount of carbon it contains. In regard to sample C. the amount of manganese and silicon is relatively high, and it may be confidently asserted that there is sufficient chemical reason for its marked failure as a material for dies. It would appear probable that the physical conditions to which it has been subjected in hardening and tempering were unsuitable, and have also contributed to such a result. With reference to D. the manganese and silicon are exceptionally high, and it is obviously, therefore, far removed from the class of steel that past experience has shown to be suitable.

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[*] From the 'Eleventh Annual Report of the Deputy Master of the Mint (1880).' Appendix No. II. Memorandum by Mr. Roberts, F.R.S.

[†] 'Report on European Mints;' Parliamentary Paper 466 (1870), p. 27: 'Eighth Annual Report (1877),' p. 40; 'Ninth Annual Report (1878),' p. 39.

[*] 'Les Métaux à l'Exposition Universelle de 1878.' Par H. Lebasteur, Paris, 1878, p. 74.

The question will be seen to be one of extreme complexity, and even when the examination of the metal is limited to its actual employment for the purpose for which it is required, there still remain a great number of conditions, the influence of each of which has to be investigated. Taking the metal as received in square bars from the manufacturers, the operations to which it is subjected in conversion into dies are: forging, turning, striking, hardening, tempering; and the influence of variations in such of these processes as can be varied should be examined while all others remain constant. Thus in his Memorandum for last year, Mr. Hill adduced some figures tending to show that dies forged by the steam-hammer afford better results than those forged by hand, and in his Memorandum for 1876, a table is given from which it appears that the form of press used also exercises a material influence. It is, however, well to remember, in considering such a question, that the quality of different bars, even from the same parcel, varies both in regard to their chemical and physical properties; indeed it is now recognized that the same bar may be expected to vary throughout its length. This would alone account for the well-known fact, that dies made of the same metal differ widely in the number of coins they produce before cracking, and it points to the necessity of only drawing conclusions from as large a number of experiments as possible.

DISINFECTING POWER OF THE CHLOROPHENOLS.*

BY C. O. CECH.

It has often been noticed that the addition of bleaching powder to carbolic acid in dressing wounds causes healing to take place more rapidly than when the acid is used alone. It has been shown by Diamin that phenol and bleaching powder react on one another, forming mono-, di-, and tri-chlorophenol, which may be isolated and separated by treatment with a strong acid, and distillation with aqueous vapour. The author, considering that these chlorophenols are probably formed when carbolic acid and bleaching powder are used together in dressing a wound, and exert a healing power greater than that of carbolic acid alone, attempted to prepare chlorophenols in quantity by the above process; it proved dangerous on the large scale, and direct treatment of phenol by chlorine gas was resorted to. A red crystalline mass was obtained, from which white crystals are obtainable by pressure between filter-paper; after purifying these crystals by precipitation from their alcoholic solution by water, they were dissolved in alcohol, and the bandages were impregnated with this solution. These crystals consist of a mixture of three chlorophenols, in which trichlorophenol predominates, and is probably the most useful. The chlorophenols present the advantage over phenol of being less corrosive and poisonous, and trichlorophenol probably has most advantage in these respects; its value as a disinfectant remains to be decided by the use of the chlorophenol bandages.

THE SPECTROPHONE.

At a recent meeting of the Philosophical Society of Washington, Professor Graham Bell communicated the announcement of his discovery of the spectrophone, the latest outgrowth of the photophone. When Mr. Bell announced the discovery of the photophone last August, he ventured to predict that probably all matter would be found to possess sonorous properties of the same nature as those manifested by the disks used in that instrument. More recent investigations in Europe with gases and liquids have fully verified this prediction. Any liquid or gas placed in a test tube, and exposed to the action of a beam of light condensed upon it by a lens can be made, by means of an interrupter, to emit musical tones. This has been shown by Professor Tyndall in his paper, read to the Royal Society, on "Radiant Heat." Some substances thus emit feeble sounds, others stronger ones. Iodine vapour, nitrogen oxide, and bromine give very loud sounds. It is found that those substances which emit loud sounds are those which absorb heat in a high degree, and among these lamp-black is especially remarkable. It has been questioned whether such sounds are provoked by the luminous rays or by the dark ones. M. Mercadier expressed the belief that the inciting rays are the red and dark ones. This led Professor Bell, with Mr. Sumner Tainter, to experiment with the sonorous properties of carbon disulphide, actuated by the light of the spectrum. When lamp-black is exposed to the action of the light of the spectrum it is found to give a sonorous reponse to all of its rays as far as the middle of the violet, and perhaps beyond. The intensity of the sound, however, varies remarkably in different parts of the spectrum. Taking the rays successively from different parts, from the violet towards the red, the sounds begin very feebly and increase in intensity, reaching a *maximum* in the ultra-red. Beyond that point they suddenly cease. The increase of intensity is very gradual, the decrease very sudden. Other substances have been experimented with, and while exhibiting similar properties, each has a range of its own. Porous and fibrous substances give loud sounds. Thus common wool or worsted is found to be very sonorous, but the sounds are obtained wholly from the visible parts of the spectrum and have the *maximum* intensity in the green. In all substances tried success has resulted, but nearly all have a very short range. In experimenting with more homogeneous substances of simpler constitution, still more definite results are obtained. The rays of the spectrum are passed through sulphuric ether. Outside of the ultra-red is a very narrow band, which causes sounds, while the other parts fail to produce them. Hydrogen peroxide gives sounds at several places wholly within the visible parts of the spectrum, and those places are found to coincide with the position of the known absorption bands of that substance. The same is found to be true of nitrogen oxide and a solution of ammonia, sulphate of copper, and many other substances. The general law deduced is that sounds are produced in any substance by the rays which it absorbs. Thus a kind of spectrum analysis can be obtained through the intermediation of sound. The principal value of the spectrophone, Mr. Bell believes, will be found in the investigation of absorption bands in the ultra-red end of the spectrum.—*Times.*

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* From the *J. pr. Chem.*, [2], 22, 345—347. Reprinted from the *Journal of the Chemical Society*, March, 1881.

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SATURDAY, JUNE 11, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the Editor, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to Mr. Elias Bremridge, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, Messrs. Churchill, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

THE REPETITION OF PRESCRIPTIONS.

It is not very long since that we had occasion to complain that the *Lancet*, in commenting upon the practice of repeating physicians' prescriptions, had dealt with this matter in a manner that was entirely unjustifiable, inasmuch as it was represented that this practice was merely an instance of improper procedure on the part of dispensing chemists, carried on by them unnecessarily and with unworthy objects. The charge thus made was obviously absurd, and though appearing in the editorial columns of a leading medical journal its unreasonable character appeared so likely to present itself to the minds of everyone competent to form an opinion on the subject, that we confined our remarks upon it to the suggestion that the *Lancet* ought to know better and to a brief statement of our opinion that whatever alteration of ordinary custom it may be desirable to introduce in regard to the use of physicians' prescriptions, the first step in that direction must be taken by medical men.

For some time past the same subject has been discussed in the United States, and though there has been some disposition on the part of medical men to treat the repetition of prescriptions as a grievance for which dispensing chemists were responsible, it has now been tolerably well acknowledged that this is not the case, but that if a physician desires that the medicine ordered in his prescription shall not be dispensed more than once without direct authority from himself, he must establish that position as a compact between his patient and himself, and must, moreover, place in the hands of the dispensing chemist adequate means of enabling him to justify a refusal to repeat a prescription, either by authorizing him to retain possession of the prescription or by writing upon it that the medicine is to be dispensed only once without further directions from the prescriber.

To anyone conversant with the way in which physicians' prescriptions are made use of in many cases it will be evident, with very little reflection, that there would be serious difficulties to encounter in any attempt to carry out a limitation of their use, persons than the patients to whom physicians have given them. It may indeed be questioned whether medical practitioners would generally be disposed to place themselves in such a position in regard to their patients as would be likely to result from the endeavour to make a prescription simply an order for one supply of medicine, leaving the patient under the necessity of again seeking the advice of the physician and naturally, we presume, of paying another fee. At the same time it must be admitted that there are sound reasons for the objections made by medical men to the indiscriminate repetition of prescriptions, and that the arguments adduced in favour of a limitation of their use are well founded from certain points of view. But when we have said thus much we have really indicated all that is possible within the scope of action that is open to the dispensing chemist, and, as we have before remarked, it is especially the province of the prescribing medical practitioners to impose such limitations upon the use of their prescriptions as they may deem fitting and be able to obtain their patients assent to.

Within the last few days we have had two instances brought under our notice which will serve to illustrate some of the difficulties that dispensing chemists have to contend with in connection with the ordinary mode of dealing with prescriptions. In one of these instances a lady sent to a London pharmacist a prescription, requesting that it should be copied and the medicine made up for her. The following day she wrote again to say that she found she had sent the wrong prescription, enclosing at the same time another one which she wished to have copied in *English*, and sent to her together with the medicine ordered. This request appears to point to a possible new phase of pharmaceutical business, and it leaves one in doubt whether its object may not be to obtain facilities for the practice of amateur dispensing or to guard against risks arising from having medicines prepared at establishments where the dispensers are not conversant with the ordinary language of prescriptions. But, however this may be, the request shows how much the public expects to get out of a physician's prescription through the medium of the pharmacist, and how much such a document is looked upon by the holder of it as property. In some such cases it may be a very difficult matter for the pharmacist to decide how to act; regard for trade interest may lead him in one direction or another; but so far as any ethical considerations affecting his relation to prescribers are concerned, he would, in the present state of public opinion as to the property in prescriptions, be powerless, unless supported by the authority of those who give prescriptions.

In the other case to which we have refered above a dispensing chemist in the country writes to a London house at the request of a lady to ask for a copy don house under a certain number, and here again we have evidence of the idea of proprietary right which is commonly entertained in regard to prescriptions. Not only is the dispensing chemist expected to dispense the medicine ordered in a prescription whenever called upon to do so by the proprietor or temporary possessor of a prescription, but it is clear that he is also expected to act in a manner as trustee of the property, and in the event of its being lost or becoming otherwise inaccessible, to go the length of reinstating the proprietor in possession of his lost property by furnishing a copy from his own books.

Both from a medical and pharmaceutical point of view this subject is one that might be usefully discussed, and we would suggest that the forthcoming International Congress that will assemble here next August would offer excellent opportunities for doing this.

THE SOCIETY'S JOURNAL.

As we have expressed an opinion concerning Mr. SMITH'S remarks on the Journal account at the late Annual Meeting it is perhaps only fair that we should insert the letter which he has addressed to us this week; but at the same time we must state that notwithstanding Mr. SMITH'S disclaimer we fail to find in it anything to modify our opinion that his remarks raised a presumption of mismanagement. In saying this much we, of course, assumed that Mr. SMITH meant to convey that, so far as the Society's financial statement was concerned, there was need for explanation as to what became of more than a thousand copies a week of our guaranteed circulation. If so large a number had not been accounted for, even as waste paper, there would have been mismanagement, and if they had been accounted for in that form the mismanagement would scarcely have been less. Therefore the presumption of some such mismanagement was, we think, distinctly raised by Mr. SMITH, when he suggested that in respect of the item of £680. 19*s.* 7*d.* charged against the Journal, "there must surely be some asset somewhere or other," and when he supplemented that remark by stating his conviction that "there were hundreds of Journals that had better not be printed." So far as concerns this point, the statement made by the President at the last meeting of Council is sufficient to show that the circulation of the Journal is what it is represented to be, and it also shows that the asset for which Mr. SMITH appeared to be seeking is the gratuitous weekly distribution of 5760 copies of the Journal to the Society's members, associates, and apprentices, who are shown by the Society's Calendar to be entitled to receive the Journal. As a member of the Society, Mr. SMITH, should, however, have been aware of this, and as a former member of the Council he should have been also aware that it is not customary to take credit for this as an asset in the annual financial statement. But even if these facts were not present to Mr. SMITH'S mind, they as well as other details might, we repeat, have been easily ascertained by any member of the Society making inquiry in the Secretary's office, which course we think would have been more appropriate than the one taken by Mr. SMITH, and it would have enabled him to ascertain that upwards of 1200 more copies were disposed of by sale and otherwise.

So far, again, as concerns the matter of account presented in the Society's financial statement, we contend that there was no occasion to ask, in reference to the Journal, for further explanation than what is there given. The item of £680. 19*s.* 7*d.* charged against the Journal in that statement is incorrectly regarded by Mr. SMITH as an "adverse balance" in the Journal account, and his error in this respect is the only foundation we can discover for his remarks on this subject at the Annual Meeting. In reality it is not as an adverse balance of the Journal account that this item appears in the financial statement, for the information given in brackets beside that item shows that the larger amount of £690. 4*s.* 3*d.*, expended for postage, had been included in the Journal account and that consequently there was, in fact, a balance of £9. 4*s.* 8*d.* to the credit of the Journal account, notwithstanding the circumstance, mentioned in the Council Report, that it had also been charged with the expenses of publishing an Index to the Journal from 1868 to 1878, amounting to £147. 6*s.* 8*d.*

We have given so much space to this matter because it is one that has been repeatedly brought forward in a mistaken light and in a way calculated to prejudice the Society's interest in what should be regarded as a valuable property, and we must express our thanks to Mr. SMITH that he has given us an opportunity of stating the facts of the case without exposing ourselves to the suspicion of having a desire to blow our own trumpet.

EXHIBITION OF SCIENTIFIC APPARATUS.

As will have been noted through the reference made to the subject at the recent Council meeting, it is intended, in connection with the jubilee meeting of the British Association at York, in September next, to hold an Exhibition to illustrate, as far as possible, the progress which has been made during the past half-century in the construction of instruments of scientific research. With this view an invitation has been sent out to men of science, scientific societies and manufacturers to exhibit instruments of the latest patterns and tools used in their construction, and, if the science be fifty years old, the instruments used in 1831, or, if not, specimens of the earliest patterns that can be found. It is proposed that the Exhibition shall extend from the 31st of August to the 8th of September, and the arrangements are to be under the superintendence of a small sub-committee formed at York. Applications for space must be made on or before the 15th of July, and the necessary forms and other information may be obtained from the Hon. Secretaries, British Association Offices, 17, Blake Street, York.

Pharmaceutical Society of Ireland.

MEETING OF THE COUNCIL.

June 1, 1881.

Present—Professor Tichborne, President; Dr. Aquilla Smith, Vice-President; Messrs. Allen, Brunker, Collins, Draper, Grindley, Harrington, Hayes, Hodgson and Payne.

The minutes having been read and confirmed,

The Council proceeded to consider Mr. Hodgson's notice of motion:—

"That a sum of £100 be invested in Three per cent. stock."

The President suggested that as Mr. Hodgson was not present some member should propose his motion for him.

Mr. Draper thought that the present price of Consols was so high that it would be advisable to invest in some other security.

Mr. Grindley had come intending to move an amendment to that effect, and asked were they bound to invest in Government securities.

The President considered that as trustees they would be obliged to do so.

Mr. Hodgson, having arrived, said he had since last meeting balanced the accounts, and that after deducting the amount required to meet outstanding accounts the working balance would be too small, and he considered it not advisable to invest at present.

The President called attention to a former resolution requiring all sums to be invested in the names of three members.

Mr. Brunker asked if the three were not the President, Vice-President and Treasurer.

The President replied that it was so.

The motion, amended by adding, "at first available opportunity," was proposed by Mr. Hodgson and seconded by Mr. Draper and passed.

Mr. Payne the proceeded with his notices of motion:—

2. Mr. J. C. C. Payne—

"To propose that after the word 'Apothecary' in the last sentence of the second paragraph relating to the Pharmaceutical examination, page 54 of the Calendar, the following be added (after omitting 'to that effect'), 'that they have devoted the whole of their time to the practice and study of pharmacy in his establishment.'"

3. Mr. J. C. C. Payne—

"To propose that candidates for the Pharmaceutical examination be required to send their certificates of practical pharmacy and practical chemistry fourteen clear days before presenting themselves for examination."

4. Mr. J. C. C. Payne—

"That a committee of three be appointed to examine the certificates of candidates presenting themselves for the Pharmaceutical examination, whose duty it shall be to instruct the Registrar if the certificates do not conform with the regulations of the Council."

He said it might be in their recollection that there was no rule in the Society at first requiring practical pharmacy, and that subsequently a regulation requiring two years' practice had been passed, and that the intention at that time was that the whole time should be given; some, however, had considered that if a student were to attend an hour a day it would be sufficient. He was acquainted with a gentlemen who had a student attending an hour a day and one or two hours during the evening. He had remarked it, and the reply was that there was no rule to the contrary. He considered that it should be made clear that the two years should be altogether spent in the practice or study of pharmacy. He had brought the matter before the Council in November, 1880, and had now again brought it forward with some alterations. He considered that all the certificates should be examined. Last year a candidate had sent a certificate, which had been allowed, open shop or dispensary of any kind, and for that reason he had proposed a committee, and a member of Council in Dublin, Belfast and Cork should form the committee.

The Vice-President suggested a committee in Dublin which could refer to the country members for information.

The President, while concurring with the intentions of Mr. Payne, thought that as proposed it would be impracticable, and that the point objected to by Mr. Payne was that the student was not an apprentice.

Mr. Hodgson had no personal interest in the matter. Not having compounding upon his establishment, he had no experience of what apprentices were required to do, but thought that under the new rule, if passed, no time for lectures could be allowed. His recollection was that in the Apothecaries' Hall the assistants and apprentices were allowed time, and he considered that if the candidates had not learned compounding the examiner would know how to treat them.

Mr. Hayes considered such a rule arbitrary. He took apprentices for five years, and none under. He totally disagreed with Mr. Payne, and could not conscientiously sign a certificate under such a stringent resolution.

The Vice-President said that Nos. 3 and 4 were desirable, but did not think No. 2 practicable.

Mr. Grindley thought, with reference to No. 2, it was to guard against such practices as Mr. Payne referred to, and that it was not hard to ask a student to say he had not been employed in one establishment and learnt pharmacy in another.

Mr. Draper said in his opinion it would be utterly impossible to carry out such a rule, and he was fully convinced that a student would become a compounding automaton under such a rule. He believed he might as well propose a two years' course of practical chemistry. The Pharmaceutical Society of Great Britain had no such rule.

The President proposed that No. 3 and 4 should be tried for a year, and No. 2 be allowed to drop, and a committee of five, three for Dublin, and one each for Belfast and Cork be substituted for a committee of three.

Mr. Harrington totally disagreed with Mr. Payne.

Mr. Brunker said Mr. Payne had brought the matter forward in consequence of some questions asked at the Annual Meeting. He believed what was required was an interpretation clause; he thought that to any sensible person the regulation as it stood could have but one meaning, and that the Privy Council would not pass it.

The President called upon Mr. Payne to proceed or withdraw.

Mr. Payne said his motions were intended entirely for the benefit of the Society; the Pharmaceutical Society of Great Britain required three years' apprenticeship, and during that period the whole time was required. It was his intention to prevent persons who were six or seven hours a day at some business not connected with pharmacy obtaining certificates, but seeing so much opposition he would withdraw No. 2.

No. 3, seconded by Mr. Grindley, passed.

No. 4, amended to a committee of five, Messrs. Allen, Brunker, Collins, Harrington and Payne, and seconded by Mr. Harrington, passed.

Mr. Brunker proposed, and Mr. Payne seconded:—

"That it be an instruction to such committee to satisfy themselves that the certificates granted guarantee a *bonâ fide* engagement in the *regular* work of a pharmacy during the period."

This was passed without dissent.

The motion, proposed by Dr. Collins, seconded by Mr. Grindley:—

"That on the 1st July of each year, the Registrar of the Pharmaceutical Society be instructed to send a printed form to all the medical schools approved by the Privy Council, for a return of all the pharmaceutical students registered with them during the session then ended,"

passed unanimously.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of this Society was held on Thursday, June 2, Professor Roscoe, President, in the chair.

The following certificates were read for the first time:—W. Rupp, J. D. Custance.

It was announced that a ballot for the election of Fellows would be held at the next meeting (June 16).

The following papers were read:—

On the Action of Solvents on Saponified Oils and Waxes. By A. H. **Allen** and W. **Thomson**.—No satisfactory process exists at present for the analysis of mixtures of hydrocarbons with animal and vegetable fatty matters, although a correct determination is often of considerable practical importance. The process at first adopted by the authors is as follows:—10 grams of the sample is weighed out into a 5″ evaporating dish, 50 c.c. of an 8 per cent. solution of caustic soda in absolute alcohol added, and the whole gently boiled with stirring until frothing occurs; 15 c.c. of methylated spirit should now be added and heat applied till the saponified oil is dissolved. Five grams of sodium bicarbonate are then gradually added with constant stirring, and lastly 50 to 70 grams of clean ignited sand are stirred in. The whole is then dried for twenty minutes in the water-oven. The mixture is transferred to a large test-tube having an aperture at the bottom plugged loosely with glass-wool. The tube is placed in a Xoxpette's fat extractor (a rather larger size than that usually made) adapted to a small tared flask, containing 100 c.c. of petroleum spirit (boiling below 80°), when the extraction is complete. The petroleum spirit is distilled off and the dry residual matter weighed. By using this process the authors obtained the following percentages of unsaponifiable matter:—Lard, 0·23; olive oil, 0·75; German rape oil, 1·00; cotton seed oil, 1·64; cod liver oil, 1·32 and 0·46; sperm oil, 39·14 and 51·31; spermaceti, 40·64; bees-wax, 52·38; carnauba wax, 54·87; Japan wax, 1·14; resin oil, 98·72; mineral lubricating oil, 99·90. In the case of the cod liver oil the unsaponifiable matter contained cholesterin. With spermaceti and the waxes this matter left a sensible proportion of ash, doubtless because the solution of melissyl or cetyl alcohol in petroleum spirit acted as a solvent for sodium soaps. The authors tried to avoid this inaccuracy by forming barium, calcium and magnesium soaps, but without success. They also investigated the action of various solvents on the sodium soaps from various oils. They found too that the hydrocarbon oils when present in quantity exercised a similar solvent action, so that while the process above described gives accurate results with unmixed animal or vegetable fats and with unmixed hydrocarbon oils, with mixtures of the two classes the method was unreliable. In such cases they recommend the following:—5 grams of the sample are treated in an evaporating dish with 25 c.c. of alcoholic soda, and the mixture boiled until it froths; 50 c.c. of warm water are added to dissolve the soap, and the solution transferred to a globular glass separator, of about 200 c.c. capacity, furnished with a tap below and stopper at the top; the basin is rinsed out with 20 to 30 c.c. of water and then 30 to 50 c.c. of ether added. The whole is then thoroughly mixed. The separation of the ether can be hastened by cooling or by the addition of a few c.c. of alcohol. The soap solution is run off, the ether washed, and the washings strained off. The ethereal solution of the unsaponifiable matter is then run into a tared flask, and distilled to dryness. The soap solution must be agitated a second and third time with ether if great accuracy is required. In order to test the accuracy of the process the following mixtures were analysed:—

Mixture.	Per cent. of mineral resin oil.	Found,
Olive and shale oil . .	60	58·028 p. c.
„ „ . .	20	19·37 „
Olive and resin oil . .	60	53·05 „
„ „ . .	60	59·42 „
„ „ . .	20	19·61 „
Lard and paraffin wax .	40	40·48 „

The authors promise further investigations on the higher alcohols from the waxes and also an examination of the products of the saponification of Japan wax.

Experimental Researches on the Amalgamation of Silver Ores. By C. **Rammelsberg**.—The author gives the result of many quantitative experiments as to the reactions which take place in the Mexican amalgamation process. He has investigated the actions of cupric and cuprous chlorides on silver, silver chloride, silver sulphide, arsenic sulphide, antimony sulphide, and on complex combinations, particularly sulpharsenide and sulphantimonide of silver.

On the Sulphides of Copper and Determination of their Molecular Weight. By S. U. **Pickering**.—The cupric sulphides were prepared by precipitation by hydrogen sulphide, and by heating electrotype copper with strong sulphuric acid at 180° C. for thirty minutes; the cuprous sulphides by heating pure copper with strong sulphuric acid at 124° for thirty minutes and by partial reduction of cupric sulphide in a current of hydrogen. The author has investigated the action of hydrogen and carbonic anhydride on the sulphides and has also heated the sulphides alone. When cupric sulphide is heated in a slow current of hydrogen, hydrogen sulphide begins to be evolved about 200° C., and between that temperature and 265° the cupric is converted into cuprous sulphide. On raising the temperature no further reaction is noticed until a red heat is nearly reached (580°–650° C.), when the whole is reduced to the metallic state. Cupric sulphide when heated in a current of carbon dioxide exhibits similar phenomena: at 130°–150° cuprous sulphide is formed; at 230° metallic copper. When cupric sulphide is heated to a sufficiently high temperature in a gas which has no reducing action upon it, half the sulphur is evolved and cuprous sulphide is left. As the sulphur is obviously eliminated in two distinct steps the author concludes that the formula of cupric sulphide must be doubled, and is therefore, Cu_2S_2.

Dr. Armstrong while admitting the extreme probability of the view suggested by Mr. Pickering, did not think that the fact, that the sulphur was given off in two steps, was quite sufficient proof that the formula should be doubled.

Mr. Pickering said that the only other explanation was that part of the sulphide was reduced to metallic copper, which immediately combined (at such a low temperature) with another portion of unaltered sulphide. This seemed to him very improbable.

The next paper was read by Mr. J. C. **Thresh**, and was entitled—

Chemical Examination of the Buxton Thermal Water.—The author first had his attention attracted by the extraordinary statement of Playfair that this water contains 206 cubic inches of nitrogen gas per gallon. Muspratt increased the quantity to 504 cubic inches. The author has repeated these determinations, but could only find about 22 c.c. of N. per litre. The erroneous results of Playfair and Muspratt seem to have been obtained as follows:—The gas which is found over the spring contains N. 98·98 per cent., CO_2 1·02. They estimated the CO_2 in the water and assumed that the same proportion existed between the gases dissolved in the spring as was found in the gases evolved by the water. They completely overlooked the fact of the greater solubility of CO_2 in water. The gases dissolved in a litre of water are 22 c.c. N. and 14·5 c.c. CO_2. The mean composition of the gas dissolved in the water is, therefore, 59·78 per cent. N., 40·23 CO_2, which by calculation from the co-efficients of absorption of CO_2 and N. should evolve a gas containing 99·12 per cent. N., 0·88 per cent. CO_2. The author gives details of the method employed by him in collecting and analysing the gases. He has also made a complete mineral analysis of the mud deposited by the spring. It contains 71·1 per cent. Mn_3O_4, 1·08 per cent. of matter inoluble in HCl, 0·02 per cent. molybdic acid, 0·30 per cent. cobalt oxide, 5·3 per cent. lime, 1·36 per cent. iron and aluminium oxides. The presence of the molybdic acid was confirmed by the yellow precipitate with sodium phosphate, etc. The author suggests that the large quantity of nitrogen may be accounted for by supposing the water to have been at one time saturated with air from which the oxygen has been removed by the lower oxides of manganese.

Mr. Thomas said that a spring near Cardiff similarly evolved a large quantity of nearly pure nitrogen; in this case he had traced the nitrogen to a shale containing large quantities of that gas.

The President then exhibited some specimens illustrating the synthetical production of indigo by Baeyer; also a magnificent specimen of isatin lent by Dr. Schunck.

The Secretary then read a paper by E. J. Mills—

On Potable Waters, Part II. Determination of Total Solids.—The author suggests that this determination should be made by accurately observing the time which a glass bulb takes to rise through a measured depth (22 centimetres) of the water. Care must be taken that all the surfaces are clean and that the temperature is constant. The time was taken by a metronome beating thirds of seconds. This method determines every constituent that is foreign to distilled water.

The following paper was also read by the Secretary:—

On the Estimation of the Value of Zinc Powder and on a Gauge for Measuring the Volume of Gases without Calculation for Temperature and Pressure. By J. Barnes. —The value of the zinc powder was estimated by the amount of hydrogen evolved. The hydrogen is measured by the quantity of water which it displaces. The gauge consists essentially of a narrow graduated tube placed in mercury; on the upper end of the tube a bulb is blown. The value of the graduations is determined. On exposing this bulb tube to the temperature and pressure at which the gas is being measured, reading off the division at which the mercury inside and outside is level, and referring to a table, a number is obtained. The observed volume of the gas is divided by this number and the correct volume at once obtained.

The Society then adjourned to June 16, when a ballot for the election of Fellows will be held and the following papers read:—"On the Isomeric Acids obtained from the Ethers of Salicylic Aldehyde and from Coumarin," by W. H. Perkin; "Notes on Naphthalene Derivatives," by H. E. Armstrong; "On the Synthetical Production of Ammonia," by G. S. Johnson; "On the Sulphates of Aluminium," by S. Pickering.

ROYAL INSTITUTION OF GREAT BRITAIN.

Selenium and its Applications to the Photophone and Telephotography.*

BY SHELFORD BIDWELL, M.A., LL.B., M.R.I.

Before entering upon my subject, I must claim your indulgence upon two grounds. A week ago I had not the remotest idea that I was to have the honour of addressing you here this evening; the time which I have had for preparation has, therefore, been exceedingly limited. In the second place, it is my desire (in accordance with the traditions of this Institution) not merely to give a description of the experiments in which I have for the last few months been engaged, but, as far as possible, to reproduce them before you. Now these experiments are mostly of a very delicate nature. In the quiet of a laboratory—where time is practically unlimited, and where an operation, if it should fail at first, may be repeated an indefinite number of times—success is tolerably certain to be finally obtained; but in exhibiting delicate experiments before an audience, one is working under the most unfavourable conditions, and, in case of failure in the first instance, the attempt cannot generally be repeated. Moreover, the substance with which we are chiefly concerned, selenium, is apparently extremely capricious in its behaviour. This appearance is, of course, really due to our present ignorance of its properties; but the fact remains that, on account of the great uncertainty of its action it is a very difficult substance to deal with.

Selenium is a rare chemical element which was discovered in the beginning of the present century. In many of its properties it closely resembles sulphur, and, like sulphur and some other substances, it is capable of existing in more than one form.

The ordinary form is that called vitreous. Selenium in this condition is as absolutely structureless as glass, and in appearance resembles nothing so much as bright black sealing-wax, with, perhaps, somewhat of a metallic lustre; its real colour, however, when seen in thin films, is ruby red. Its melting point is a little higher than 100° C. In its second modification selenium is crystalline. When in this form its surface is dull, its fracture is metallic (not unlike that of cast iron), its colour is grey or leaden, and it is quite opaque to light; its melting point also is considerably higher, being 217° C.

Vitreous selenium, if melted and kept for a certain length of time at a temperature between its own fusing-point and that of crystalline selenium, will crystallize; and I think I am right in saying, from casual observation, though I have made no experiments to verify the point, that the length of time necessary for crystallization depends upon the degree of temperature, being proportionately shorter as the temperature approaches 217° C.

Vitreous selenium is an exceedingly bad conductor of electricity; it is, indeed, an almost perfect insulator. Crystalline selenium is a moderately good conductor, and it possesses this very remarkable property, which has been utilized in the photophone and other inventions, that it conducts better in the light than in the dark, the change in its resistance to the passage of a current of electricity through it varying, according to Professor W. G. Adams, as the square root of the illuminating power.

Let a galvanometer be connected to the two poles of a battery by means of two copper wires. The passage of a current of electricity will at once be denoted by the deflection of the magnetic needle; or, if a little mirror is attached to the needle, and a beam of light be reflected from it upon a scale, the movement of the spot of light will indicate the movement of the needle. Let now one of the wires be cut, and the two ends be joined together by a piece of crystalline selenium. The spot of light will again move, but its deflection will be very much less than it was before, showing that the resistance of the selenium is very much greater than that of the wire. Moreover, if the piece of selenium be alternately exposed to and screened from a beam of light, the deflection will be greater when it is in the light than when it is in the dark, showing a corresponding variation in its resistance. This remarkable property of selenium was first announced and exhibited by Mr. Willoughby Smith in 1873. But the effects produced by the simple arrangement which I have just described are small, and very delicate instruments are required for their observation.

Since that date several devices have been proposed for exaggerating the effect, but they all depend upon the fact that the amount of the variation increases with the extent of the selenium surface acted upon. It has lately been the fashion to call these arrangements "cells," which, in most cases at all events, seems to be a very inappropriate name. It has been suggested that they should be termed "rheostats," a name which well expresses the purposes for which they are generally used, and is less likely to lead to confusion than the other. In deference to custom, however, I shall to-night call them by the usual name.

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* Read Friday, March 11, 1881.

The simplest selenium cell which could be devised would be made by placing two short pieces of copper wire parallel to each other, and very near together, and connecting them by a narrow strip of selenium. The effect produced by light is increased by lengthening this arrangement. We might go on increasing the wires with advantage until they were 10 or 12 feet long or more, every additional inch of length producing an increase of "sensitiveness" as it is called. But a cell of this length would be cumbersome and unwieldy to use, and in fact could hardly be lifted without being destroyed. Dr. Werner Siemens therefore adopted the device (among others) of coiling up the wires so as to form a double spiral, and thus made a convenient and portable cell of great sensitiveness. But it is very difficult indeed, as I know by experience, to produce these double wire spirals of any considerable size without the two wires touching one another at some point. After many attempts I succeeded in producing spiral cells about ¾ inch in diameter, but I found it impossible to exceed this size, and as it was not large enough I adopted a simple and very effective variation of Siemens's method, which I believe has not been previously suggested. A copper wire is wound after the fashion of a flat screw around a narrow slip of mica, the threads of the screw being about $\frac{1}{16}$ inch apart. Beside this wire, and at a distance of $\frac{1}{32}$ inch from it, a second wire is wound in exactly the same manner, each of its turns coming midway between two consecutive turns of the first. Care is taken that the two wires do not touch each other at any point. Over one surface of the mica a film of melted selenium is spread, and after being worked smooth and uniform it is crystallized. By this means the two wires are connected with each other through half their entire length, by a series of very narrow strips of crystalline selenium.

I have here a tiny selenium cell which has been constructed in this manner. Each wire makes about six turns, and the area of the selenium upon its surface is about half that of a threepenny piece, its thickness not much exceeding that of a sheet of ordinary note-paper. Its resistance, though it is very high relatively to that of good conductors, is, compared with anything of the kind that I had ever seen before, remarkably low, and its sensitiveness to light is great. When a batswing gas-flame is held at a distance of three inches from it, its resistance is less than one-third of that which it measures in the dark. Larger and more carefully constructed cells, of course, show better results. No form, however, that I have tried (and I have made several dozens) has in my hands been superior to that of a double flat screw.

When cells are to be made of any considerable size, the labour of winding on the wires with sufficient regularity is very great. By the help of a lathe this difficulty may be reduced to a minimum. The method of proceeding is this:—A cylinder is turned of hard wood, of length and diameter slightly greater than that of the proposed cell. This cylinder is cut longitudinally into two equal parts, and between the two semi-cylinders thus formed a slip of mica is placed sandwich-like. The ends are secured with screws, and the whole is smoothed down in the lathe. When the edges of the mica are quite flush with the surface of the wood, a screw of from thirty to forty threads to the inch is cut upon the cylinder. On removing the mica from the wood its two edges are found to be beautifully and regularly notched. The first wire is then wound into alternate notches, and the second into the others.

I will throw upon the screen the image of a slip of mica with the two wires wound upon it, and ready for the reception of the selenium coating. It will be seen that the turns are perfectly regular, and close as the wires are to each other, they do not touch at any point.

The next step is to apply the selenium, and to do this properly is an operation which requires a certain amount of practice and patience. The mica is heated to a temperature slightly above 217° C., and melted selenium is spread over its surface as evenly as possible with a metal spatula. The cell is then cooled, and its surface should be smooth and lustrous. Before you is an embryo cell which has reached this stage of its preparation. The selenium, being still in the vitreous condition, is a perfect insulator, and when the cell is connected in circuit with a battery and a reflecting galvanometer, the spot of light is found to be absolutely motionless. I now propose to crystallize the selenium in your presence. The mere crystallization occupies a very short time. It is only necessary to place the cell upon a brass plate, and raise it by means of a Bunsen burner to a temperature somewhat below the fusing point of crystalline selenium. The method described by Professor Adams in his classical paper published in the 'Philosophical Transactions,' is entirely different. He heated a bucket of sand by placing in it a red-hot iron ball. At the expiration of an hour he removed the ball, and placed in the heated sand his pieces of vitreous selenium, wrapped up in paper. After remaining for twenty-four hours, the selenium was generally found to have attained the crystalline form, and the resistance of some of his specimens thus prepared was far lower than that of any which have been made by myself. Their sensitiveness, however, does not appear to have been great. The method of crystallization which I generally adopt, and which is due to Professor Graham Bell, has at all events the merits of simplicity and rapidity. In two or three minutes the whole surface of the selenium film becomes dull and slate-coloured, and if, when the cell has attained this condition, it be removed from the hot metal plate, I have little doubt that on testing it with a galvanometer it will be found to conduct electricity and to be sensitive to light. According to Professor Graham Bell, nothing more is necessary for obtaining the greatest degree of sensitiveness. The old-fashioned process of long heating and slow cooling may, he says, be altogether dispensed with. In this matter my experience differs entirely from his, for I find that cells which have been kept for some hours at a temperature just below the point of fusion, and then allowed to cool very gradually, are vastly more sensitive to light than those which have not been thus annealed.

The following table shows the resistances in the dark, and under different degrees of illumination, of a few cells taken from my stock. The resistance of No. 6, when exposed to a lime light at 10 inches, is less than one-fiftieth of its resistance in the dark.

Resistances in Ohms.

Cell No.	In Dark.	Gas Jet at			
		12 Inches.	6 Inches.	3 Inches.	Lime Light at 10 inches,
4	400,000	190,000	150,000	80,000	
6	290,000	80,000	54,000	29,000	5700
7	430,000	160,000	110,000	64,000	With
9	87,000	52,000	42,000	33,000	Alum Cell.
10	62,000	32,000	26,000	17,000	14.000
11	100,000	63,000	50,000	33,000	24,000
12	22,700	9,100	6,600	4,500	...

It is an interesting question, which of the coloured components of white light has the greatest power in effecting these changes in the resistance of selenium; or, again, whether the effect is produced by light at all, or is due simply to heat. Captain Sale came to the conclusion, on moving a piece of selenium through the solar spectrum, that the maximum effect was produced at or just outside the extreme end of the red, at a point nearly coinciding with the maximum of the heat rays. Professor Adams performed the same experiment with the spectrum both of the sun and of the electric light, and found that the action on the selenium was greatest "in the greenish-yellow and in the red portions of the spectrum." The greenish-yellow is the point of maximum illumination, which is a remarkable fact; but his words seem to imply that there was a second maximum in the red. The violet and ultra-violet rays, he says, produced very little, if any, effect. In consequence of the discrepances in these results, I determined to repeat the experiment for myself. The source of light which I used in the first instance was an oxy-hydrogen lime-light, and the spectrum was formed with a bisulphide of carbon prism. The experiment was repeated six times, and three different selenium cells were used. The results were precisely the same in every case, and proved in the most marked manner that the greatest influence occurred in the boundary-line between the red and the orange; thus differing completely from the results obtained both by Captain Sale and by Professor Adams. Moreover, the resistance when the selenium cells were placed in the ultra-red, two inches beyond the limits of the visible spectrum, was in every case lower than when it was in the blue, indigo, and violet. But even in the ultra-violet the resistance of the cells was lower than when they were quite removed from the spectrum.

My friends Mr. Preece and Mr. W. H. Coffin, who were present during these experiments, suggested that it would be desirable to vary them by making use of different sources of light, and different methods of dispersion; and a few days afterwards, by the great kindness of Mr. Norman Lockyer, they were repeated in Mr. Lockyer's laboratory by Mr. Preece and myself with the electric light and a magnificent diffraction grating. Nine experiments were made with three cells, and the results were as absolutely concordant as those which we had previously obtained; but they all concurred in placing the maximum at the extreme edge of the red, thus agreeing with Captain Sale's observations. One other remarkable effect must be noticed. In the case of a single cell—that which I distinguish as No. 6—with which three experiments were made, a second maximum was observed in every case in the greenish yellow, though the effect was about 20 per cent. smaller than at the extreme red. The electric light, however, is from its great unsteadiness most unsuitable for experiments of this nature, and since no such exceptional phenomenon was ever observed before or since, I am inclined to believe that, by a coincidence which however remarkable is by no means impossible, the light happened to be unusually intense just on the three occasions when this particular cell was in the greenish yellow. A third series of experiments made with a gas flame and a bisulphide of carbon prism, agreed with the first in placing the maximum at the orange end of the red. Many more combinations of sources of light and dispersion remain to be tried, but time for these and for innumerable other experiments which have suggested themselves has hitherto been wanting: for an operation which may be described in a dozen words not unfrequently requires as many hours for its performance.

By the help of a reflecting galvanometer I now propose to show you the various effects produced by different parts of the spectrum of the electric light formed by a bisulphide prism upon the resistance of a selenium cell. The maximum deflection is seen to occur when the selenium is at the extreme outer edge of the red.

The effect of interposing various coloured glasses between a gas flame and the selenium cell was also tried. The greatest effect was produced by orange glass, the smallest by green It was, too, observed as a remarkable fact that the light transmitted by a dark-blue glass produced a greater effect than that which had been passed through a blue glass of much lighter tint. But on a spectroscopic examination the darker one was found to transmit a certain portion of red light. I also tried the effect of radiation from a black-hot poker held at a distance of about 6 inches from the selenium, and upon the first trial found that the resistance, instead of being diminished, was increased by several thousand ohms. I imagine this to be due to a rise of temperature in the selenium, and was thus led to experiment upon the effect of temperature. In this matter, too, there is a remarkable discrepance between the authorities. Professor Adams says that an increase of temperature *increases* the resistance of selenium, and even suggests that a selenium bar should be used for the construction of a very delicate thermometer. Dr. Guthrie, Messrs. Draper and Moss, and others, make the directly opposite assertion that the resistance of selenium *diminishes* with heat. I repeated my poker experiment, which had in the former case apparently corroborated Professor Adams, and now to my utter astonishment I found that the resistance was greatly diminished. This second experiment, therefore, seemed to support Dr. Guthrie's statement. A great number of experiments were now undertaken for the purpose of arriving at the truth of the matter, with the details of which I will not weary you. Solutions of alum in water, of iodine in bisulphide of carbon, plates of glass and of ebonite were interposed between the selenium and the sources of light and heat. The selenium was now fried, now frozen; and the most contradictory results were obtained. At one moment I felt convinced that Professor Adams was right, at the next there appeared to be no shadow of doubt that Dr. Guthrie's was the true theory. In fact, it seemed as if the selenium was possessed by a demon which produced the variations in accordance with the caprices of its own unaccountable will. At length, when the confusion was at its height and the demon most bewildering, the true explanation was suddenly revealed, and so exceedingly simple is it that now the only marvel is that it should have so long eluded discovery. The secret of the matter is this: and it discloses one of the most remarkable properties of this most remarkable substance. There is a certain degree of temperature at which a piece of crystalline selenium has a maximum resistance. If a piece of selenium at this temperature is exposed to either heat or cold—it matters not which—its resistance will at once be diminished: and extremes of either produce a far greater variation than is ever effected by the action of light. A selenium cell which at the ordinary temperature measured in a dim light 110,000 ohms, was reduced by immersing it in oil at 115° C. to 18,000 ohms. The resistance of the same cell was reduced by immersing it in turpentine at —6° C. to 49,000 ohms. In the case of the single cell with which I have hitherto made the experiment, the temperature on each side of which the resistance is diminished is 24° C.* Let this piece of selenium be gradually raised from a temperature of zero to a temperature of 100° C. While passing from zero to 24°, its resistance will rapidly increase. Passing from 24° to 100° its resistance will again rapidly diminish.

Until Professor Bell directed his attention to selenium, all observations concerning the effect of light upon its conductivity had been made by means of the galvanometer. But it occurred to him that the marvellously sensitive telephone which he has invented might with advantage be used for the purpose, and on May 17, 1878, he announced in this theatre "the possibility," to use his own words, "of hearing a shadow by interrupting the action of light upon selenium." A few days afterwards Mr, Willoughby Smith informed the Society of

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* The experiment has since been repeated with five other cells, and their temperatures of maximum resistance were found to be 23°, 14°, 30°, 25°, and 22° respectively.

Telegraph Engineers that he had carried this idea into effect, and had heard the action of a ray of light upon a piece of crystalline selenium.

When a selenium cell, a telephone, and a battery are connected in circuit, a uniform current of electricity will, under ordinary circumstances, flow through the telephone, and a person listening would hear nothing. Suppose now that a series of flashes of light were allowed to fall upon the selenium. In the intervals of darkness the selenium cell would offer a greater resistance to the passage of the electric current than during the intervals of light. The strength of the current would be constantly varying; and if the flashes succeeded one another quickly enough and with sufficient regularity, a musical note would now be heard by a person listening at the telephone. The exact pitch of this note would of course depend upon the rate at which the flashes succeeded one another, being high when the succession is rapid, low when it is slow. The nature of this sound is very peculiar, reminding one of the moaning of a syren or the rising and falling of the wind. With a sufficiently sensitive cell, powerful battery, and delicate telephone, the sound may be heard at a distance of many feet.

I shall interrupt the steady beam of light which is now falling upon the cell by causing a zinc disk with radial slits cut in it to rotate in the path of the beam, and the sound produced by the rapid succession of light and shade upon the selenium cell will be heard in the telephone. When the cell is screened from the light, the sound at once ceases. When the screen is removed, the sound is again heard as before. By using a system analogous to that of dots and dashes, an intermittent beam of light might be employed to convey photophonic messages to a distance.

But Professor Bell has gone further than this. He was not satisfied with merely *interrupting* a steady beam of light, producing alternately strong light and total darkness, but he aimed at graduating its intensity in correspondence with the varying phases of the complex sound-waves produced by the human voice. It is evident that if a beam so regulated were allowed to fall upon the selenium cell, the exact words spoken, with their articulation unimpaired, would be reproduced in the telephone. Professor Bell adopted a device which is equally marvellous for its extraordinary simplicity and for its perfect efficiency. The beam of light is made to fall upon the face of a small flexible mirror, whence it is reflected to the distant selenium cell, lenses being used for the purpose of rendering the rays parallel and condensing them where required. The speaker directs his voice upon the back of the mirror, which takes up the sound-waves and is thrown into a state of vibration, thus becoming alternately concave and convex. Now, when it is concave the light reflected by it is more concentrated, and the selenium cell more brightly illuminated. On the other hand, when it is convex, the opposite effect is produced: the rays are more dispersed and the illumination of the cell less intense. And since the movements of the mirror are in exact correspondence with the sound-waves of the voice, so also will be the intensity of the illumination of the selenium cell. The strength of the current passing through it will vary in the same proportion, and will cause the telephone plate to vibrate in consonance with the mirror, and thus to reproduce the exact sounds by which the mirror was set in motion.

In the small experimental photophone which is before you, the receiving station is within 20 feet of the transmitter, and any sounds heard in the telephone would of course be utterly drowned by the actual voice of the speaker at the mirror. It is necessary, therefore, to prolong the telephone wires, and carry them to a distant room, where the sounds that have travelled along the beam of light can be heard without interruption. Professor Bell, using instead of a lens a large reflector for receiving the beam of light, has heard words which were spoken when the mirror was 700 feet away from the selenium cell.

It is impossible to exhibit the photophone in action to an audience, because the effects can only be heard by a single person at a time. But I may mention, that in the course of some experiments with this little instrument which Professor Tyndall very kindly permitted me to make here on the 7th of December last, every word transmitted by it was perfectly understood.

I propose now to say a few words upon another and very different application of selenium. In point of interest and importance it cannot be compared with the photophone: but since it is a child of my own I naturally regard it with a certain amount of affection. It occurred to me a few months ago that the wonderful property of selenium, which we have been discussing this evening, might be applied in the construction of an instrument for transmitting pictures of natural objects to a distance along a telegraph wire. I have constructed a rough experimental apparatus in order to ascertain whether my ideas could be carried out in practice, and it is so far successful, that although the pictures hitherto transmitted are of a very rudimentary character, I think there can be little doubt that further elaboration of the instrument would render it far more effective.

Iodide of potassium is very easily decomposed by a current of electricity. If a piece of paper which has been soaked in a solution of this substance be laid on a piece of metal, which is connected to the negative pole of a battery, and a piece of platinum wire, which is connected with the positive pole, be drawn over its surface, the path of the point will be marked by a brown line, due to the liberation of iodine. Let the platinum wire and the metal plate be connected to a second battery in such a manner that a current of electricity may pass through the paper in the opposite direction; and let a variable resistance be inserted between the platinum wire and the first battery, and a selenium cell between the platinum wire and the second battery. And let the resistance be so adjusted that when the selenium cell is exposed to a strong light, the two opposite currents through the paper and the galvanometer neutralize each other; then the point when drawn over the paper will make no mark. But if the selenium cell is shaded, its resistance will be immediately increased, and the current from the first battery will predominate. The point, if moved over the paper, will now trace a strong line, which, if the selenium is again exposed, will be broken off or enfeebled according to the intensity of the light.

If a series of these brown lines were drawn parallel to one another and very close together, it is evident that by regulating their intensity and introducing gaps in the proper places any design or picture might be represented. This is the principle of Bakewell's copying telegraph, which will transmit writing or pictures drawn upon tinfoil with a non-conducting ink. My instrument differs from his in that the current is varied simply by the action of light. The transmitting instrument consists of a small cylindrical box 2 inches deep, mounted upon a horizontal spindle, upon which is cut a screw having sixty-four threads to the inch. This works in two bearings 4 inches apart, one of which has an inside screw corresponding to that upon the spindle. At a point midway between the two ends of the cylinder a pin-hole is drilled, and behind the hole a selenium cell is fixed. One terminal of the selenium cell is connected (through the spindle and stand of the instrument) with the negative pole of a battery, the other with the line wire to the distant station. The receiving instrument contains a similar brass cylinder, similarly mounted. A platinum point presses gently upon its surface, and is connected both to the line wire and, through a variable resistance, with the positive pole of a local battery, the negative pole of which is connected through the galvanometer with the cylinder. A wire or earth connection between the negative pole of the local battery and the positive pole of the other, completes the arrangement.

To prepare the instruments for work the cylinder of the transmitting instrument is brought to its middle position and a picture not more than 2 inches square is focussed upon its surface by means of a photographic lens. The hole in the cylinder is then brought to the brightest point of the focussed picture, and a scrap of sensitized paper being placed under the platinum point of the receiver, the variable resistance is adjusted so that the two opposite currents through the paper neutralize each other. When this is accomplished the two cylinders are screwed back as far as they will go, the cylinder of the receiver is covered with sensitized paper, and all is ready to commence operations.

The two cylinders are caused to rotate slowly and synchronously. The little hole in the transmitting cylinder will in the course of its spiral path cover successively every point of the focussed picture, and the amount of light falling at any moment upon the selenium cell will be proportional to the illumination of that particular spot of the picture which, for the time being, is occupied by the pin-hole. During the greater part of each revolution the platinum point will trace a uniform brown line upon the prepared paper, but when the pin-hole happens to be passing over a bright part of the picture, this line is enfeebled or broken. The spiral traced by the point is so close as to produce, at a little distance, the appearance of a uniformly coloured surface, and the breaks in the continuity of the line constitute a picture which, if the instrument were perfect, would be a counterpart of that projected upon the transmitter.

The pictures upon which I have hitherto operated have been mostly simple designs, such as diamonds and squares cut out of thin metal and projected by a magic lantern. But the instrument is in its earliest stage of infancy. It is at present hardly a single month old, and I regret to say that since its birth it has been shamefully neglected, circumstances having prevented me from giving it even the ordinary care and attention which all young creatures ought to receive. Nevertheless, I cannot but think that it is capable of indefinite development; and should there ever be a demand for telephotography, it may in time turn out to be a useful member of society.

Parliamentary and Law Proceedings.

A Chemist Fined under the Explosives Act.

On Thursday, June 2, at the Chesterfield Borough Police Court, Messrs. Abraham Greaves and Son, chemists and powder and oil merchants, of Chesterfield, were summoned by Major Ford, Inspector under the Explosives Act, for having committed three separate offences under the Explosives Act.

The first charge was that the defendants on the 19th of last month, being occupiers of registered premises under the provisions of the Explosives Act of 1875, kept explosives exceeding 1 pound weight, the same not being enclosed in substantial cases, bags, or canisters, so as to prevent them from escape, as required by the Act. The second charge was that they kept on their registered premises an amount of powder exceeding 50 pounds in weight, the amount found on the premises on the 12th of last month being 317 pounds, which was not in a substantially constructed building exclusively appropriated for the purpose. The third charge was that the defendants, being occupiers of registered premises under the Explosives Act, 1875, did not take all due precaution for the prevention of accidents by fire or explosion. In accordance with the suggestion of Mr. Greaves, it was agreed to hear the three charges together.

Major Ford, having been sworn, said that on May 19 he had occasion to call on Messrs. Greaves with reference to their factory at Grassmoor. Witness went down their yard in the Market Place (Low Pavement), and found lying close to the door of one of the warehouses—firstly, a barrel, containing 100 lbs. of powder, a box containing 12 lbs. blasting cartridges, one containing 25 lbs. having been opened. Witness, having referred to Act 22 and its provisions, which bore on the case, he proceeded to sections 39 and 44, which lay down that blasting cartridges shall be considered and treated as gunpowder. With regard to the second charge, witness said that having examined the powder near the door, which weighed altogether 192 lbs., he proceeded to the building at the bottom of the yard, and in which defendants kept the explosives. This building, from its situation, would be only qualified to hold 50 lbs., but 145 lbs. was stored in it,—75 lbs. in excess of the proper and lawful amount. Witness ordered the 75 lbs. and the other 192 lbs., in all 267 lbs., to be put under seizure. With regard to the third charge, defendant had loose powder and a box of cartridges standing open near the door of the warehouse in the yard. Their worships would understand that any-one smoking would pass within a foot or two feet of the powder, and within a very few feet of a large quantity of petroleum, amounting to thirty-six barrels, in addition to which there was a quantity of other oils. There were in addition a number of empty barrels which had contained inflammable substances. Witness did not say whether what he had stated was within the Petroleum Act, but it was a source of very considerable danger. If by any means a fire had taken place the petroleum would have run down the yard, which inclines, and conveyed the flames to a number of houses down the yard and no one knew where else. He wished to say with regard to the excess—192 lbs.—which was found at the door of the warehouse, that it was the powder to which the charge of carelessness referred.

Mr. Greaves said that the magazine was registered by the local authority to hold 200 lbs., and he therefore held that Major Ford's charge on that account must fail.

Major Ford explained that the local authorities simply registered the building, but they did not settle the weight of explosives to be kept.

Mr. Greaves: Have we not always shown a readiness to obey any suggestions you have made in the past, and was not our Grassmoor place within the requirements of the Act?

Major Ford: Well, sir, it was the condition of the factory at Grassmoor which caused me to visit your Chesterfield place. There is no mound round the place as laid down by the Act.

Mr. Greaves replied to the charge at great length, maintaining that no wilful offence had been committed, and that there were only four barrels of petroleum in the yard, which would not have ignited if a red hot poker had been put into them. As regarded the breach of the statute, he had never seen it, and he felt that the authorities had not published the regulations as they should do.

Major Ford said that the statute under which proceedings were taken had been published in the *Gazette*, and could be obtained for 1*d*.

Mr. Greaves, in defence, said that he had been in business forty-five years, during such time no explosive mishap had occurred, and he had never heard of any such occurrence, and he would like the Bench to remember that it was in his own interest to avoid any explosion or occurrence such as had been suggested by Major Ford.

After further discussion the Bench consulted a short time, and inflicted a fine of £10 and costs (the powder not to be forfeited), which Mr. Greaves remarked was, in his opinion, excessive.—*Derbyshire Times.*

Obituary.

Notice has been received of the death of the following:—

On the 19th of January, 1881, Mr. John Roose Elias, Chemist and Druggist, Pentraeth, Angelsey. Aged 61 years.

On the 8th of April, 1881, Mr. Thomas Woodcock, Chemist and Druggist, Bury. Aged 68 years.

On the 20th of April, 1881, at Canterbury, Mr. Thomas Francis Tangney, Chemist and Druggist. Aged 45 years.

On the 5th of May, 1881, Mr. Thomas Potterton Hickley, Pharmaceutical Chemist, Edgware Road, London. Aged 55 years. Mr. Hickley had been a Member of the Pharmaceutical Society since 1852.

On the 10th of May, 1881, Mr. Edmond Henry Ombler, Chemist and Druggist, New Southgate. Aged 43 years.

On the 21st of May, 1881, Mr. Henry Philpot, Pharmaceutical Chemist, Praed Street, London. Aged 67 years. Mr. Philpot had been a Member of the Pharmaceutical Society since 1842.

BOOKS, PAMPHLETS, ETC., RECEIVED.

The History of Salt; with Observations on its Geographical Distribution, Geological Formation, and Medicinal and Dietetic Properties. By Evan Marlett Boddy, F.R.C.S., F.S.S., etc. London: Baillière, Tindall, and Cox. 1881. From the Publishers.

Maladies Cancéreuses. Observations par le Dr. Gérard Von Schmitt. Paris: Leclerc. 1881. From the Author.

The Study of Botany, with a Sketch of the History of the Science. By William Southall, F.L.S. Birmingham. 1881.

An Unofficial Pharmacopœia comprising over Seven Hundred Popular Non-Official Preparations, and containing an Account of the Metric System of Weights and Measures, Americanized and Simplified, and a Comprehensive Dose Table, etc. By Oscar Oldberg, Phar. D., etc. Philadelphia: Presley Blakiston. 1881. From the Publisher.

The Metric System in Medicine, containing an account of the Metric System of Weights and Measures, Americanized and Simplified, etc. By Oscar Oldberg, Phar. D., etc. Philadelphia: Presley Blakiston. 1881. From the Publisher.

Dispensing Memoranda.

In order to assist as much as possible our younger brethren, for whose sake partly this column was established, considerable latitude is allowed, according to promise, in the propounding of supposed difficulties. But the right will be exercised of excluding too trivial questions, or repetitions of those that have been previously discussed in principle. And we would suggest that those who meet with difficulties should before sending them search previous numbers of the Journal to see if they can obtain the required information.

[550]. I am constantly dispensing the following (which is almost identical with No. 550), and find it makes a perfectly bright mixture:—

℞	Vin. Ferri	℥iss.
	Liq. Fowleri	ʒiss.
	Syr. Simp.	ʒiiss.
	Aq. Puræ	ad ℥iv.

M.

The only difference is in the quantity of water.

Civitas.

[550]. Having dispensed the prescription, I have obtained a clear, bright solution and I cannot at all account for the mixture being otherwise. I think that the vin. ferri was not properly made, hence the cloudiness.

G. E. Wells.

[550]. I cannot understand why "Provincial" was unable to dispense this prescription so as to produce a perfectly bright and clear mixture. It is a prescription frequently ordered by Mr. Erasmus Wilson, and I have dispensed it several times and have always found it appear clear and bright.

A. H. D.

[550]. Having dispensed this prescription, I do not fail to obtain a bright and clear mixture. The liq. Fowleri, although containing potass. carb., does not contain sufficient in the quantity prescribed to precipitate the iron.

London, W. P.

[550]. This mixture should be quite clear. It is taken for granted that "Provincial" ought to use aq. dest.

"374."

[551]. "374" would have used liq. ferri acet., Ph. Germ.

[551]. I think the ferri acetatis of the Dublin Pharmacopœia of 1826 is intended.

London, W. P.

[552]. In this mixture the spirit throws down the mag. sulph., but itself remains unaltered.

"374."

[552]. The magnes. sulph., although very soluble in water (10 in 13), is but slightly soluble in weak spirit, hence the magnes. sulph. is thrown out of solution when the spirit. æther. nit. is added.

London, W. P.

[553]. Could any of your readers inform a student how carbonate of ammonia and tincture of capsicum are incompatible and what is the nature of the change produced when both are mixed?

Student.

[554]. The following prescription was presented to us to dispense a few days ago:—

℞	Alcoöl d'Iode	10	grammes
	Acide Phénique	1	„
	Glycerine de Price	80	„
	Eau	410	„

M. Pour gargarisma.

We dispensed for the first ingredient the alcoholic preparation of iodine of the French Pharmacopœia, the strength of which is stated in Squire's 'Companion' to be 1 in 12. It was sent out as a 16 oz. gargle of an orange colour.

The gentleman for whom it was made up stated that he had had it made up once only before, and that was by an English chemist; it was then perfectly colourless. Perhaps some reader of the Journal can say which of the two was right.

Junior.

Notes and Queries.

[703]. FLUORESCINE.—Would any reader kindly inform me how this preparation is used for making the colour for carboys?

N.

[704]. MIST. AGRIMONII COMP.—Would some reader of the Journal kindly give the recipe for mist. agrimonii comp.?

John.

[705]. HERMOND'S POWDER.—What is Hermond's powder?

John.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE SOCIETY'S JOURNAL.

Sir,—As one of the members who at the Annual Meeting asked what became of the 7000 Journals advertised as issued weekly, will you allow me to express my thanks to the President for the statement presented by him to the Council? It is at once lucid and satisfactory, and had such a statement accompanied the annual report there would have been no necessity for raising the question at the meeting.

Perhaps I may be allowed further to say that I did not raise "any presumption of mismanagement respecting the Journal," as stated in last Saturday's leader. I merely asked for an explanation how the 7000 Journals were disposed of, seeing there were a "little over 5000" persons entitled to receive them. Further, so far were the details from being "easily ascertained," as you say, that neither the President, nor Secretary, nor apparently anyone else at the meeting, were able to give the information, for the President in his reply stated that 300,000 were annually (or 5770 weekly) disposed of. Until, therefore, "the Secretary had got out the figures" presented to the Council last week the matter stood in this way, that there were 5000 members entitled to the Journal, that the number issued, according to the President was 5770, but according to the publisher 7000.

I am still strongly of opinion that a supplementary Journal account should have been issued with the annual balance-sheet. No business man could possibly accept and pay an adverse balance of £680 in connection with any branch of this business without knowing the reason why, as the members of the Society have been required to do.

8, The Strand, Torquay. EDWARD SMITH.

[*** It is shown at p. 1030 that Mr. Smith's figures are all incorrect.—ED. PH. JOURN.]

Sir,—As an associate (not in business) I was much troubled to read the speech of a Torquay gentleman at the Annual Meeting, and think there must be few students and assistants but felt inclined to rebut Mr. Smith's sweeping comments upon us as a class. I will ask Mr. Smith if half-a-guinea is not more in proportion for an apprentice to pay than for the average chemist who subscribes his guinea annually, and while the Society is entirely neglected by so large a majority of men in business, it is gratifying to find a good number of apprentices joining. Mr. Smith must be very "singular" in his experience as to the manner that assistants use their Journals. At any rate, I joined the Society eight years ago, and, I believe, have every number in good condition, for, if at any time a non-delivery has occurred, a few lines to the worthy Secretary has always been quickly replied to.

As a rule, those who grumble most have least cause to do so, and I should be pleased to know if Mr. Smith contributed to the Society's funds as an apprentice or even as an assistant. It is gratifying to read more moderate orations which follow the objectionable one, and if any change is to be made in the subscriptions, I would propose that Major and Minor assistants should pay the same, namely, half-a-guinea; the present system certainly is not any inducement for them to take the higher degree.

After Mr. Smith's own statement that there are only 5471 "persons" on the Register entitled to receive the Journal. I can see no good in trying to reduce that number, and rather think that an increase can only come from the younger ranks. As the annual postage of each Journal amounts to only 2*s*. 2*d*., I call it mean in the extreme to talk of charging postage to students and assistants.

Then for provincial associations. I have had a fair amount of experience with them, and would give no very grand opinion of any which was not self-supporting from a cash point of view, the Society having always shown itself willing to assist with specimens, and even go to the expense of "postage" by sending a Journal for the use of the reading room (where such exists).

By inserting the above you will confer a favour on one who considers Mr. Smith's remarks as uncalled for and most injudicious upon the occasion.

FAIR PLAY.

ASSISTANTS' SALARIES.

Sir,—I was pleased to observe a letter signed "Revolutionist" in the Journal of May 28, and am somewhat surprised that no comment has been elicited in the subsequent issue of that paper. That some steps should be taken by us as chemists' assistants seems beyond a question, but it is to be regretted that this subject has not been earlier brought under consideration. The competition with stores, combined with the proverbial "bad times," will, I am afraid, at present afford a sufficient plea for employers to remain obdurate in the matter of increased remuneration. It is an admitted fact that our salaries have been increased of late years; but this augmentation has not been granted in ratio to the profits derived by principals; it has been necessitated by the expensive curriculum for examination. "Revolutionist" has evidently put a too cheap estimation on his services, taking into consideration the amount of business he represents himself to get through; but I know several young men who, after a ten months' course at the "Square" (and I presume a probable expense of upwards of £100), have engaged in situations at £40 a year. So much for the glory of the profession, after payment of a premium and four or five years' gratuitous services. I find that many of my old school colleagues who adopted other paths in life, such as bankers' clerks, etc., are now receiving salaries which I cannot hope to attain to, whereas they have the additional advantage of working office hours from 9 till 4 or 6 o'clock and also receiving Bank Holidays and Sundays entirely free. Apart from the subject of salary, what is required in our vocation is more time for recreation.

It will be granted that the pale and unhealthy appearance which characterizes chemists generally is owing to excessive taxation of faculties while at business and late hours, which latter debars us from enjoying those out-door exercises and amusements that are absolutely essential to robust health, and which men in other callings have the privilege of enjoying. I have been connected with first-class establishments both in London and the provinces during the last few years and am fully convinced that the want of more time for recreation is keenly felt by us as a community. As a primary step in the way of reform I would propose that we advocate for at least half a day's holiday per week. I think this a reasonable demand and one which is not calculated to produce any serious inconvenience to principals when properly established and recognized.

The remedy is in our own hands, and I may add that I am not desirous of disseminating the elements of discord betwixt employers and assistants; yet I maintain that we "have a grievance," and it remains to be seen whether we have sufficient force of character in our midst to carry a measure like this, or to still blindly yield to circumstances. Can a few gentlemen in London form a committee to receive general expression on this subject?

Warwickshire. A REFORMER.

Sir.—I quite agree with "Revolutionist" in his statement that chemists' assistants taken as a class do not receive a proper remuneration for their services.

The business of his employer seems to be in a flourishing condition, as shown by the number of prescriptions dispensed weekly; so his master ought to have been able to afford to pay his assistant well.

But I have noticed that chemists who do the most dispensing, and necessarily obtain the largest profits, pay their assistants the worst.

A friend of mine, a Major man, lately took a situation with a large firm at £35 per annum. I had occasion to advertise for a situation about a year and a half ago, and another firm offered me the same sum. No doubt this state of affairs is brought about in a great measure by the assistants themselves, who, not being satisfied with their own capabilities to get a living, starting upon the same footing as others, must do the jackdaw business, and take some of the peacock's feathers to make a better external show, putting up over their establishments "From Dash and Dash's," etc., etc. Perhaps also the masters themselves are a little blind to their own interests in not giving a larger salary to the assistant, therefore driving him into business on his own account, and he often takes for want of capital one of those small pharmacies we see advertised—*e.g.*, in the Journal of May 28 some may be seen offered at £350, £130, and £50—where to obtain a living he must go in for cut-throat prices, and therefore a disadvantage to the trade in general, whereas if such an assistant had received fair pay he would have been content to have remained in his former capacity. Another reason, perhaps, why we do not get our share of the loaves and fishes is because there is such a surplus of us in the trade, and "Revolutionist" has himself done the right thing to benefit us, that is, leaving the trade. Could he not prevail upon some others to follow his good example?

An Assistant and M.P.S.

The Exhibition.

Sir,—We shall refrain from indulging in any lengthened comment on the letter from "One of the Committee," which appeared in your last issue.

Our complaint was that we were prohibited by the Committee from contributing to the Exhibition specimens of certain chemicals which other firms were allowed to exhibit. Your correspondent has not attempted to justify this principle of "selection."

After consuming three long paragraphs in dilating upon exhibitions in general, he commences to quibble about the precise wording of the resolution of the Committee as quoted in our previous letter, and he at length succeeds in discovering a distinction where there is no difference.

He then falls foul of the terms in which we described our proposed exhibit, inasmuch as we simply asked leave to send "crystals of iodine" instead of "large crystals of iodine."

We were unfortunately ignorant of the fact that the absence of adjectives was fatal, or we should have endeavoured to supply ourselves with a few appropriate epithets. Surely, however, "One of the Committee" might have accorded us some modicum of modesty, however much he may despise that quality himself.

We are by no means wanting in our appreciation of the labours of the Committee, and when we reflect upon the enormous amount of work and anxiety which must have been involved in the process of deciding between the conflicting claims of no less than thirteen applications, which, as your correspondent tells us, were actually received before April 21, we marvel that even "One of the Committee" has preserved his mental equilibrium.

We pass by the concluding paragraph of your correspondent's letter, remarking only that we trust his *confrères* in the Council will consider that its delicate insinuations reflect credit upon the responsible member of what should have been an important Committee.

Fletcher, Fletcher and Stevenson.

Glycerinum Acidi Gallici.

Sir,—The paper on "Pyrogallic Acid," by Mr. Thorpe, in a recent issue, should direct the attention of pharmacists to the official glycerinum acidi gallici. In Squire's 'Companion' it is stated that gallic acid is soluble with heat in 5 parts glycerine; also that in the B.P. solution, which is made with 4 parts, "part separates after cooling and remains undissolved."

Bearing this in mind, I have made it extemporaneously when required; which has occurred several times lately; and I have noticed a precipitate at the bottom of the bottle when brought back to be replenished.

On the last occasion, however, the absence of this, as well as a remark from my customer on the extraordinary staining properties of the medicine, led me, after reading Mr. Thorpe's paper, to the conclusion that in my desire to send out the preparation of full strength, I had carried the heat applied to the point of converting some of the gallic acid into pyrogallic.

The application of the colour test with milk of lime, described in Attfield, confirmed this impression.

Without entering upon the exact therapeutic effect of pyrogallic acid, which indeed is unknown to me, I would urge that it is desirable to bring about such an alteration at the next pharmacopœial revision that sufficient menstruum may be used to render the solution permanent, and to avoid any risk of the chemical change I have described.

Dover. J. F. Brown.

The Testing of Olive Oil.

Sir,—We must express our regret that we have caused the loss of so much of Mr. Conroy's valuable time, but we were not unnaturally under the impression that any process fully described in a work of the nature of Cooley's 'Practical Receipts,'—a work cited twice in the very page of the Journal in which Mr. Conroy's letter appears—could but be well known. Perhaps, however, 'Cooley,' is not of a sufficiently scientific nature to find a place in Mr. Conroy's chemical library.

On comparing the process there described with that recently published it will be seen that the only points of difference are the relative proportions of acid and oil, and the point at which the experiment is arrested.

To our minds, it seems that shades of colour are much more appreciable in clear liquids than in semi-solid masses. In conclusion we are sorry that Mr. Conroy did not understand that the experiments to which we referred were only part of a series we have undertaken during the last eight or ten months, but which we have now almost completed. In anticipation, however, of more detailed remarks we may say, that with three or four exceptions, all the oils occurring in commerce give reactions when treated by this method of Hauchecorne's, and that these reactions are in some cases so peculiar as to be almost characteristic of certain oils.

Bristol. F. W. and A. F. Stoddart.

[*** We think Messrs. Stoddart's original criticism of Mr. Conroy's recommendation of a test for the purity of olive oil was unnecessary, since Mr. Conroy merely stated the result of his own experience, and further since his mode of operating was certainly different from that ascribed to Hauchecorne.—Ed. Pharm. Journ.]

J. Hutchinson.—*Amelanchier vulgaris.*

Assistant (who should have sent his name and address), will find information on the subject in the present volume, before, p. 250.

Erratum.—In the notice of the Half-Crown Microscope shown in the recent exhibition (before, p. 954), the maker is spoken of as Messrs. Rae, of Anerley, instead of Mr. C. S. Rae, of Allesley, near Coventry.

County Chemist.—The Bill is not yet been issued. No doubt it will receive the attention of the Council if it ever arrives at that stage.

Minor should study one or more of the standard works upon food.

F. J. Field.—Your question is not explicit, as you say nothing as to the colour desired. Probably experiments in the direction of the tar colours would be successful.

Inquirer.—We cannot read your question.

Aurum.—Probably the article you refer to is the finely divided gold obtained as a precipitate by mixing a solution of chloride of gold with a solution of ferrous sulphate.

Ferrum.—We do not know of anything better.

Aqua.—A sufficiently approximative result may be obtained by ascertaining the quantity of calcic carbonate precipitated by boiling.

W. J. S.—We think that your informant was correct.

W. F. G.—We think it probable that a zinc trough would be acted upon.

Professorial Certificates.—We have received from Messrs. Lloyd and Co. a letter on the subject which has been dealt with by Professor Attfield and Mr. Percy Wells, in the last two numbers of the Journal, but as to the composition of their article we cannot recognize any obligation to publish their answer to Mr. Wells's opinion, which must be taken for what it is worth. As to the other point they refer to, opinions differ, and as we cannot undertake to decide between them, Messrs. Lloyd must be content that, as they say, Professor Attfield "indignantly repudiates" having given their article a "puff."

Communications, Letters, etc. have been received from Messrs. Thresh, Rae, Madsen, Parker, Baker, Country Chemist.

JAPANESE AND CHINESE ACONITE ROOTS.*

BY DR. ALEXANDER LANGGAARD,

Academy of Medicine, Tokio, Japan.

(*Concluded from page* 1025.)

3. 勝山附子 "Katsuyama-bushi." (Fig. III. *a* to *f*.) These are tubers likewise grown in Japan, which come into commerce from Katsuyama, and are named after that place.

Fig. III. *a* and *b* shows the tubers ½ natural size. They are conical or napiform, dirty grey or yellow brown, soft, tough, covered with an earthy saline crust, bear scars of secondary tubers that have been cut off, are strongly wrinkled, shrivelled, and have a cortex that readily exfoliates. The largest, covered with numerous warty excrescences, resemble on their exterior the smaller "Daibushi." They are 18 to 38 mm. long and weigh 4·1 to 14·7 (average 8·8) grams. They are almost always worm-eaten.

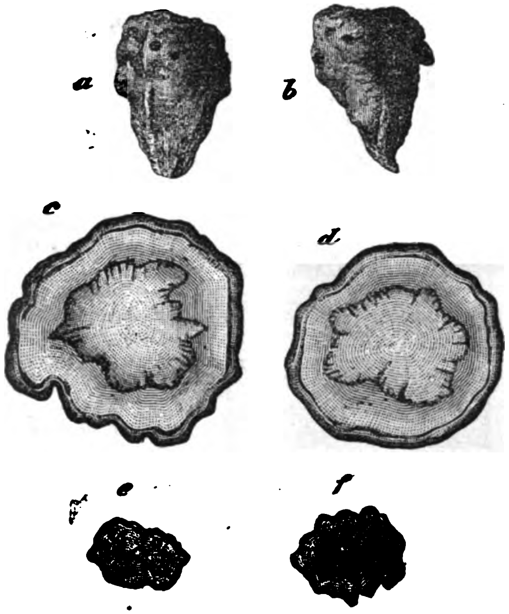

Fig. III. *a* and *b*, Katsuyama-bushi, ½ nat. size. *c* and *d*, Transverse sections, soaked in water, 1½ times magnified. *e* and *f*. Transverse sections, ½ nat. size.

The transverse section, of a light clay colour, is tough or horny, and shows after steeping in water a dark closed almost circular cambium ring, drawn out towards the cortex in sinuses or undulations, but not star-shaped, and enclosing a medulla more than double the width of the cortex (fig. III. *c* and *d*). In other tubers the cambium ring is star-shaped (fig. III. *f*). Finally, some are met with also in which the cambium ring is wanting; the vascular bundles lie scattered and separated from one another by a denser tissue (fig. III. *e*). The cortex is fissured. Examined microscopically it presents no special characters.

Forty grams of tubers yielded 4·63 grams = 11·57 per cent. of alcoholic extract.

Experiments on rabbits showed that the tubers are almost inert. Two or three cubic centimetres of a solution of extract prepared in the manner stated, per kilogram of rabbit, may be injected without any result.

The origin of these tubers is unknown to me. Whether we have here to do with the tubers of a non-poisonous species of aconite, or whether the tubers are made inactive by too conscientious preparation, cannot be determined with certainty. Probably the latter is the case. Extracts of the tubers, indeed, give an alkaloid reaction, but the appearance of the tubers points to a preparation energetically carried out. It is remarkable that these tubers are frequently used as a substitute for "Daibushi," which latter, as has been stated above, shew a decided, though somewhat weak aconite action.

4. 白川烏頭 "Shirakawa-uzu." (Fig. IV. *a* to *f*.) Called after a locality, "Shirakawa." The tubers present an appearance essentially different from all those previously described. They are long napiform, gradually tapering tubers, without remains of stem, frequently pressed somewhat flat, here and there curved, with the points cut off and consequently ending broadly truncate, wrinkled longitudinally, with a warty surface, and bearing the scars of adventitious tubers that have been cut off, of a dirty grey colour, coated with an earthy saline crust, soft, tough to cut, strongly hygroscopic, and having a saline taste that afterwards becomes acrid and burning (fig. IV. *a* and *b*). The transverse section (fig. IV. *c*) is nearly oval, grey-white, fatty and fibrous. The cambium is drawn out into numerous radiations or points, the separate points being obtusely rounded. The medulla is large and in the centre of a dark grey colour.

Examined microscopically, the outer layer of bark appears to consist of two or three rows of pressed-together, thick-walled brown coloured cells. The middle layer, consisting of five to seven rows of tangentially elongated cells, shows scattered stone-cells, and is separated from the inner layer by a cellular sheath formed of square yellow cells. The inner bark, in its outer layer, consists of tangentially elongated cells; towards the centre, these become more roundish polyhedral, but in the interspaces between two neighbouring points are elongated radiantly. The fibro-vascular bundles, consisting of four to eight vessels arranged in rows, are separated from one another by medullary rays which are thus allowed to penetrate to the bark. The vessels themselves are scalariform vessels, provided with transverse walls, and frequently curved like a knee. The medulla consists in the centre of large polyhedral cells; where it fills up the points, the cells are much elongated radiantly. The cells of the bark and of the medulla are filled with starch (fig. IV. *e* and *f*).

Besides tubers with the transverse section described, some are met with in which the cambium ring does not radiate so far; the medulla is smaller, scarcely attaining to the thickness of the inner bark layer, in which stand three to twelve vascular bundles arranged in a circle, and separated from one another by a denser tissue (fig. IV. *d*). Examined microscopically these tubers show a structure similar to that described under "Daibushi."

25 grams of tuber yielded 5·58 grams = 22·32 per

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* Translated from the *Archiv der Pharmacie* (vol. xv., p. 161), to the Editor of which Journal we are indebted for *clichés* of the original engravings.

cent. of alcoholic extract, containing much common salt.

1·2 c.c. of a solution of extract was subcutaneously injected at 10.52 o'clock into a black rabbit weighing 1200 grams, corresponding to 1 c.c. of solution or 0·22 gram of extract per kilogram of rabbit. Some minutes after the injection there was much restlessness, the animal licking the place of injection. After eight minutes movements of the jaw set in, then salivation and difficulty of breathing, which increased to a most intense dyspnœa. The heart pulsated irregularly, but strongly; 50 minutes after the injection the respiration was again regular, without dyspnœa; the heart contractions were still irregular, but the pulse was not marked. About 12 o'clock the animal sat in a squatting position. At 12.20 the heart still pulsated irregularly. Favourite food was not eaten. Next morning the animal had become perfectly lively.

Upon the origin of these tubers, I am not in a position to give any information. They are, however, likewise prepared and salted. In their action they behave nearly like "Daibushi," and are said to be used in their place.

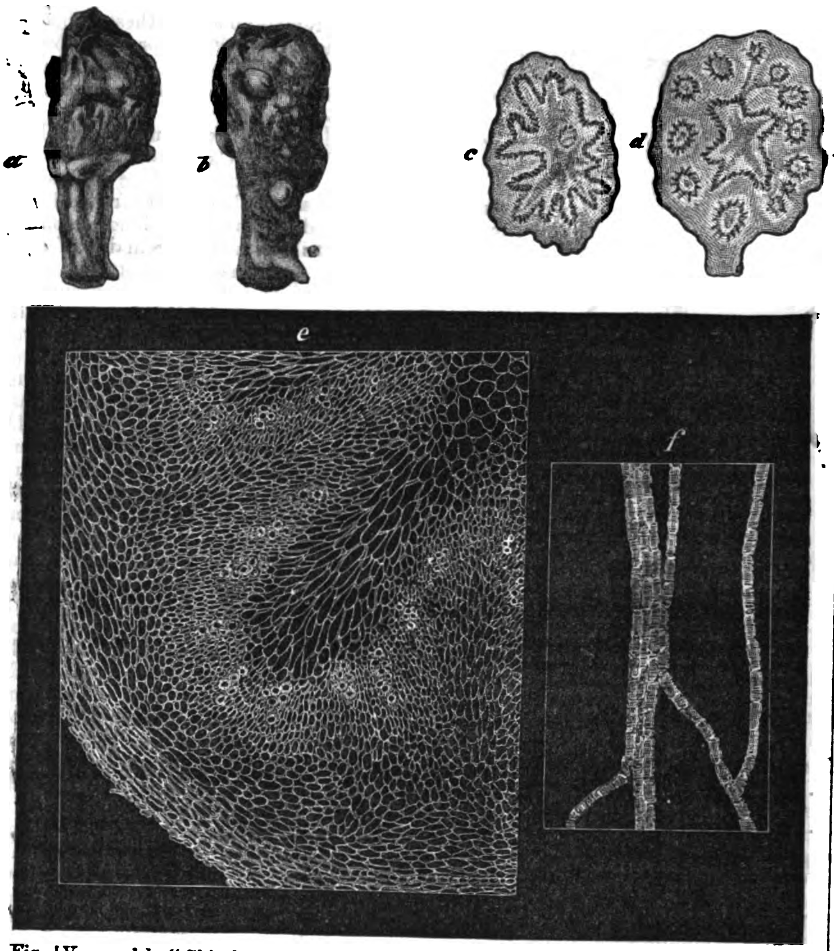

Fig. IV. *a* and *b*. "Shirakawa-uzu," ½ nat. size. *c* and *d*, Transverse sections of the same, soaked in water, 1½ times magnified. *e*, Microscopic transverse section, with starch granules removed by potassium hydrate. *f*, Vessels.

From this kind also I obtained two alkaloids; one crystalizing easily from ether, the other non-crystalline, and prepared as a hard colourless varnish.

5. 草烏頭 "Kusa-uzu." (Fig. V. *a* to *m*.) The description of these tubers I have already given in another place.* For the sake of completeness I give it here again, as follows:—"They are small napiform tubers, gradually tapering, mostly running to a point, seldom ending obtusely, frequently pressed somewhat flat in the upper part, and slightly crooked. They are of a grey-brown colour, generally strongly wrinkled longitudinally and transversely, seldom smooth, frequently bearing the remains of stalk and the scars of adventitious tubers that have been cut off, worm-eaten, 1·5 to 3·5 centimetres long, 0·8 to 1·5 centimetre broad in the greatest diameter, and weighing 0·7 to 1·3 gram. The transverse section is yellowish or pure white, mealy in a few examples, horny, and then of a dirty grey colour. The bark, ¼ to ⅓ of the diameter, is separated from the medulla by a darker, seldom brown, generally in some places somewhat stellate, cambium ring. In powdering the tubers, the dust provokes intense sneezing, and causes burning of the nose and lips, followed by dryness. Occasionally separate vascular bundles are met with scattered in the inner bark layer. Fig. V. *a* shows a specially large specimen. The shape resembles, in fact, that of a bird's head, and perfectly justifies the designation "Uzu," or the head of a cormorant.

The microscopic structure is shown in fig. V. *l* and *m*. *l* gives the structure of the tuber with the drawn out cambium ring; *m* that of the tuber with the round medulla. The latter is distinguished by the large number of stone-cells and the distinct medullary rays.

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* Virchow's 'Archiv,' vol. lxxix., p. 229:—"Ueber eine Art japanischer Aconitknollen, Kŭsa-ŭsŭ genannt, und über das in denselben vorkommende Aconitin."

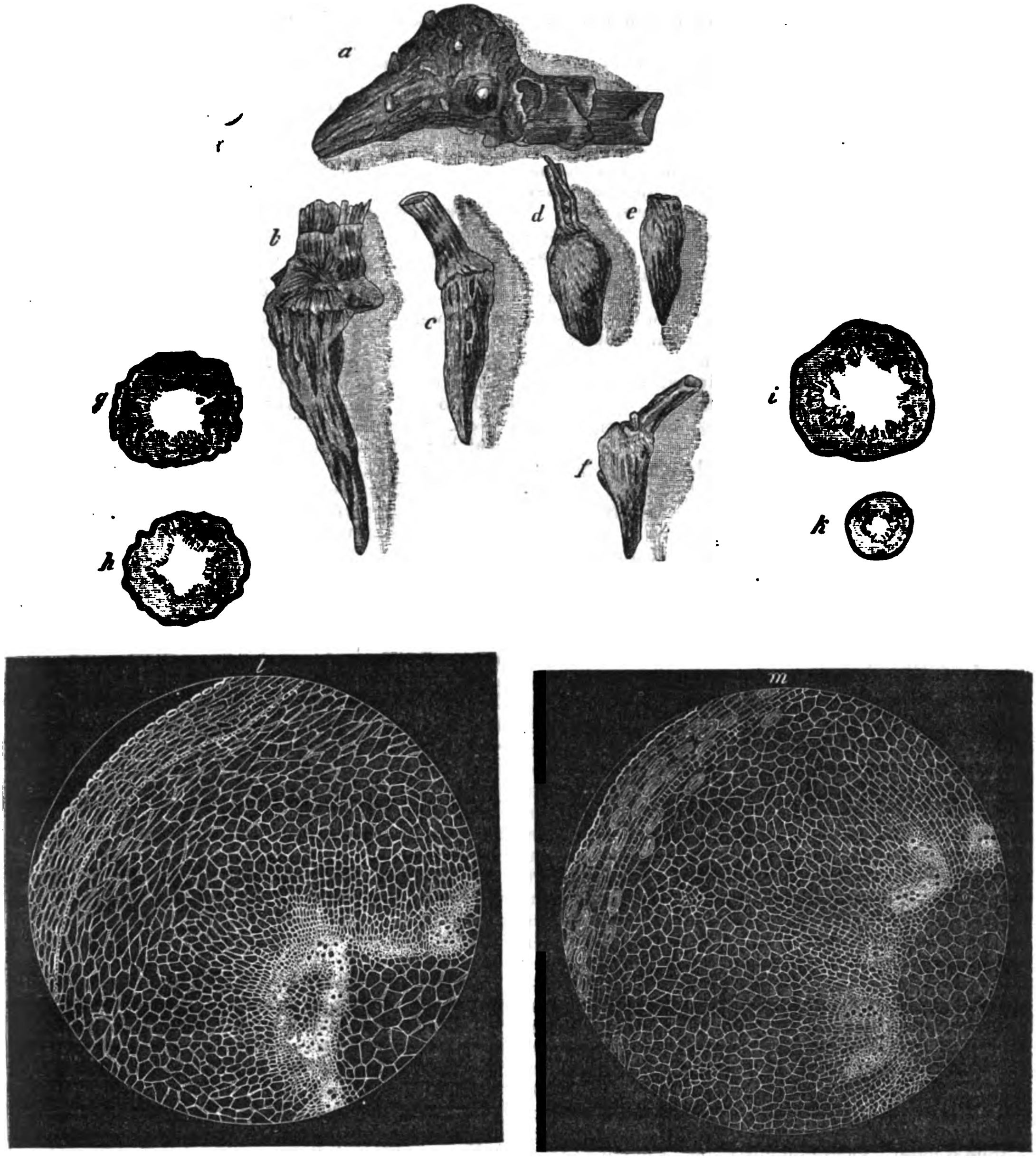

Fig. V. *a* to *f*, "Kusa-uzu." *g* to *k*, Transverse sections, soaked in water, 1½ times magnified. *l*, Microscopic section of *h*; *m*, Microscopic section of *k*. *l* and *m* treated with potassium hydrate.

50 grams of tubers yielded 4·07 grams=8·14 per cent. of alcoholic extract.

The enormous toxic power of these tubers appears from the following experiment:—At 12.18 o'clock a white rabbit, weighing 1610 grams, received 3·2 c.c. of a solution of extract, corresponding to 2 c.c. of solution or 0·162 gram of extract per kilogram of rabbit. 12.22, extreme difficulty of breathing; respiration frequently stopping for several seconds. 12.25 and 12.26, convulsions. 12.27, animal lay on its side; respiration rattling and wheezing. 12.28, convulsions. 12.30, long-continued convulsions; opisthotonus; pupils, previously contracted, suddenly dilated to the utmost; breathing ceased; heart not to be heard. Dissection the next morning yielded the results already described.

This strongly poisonous action the tuber owes chiefly to an alkaloid crystallizing easily from ether. Paul and Kingzett attributed to it the formula $C_{20}H_{43}NO_9$. Wright and Luff, who investigated it subsequently and named it "japaconitine," set up the formula $C_{66}H_{88}N_2O_{21}$. Upon boiling with alkalies, according to these authors, it splits up into benzoic acid and a new base having the composition $C_{26}H_{41}NO_{10}$, according to the equation—

$$C_{66}H_{88}N_2O_{21}+3H_2O=2(C_7H_6O_2)+2(C_{26}H_{41}NO_{10}).$$

In the above-quoted work I have shown that this alkaloid belongs to the strongest of poisons. The conclusions to which I came, on the basis of experiments with rabbits and frogs, were as follows:—

(1). It is one of the strongest poisons, exceeding in toxic power aconite and pseudaconitine.

(2). It possesses strong locally irritant properties.

(3). In frogs, it gives rise to spontaneous motions, diminishes the sensibility, and destroys the reflex excitability and conducting power of the spine.

(4). It excites and then paralyses the intramuscular nerve endings, whilst the transversely striped muscle still preserves excitability.

(5). It is a powerful heart poison and kills through paralysis of the heart muscles. Previously, however, the vagus terminations in the heart are first excited and then paralysed. The muscular motor centre is also paralysed. In rabbits, an irritation appears to precede the paralysis of this centre.

(6). The phenomena in the respiratory organs are central in their nature.

(7). In rabbits, the paralysis phenomena observed in frogs are wanting or only faintly indicated; probably because the animal dies too rapidly from heart paralysis.

Besides this crystallizable alkaloid these tubers contain still another non-crystalline varnish-like alkaloid.

Hanbury, in his 'Notes on Chinese Materia Medica,' under "Tsaou-woo," figures tubers which appear to be identical with the "Kusa-uzu" tubers, and v. Wasowicz describes the drug investigated by Paul and Kingzett. Further, v. Schroff has received similar tubers from China in commerce. It appears, consequently, that the Chinese and Japanese tubers are derived from the same species. As I have already mentioned above, in the 'Honzo-Komoku' the "Kusa-uzu" are represented as the tubers of wild growing species. Whether they are derived from one or more species does not appear from the information. The authors named, as well as F. Porter Smith, are disposed to look upon the tubers occurring in commerce as a mixture of several very poisonous species. In reference to the origin of these tubers, I remarked in my work as follows: "I consider them to be the tubers of a species with blue violet flowers, the inflorescence of which always springs in pairs from the axils of the leaves. The helmet is higher, narrower, more curved, and more strongly beaked than in *Aconitum Napellus*; the stalk is thin and smooth; the leaves are deeply incised, not hairy. Frequently two secondary tubers occur, one opposite the other. They are said to come from different mountain districts. I obtained them during my residence this year in the Nikko mountains, where they are met with at about 1600 metres above the sea level. More probably, however, with the 'Kusa-uzu' tubers are mixed those from a species bearing light violet flowers with a slender twining stem, which is called by the Japanese, 'Hanakadzura' or 'Hanadzuru.'"

The best authority on the Japanese flora, Savatier, represents three species of aconite as occurring in Japan:—

(1). *Aconitum Lycoctonum*, L., var. flor. ochroleucis. —Jap. "Reisin-So."

(2). *Aconitum Fischeri*, Reich.—Jap. "Tori Kabouto."

(3). *Aconitum uncinatum*, L.—Jap. "Hana-dzouron."

Aconitum Japonicum, Thunb., has been identified by Miquel also, in his 'Prolusio Floræ Japonicæ,' with *Aconitum Lycoctonum*, and *Aconitum chinense*, Sieb., with *A. Fischeri*. Now those plants which I obtained in the Nikko mountains and described as the mother-plants of the "Kusa-uzu" tubers were called by the inhabitants of the district "Tori-kabuto." According to the above statement these tubers were therefore derived from *Aconitum Fischeri*, Reich. But the same name, "Tori-kabuto," is also given by the Japanese for the same plant which I held to be the mother-plant of "Daibushi" and "Sen-uzu." According to this, "Kusa-usu," "Daibushi" and "Sen-uzu" would consequently have the same origin, which is very improbable, and *Aconitum Chinense*, Sieb., would be united with *Aconitum Fischeri*, Reich. But it in fact appears to be that the Japanese name "Tori-kabuto" is by no means to be referred to one species alone. "Tori-kabuto" means "bird-helmet," a name which refers to the form of the flower and is a generic name like *Aconitum* or "Eisenhut." Hanbury describes his "Tsaou-woo" tubers as "Root of *Aconitum Japonicum*, Thunb." This, according to Miquel and Savatier, who describe *A. Japonicum*, Thunb., as synonymous with *A. Lycoctonum*, is incorrect. Miquel gives for the same the Japanese name "Reisin-Soo." "Rēshin-so," which I have likewise obtained in the Nikko mountains, is certainly *Aconitum Lycoctonum*, the root of which can never be confounded with the tubers of other species. But Thunberg says, in the description of his *Aconitum japonicum*: "Differt ab *A. Lycoctono* (1) foliis tantum profunde trifidis, (2) laciniis incisis, obtusis, rotundato-dentatis." As the Japanese name he gives "Soo-Huso." The Chinese character which is ordinarily read by the Japanese "Kusa-uzu" can, however, also be read "Soo-uzu." "Kusa," grass or herb, is the Japanese synonym for the Chinese "Soo."

I must content myself with having referred to the botanical relations; I am wanting materials for comparison. The final decision I must leave to others who are more competent on this question than I am.

These tubers are only rarely used in medicine, and then mostly externally. Probably the same tubers are used also for the preparation of arrow-poison, of which I recently obtained a small quantity. 0·1 gram killed a rabbit within thirty-three minutes with symptoms like those I have described for japaconitine (Wright and Luff).

According to their poisonous action consequently "Kusa-uzu" and "Sen-uzu" take the first place; then follow "Shirakawa-uzu" and "Daibushi," almost equally powerful, and lastly, "Katsuyama-bushi." In practice, therefore, it follows that only "Daibushi" and "Shirakawa-uzu" can replace one another in use. It will be of interest also to give a comparison of the separate extracts.

"Sen-uzu"	gave	. .	4·92	per	cent.	of extract
"Kusa-uzu"	"	. .	8·14	"	"	"
"Katsuyama-bushi"	"	. .	11·57	"	"	"
"Daibushi"	"	. .	15·00	"	"	"
"Shirakawa-uzu"	"	. .	22·32	"	"	"

The most poisonous extract is yielded by "Sen-uzu" and "Kusa-uzu;" then follows "Daibushi;" the "Shirakawa-uzu" has a somewhat weaker action; and last comes "Katsuyama-bushi" extract.

The Japanese physicians make extensive use of

"Bushi;" they ascribe to it healing properties. It brings fever which is present in the body, but not apparent, to an eruption; it has a stimulating action, allays convulsions, and is diuretic. Its action extends to all parts. It not only drives out disease from the body, but it replaces disease by health. It is therefore used in ague, diarrhœa arising from colds or chills, rheumatism, apoplexy, paralysis, convulsions and dropsy, always in combination with other substances. "Kankio-bushi-to" (decoction of rhiz. zingiberis and aconite), or a decoction of "Kankio" (rhiz. zingiberis), "Bushi" and Kinjin" (ginseng root) are frequently used. Equally much used is a decoction of "Bushi-Mao" (Gramineæ) and "Kanzo" (rad. glycyrrhizæ). "Bushi" is also frequently given in combination with "Shakuyaku" (root of *Pæonia officinalis*).

In the 'Honzo Komoku' there is a caution against confounding tubers which are described as "Haku-bushi" (Jap.), "Teh-futsze" (Chin.), that is, "white Bushi." 白附子 These are the tubers of an aroid, which in external appearance have a certain similarity to "Kusa-uzu," but are easily distinguishable from them by their light weight or through a transverse section.

In my investigations I have been helped in a most trustworthy manner by my assistant, Mr. Shimoyanea, Tokio.

BORNTRÄGER'S ALOES TEST.*

BY RICHARD H. GROVES.

This test, proposed by Hugo Borntrager, appeared in the *Zeitschrift für anal. Chemie*† It is there described as being an easy and very delicate test by which 1 part of aloes in 5000 can be detected. The mode of operating is as follows:—A little of the suspected liquor is well shaken with about twice its bulk of benzene, which is allowed to separate and being carefully decanted is shaken with a few drops of strongest solution of ammonia. This is again allowed to separate, when, if aloes be present, the ammonia solution will be of a beautiful clear red colour. In the case of solids a cold alcoholic solution is made and treated in the above manner.

Thinking that the colour might be due to aloin, I tried the test on some barbaloin, but obtained only a very slight pink colour, which was probably due to the occurrence in the aloin, as an impurity, of traces of the substance giving the colour. This being the case, the next thought that presented itself was whether all the varieties of aloes would furnish the reaction, and if so, to what extent in each case.

The test was accordingly tried on alcoholic solutions of six different varieties of aloes, namely, Barbadoes (first and second quality), Socotrine, hepatic, Cape and Natal. The solutions tested were of 40 per cent., 10 per cent., 5 per cent., 2 per cent. and 1 per cent. strength. In the stronger solutions the colour was too intense for the gradual lessening of colour to be well seen, nevertheless the second quality Barbadoes was always the darkest and the Natal the lightest. The following table represents the results obtained with a 1 per cent. solution, the aloes being arranged according to the intensity of the colour obtained:—

Variety of Aloes.	Results.
Barbadoes (No. 2) . . .	Very red.
Barbadoes (No. 1) . . .	Not quite so red as the former.
Socotrine	
Cape	Red with a tinge of brown.
Hepatic	Red.
Natal	Very slightly red with a tinge of brown.

The colour given by the Natal aloes was so slight that the test would not be at all reliable in more dilute solutions than 1 per cent. The test was also tried on a solution of 1 part second quality Barbadoes in 250, but the colour obtained was not sufficiently distinct to be relied upon as a test. The colour of the benzene solution in each case was greenish-yellow, that which had been shaken with the Natal and hepatic aloes being the lighter.

The idea naturally occurred that it was quite likely that some bodies analogous to aloes would behave in a like manner. Borntrager states that he tried the test on preparations of logwood, wormwood, cinnamon, pimento, colocynth, sweet flag, liquorice, juniper fruits, burnt sugar, etc., but obtained no reaction.

Czumpelik* has pointed out that aloes contains a tannin-like body, and this suggested the application of the test to tinctures of catechu and kino. After shaking with benzene, half was used whilst in a slightly opalescent condition, and gave a bright red colour, similar to that produced by the aloës, but the remainder which was set aside for a day to get perfectly clear gave a very pale yellow colour without any trace of red.

Tannic acid is a known reagent for the detection of alkalies,† and one drop of strong tincture of catechu in a test-tube full of water gave a bright red colour with strong solution of ammonia. This being the case it points to the necessity of always allowing the benzene to become *absolutely* clear before decanting, and great care must be taken that no little globules of the solution are remaining on the surface of the benzene, or attached to the sides of the tube, for if the liquid contain tannin a red colour will certainly result. The results of my experiments point to the following facts:—

First.—That the test could not be relied upon in solutions in which Natal aloes might be present, having a less concentration than 1 per cent., and that in no case can it be used in solutions as dilute as 1 part in 250.

Secondly.—That the colour is not due to aloin, and if due to a tannin-like substance, it must be a variety which *is* soluble in benzene.

Thirdly.—That extreme care must be taken when employing this test for the detection of aloes that the benzene layer is perfectly clear before decanting from the underlying liquor.

The foregoing experiments were carried out in the laboratories of the Society's School of Pharmacy.

THE EARLY MANUFACTURE OF COD LIVER OIL.

The following note has been placed at our disposal by Mr. Thomas Townson, of Bridgwater:—

During my apprenticeship at Manchester, Dr. Bardsley began to prescribe cod liver oil at the infirmary for rheumatism. The article supplied was the oil used by curriers under the name of ling liver oil.

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* Read before the School of Pharmacy Students' Association, June 9, 1881.

† Vol. xix., 165, 1880.

* *Chem. Centralbl.*, 1866, 29.

† *Zeitsch. für analyt. Chemie*, vol. xx., p. 234.

Dr. Jenkins, a German physician, prescribed cod liver oil in London, and the same description of oil was supplied.

In the winter of 1839, passing Billingsgate Market, I saw on one of the stalls a quantity of fine white livers. On inquiring what was done with them I was informed that a few were sold to the poor, some were thrown into a cask to run to oil which was burnt in lamps, and the rest were thrown into the river. I requested them to send a few to Plough Court, which I melted down in a wedgwood ware dish, over a charcoal fire, and strained through a cloth.

On showing a sample of the oil to the late Mr. J. T. Barry, and explaining how I had prepared it, he said if we could make such cod liver oil as that he would not buy any more of such as we were selling, and requested me to make a stock for sale. That season we only made 40 to 50 lbs.

A sample of the oil was shown to Dr. C. B. Williams, who was prescribing cod liver oil extensively, and he was much pleased with it.

The sale very much increased, and we were not able to procure sufficient livers in the London markets to meet the demand.

One Christmas Eve we had 25 cwt. of livers, and I and two of our men were at work from 6 o'clock p.m. until 7 o'clock the following morning.

When we first commenced making oil we were able to pick such livers as we approved of, and the yield of oil was one-half the weight of the livers; but when competition commenced and we were obliged to take them all, the yield was only one-third.

The purity and sweetness of the oil as well as the colour altogether depended upon the freshness of the livers. If they were kept twelve hours before being melted the oil had a yellow tinge and a stronger flavour.

ILLICIUM RELIGIOSUM, *Sieb.*[*]

ITS POISONOUS CONSTITUENT, AND ESSENTIAL AND FIXED OILS.

BY J. F. EYKMAN.

The *Illicium religiosum*, Sieb. (Jap. "Shikimi[†] no ki"), a plant belonging to the family Wintereæ, growing wild in Japan, is generally considered by the Japanese and Chinese, and indeed from the earliest times, to be a poisonous plant, and many cases of poisoning have been attributed to this plant, especially to its fruit. Last year, cases of poisoning also occurred at Leeuwarden, in the Netherlands, through the use of commercial star-anise in the preparation of "anise milk."[‡] According to a report of the Commission which was charged with the investigation of the cause of the poisoning, star-anise fruit is said to have been used in the preparation of the beverage which corresponded in description to the fruit of the Japanese "Shikimi no ki."

Although a chemical investigation was undertaken, the experiment failed to separate any definite poison in a pure state from the suspected fruit. In some comparative, but not very intelligible, analyses of the true and suspected star-anise fruit there was found :—

		True Star-anise.	Suspected Star-anise
Extract	per cent.	11·5	16·0
Green fixed oil . . .	„	3·8	3·1
Resin, insoluble in ether	„	6·65	11·9
This resin consisted of—			
Substance insoluble in water	„	90·5	90·0
Resin insoluble in water .	„	4·2	3·8

The presence of an alkaloid, both in the genuine and the suspected fruit, was established by the general methods for the detection of poison of Dragendorff and Stass-Otto; this alkaloid, however, was not further investigated.

From an acid extract of 250 grams of the suspected fruit there was separated by shaking with chloroform 0·43 gram of a brown substance, which dissolved partially in water, and completely in alcohol. It was further stated that milk boiled both with true and the suspected star-anise was coagulated, and that in an extract of the suspected star-anise which had stood three weeks the poisonous principle appeared to have disappeared.

The symptoms following the administration of the suspected star-anise to different animals, such as dogs, consisted principally of irritation of the stomach, producing vomiting and some diarrhœa. Injection of the extract into frogs mostly caused death. In rabbits the symptoms were, shaking of the head, restlessness, sometimes moving in a circle, acceleration of the respiration, irregularity of the heart-beat, then clonic convulsion, especially in the hinder extremities; a paralysed condition of the hinder extremities followed, leading to violent convulsions and death.

In the same place (*Pharmaceutische Weekblad*, vol. vii., No. 4), it was also stated that Plugge, some years previously, during his residence in Japan, had, at the request of the Director of the Health Bureau there, investigated the different parts of the "shikimi no ki;" but it is not mentioned that he succeeded in isolating in a pure condition the poison contained in it.

In No. 15 of the above-mentioned journal, Geerts communicates some cases of poisoning occurring in Yokohama with the fixed oil of "shikimi" seeds, which in Japan is expressed and used instead of rape oil as a lighting material.

This oil was used in Kanawago in the preparation of food, and had produced in six persons symptoms of poisoning. One died shortly after taking the food, the five others recovered. Geerts communicates the following, in respect to the investigation which he carried out at the request of the Japanese Government :—

"The oil used in the preparation of the food, which was greenish yellow, and had a peculiar aromatic smell, was a thick turbid liquid, with a strongly acid reaction; it yielded when heated with soda-lime 0·3 per cent. of ammonia, derived from the albumenoids present, and contained 6 per cent. of free fat acid. It was administered in a dose of 10 grams to a large dog. After 50 minutes the following symptoms of poisoning were manifested: moving in a circle, vomiting, convulsive movements, repeated vomiting of white froth and bile, difficult breathing, dilated pupils and great restlessness, defecation, and all the symptoms of irritant poisoning. After three hours' quiet the dog drank water, and after about 5½ hours had quite recovered."

The symptoms corresponded consequently with those mentioned by the Leewarden commission. An oil containing less free fat acid, prepared by Geerts himself from one year old seed, caused, in the same dose of 10 grams, similar symptoms, even more strongly in proportion to the percentage of free fat acid found (5·9 per cent). A dose of 2 grams of the powdered seed acted quite similarly, but not so powerfully.

The investigation led to the following conclusions as to the action and nature of the poison :—

(1) The poisoning symptoms of the fixed oil and the seeds of the Japanese "shikmi" consist in repeated

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[*] Translated from the "Mittheilungen der Deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens," vol. xxiii. (Yokahama, 1881.)

[†] Sikimi.

[‡] This beverage is ordinarily prepared from *Pimpinella Anisum*, less frequently from star-anise.

vomiting and other results of irritation of the central nervous system.

(2) No alkaloid could be found with certainty; probably the fixed oil, or the free fat acids (of the oleic acid series) formed the poisonous principle.

On the 29th of October of last year some fresh cases of poisoning became known, which had occurred in Uyeno, and which it was believed were also to be ascribed to "shikimi" seed. The following was communicated to me from the report of two Japanese physicians to the Health Bureau. Five children were on that day found lying in the road in Uyeno Park, foaming at the mouth and violently convulsed. Notwithstanding that all received medical help, three of the children died soon after, whilst both the others recovered quickly. The following are the details of the cases :—

(1) Girl, 5 years 7 months old. Symptoms—Repeated vomiting, convulsions, contracted pupils, blue skin and lips, foaming at the mouth. Treatment—Pulvis ipecacuanhæ, 8 grains, and an enema of soap. After motion, white of egg and sodii sulphas were administered. Result—Rapid recovery.

(2) Girl, 1 year old. Symptoms as above. Treatment—Mixture consisting of chloral hydrate, 8 grains, simple syrup, 4 drachms, given in three doses. Result—Rapid recovery.

(3, 4, and 5) Two boys, 4 and 7 years old, and a girl, 8 years old. Symptoms—Repeated vomiting, convulsions, vomiting of mucus and blood streaks, blueness of visage, lips violet-black and covered with foam, pupils dilated, muscles of the face strongly contracted, limbs cold, pulse and respiration very weak. Treatment—Pulv. ipecacuanhæ, 5 grains; subsequently another dose of pulv. ipecac., 5 grains, and cupri sulphas, 2 grains; this was followed by slight vomiting of mucus and blood. Result—Speedy death.

The opinion that these were cases of poisoning by "shikimi" was based upon the occurrence of a number of fruit-bearing specimens of *Illicium religiosum* in Uyeno Park in the neighbourhood of the place where the children had been playing, and the discovery of some "Shikimi" seed in the sleeves of the dresses and in the vomit of one child and the fæces of another.

These cases of poisoning induced Herr Sensai Nagayo to request me to undertake the chemical investigation, because the isolation of the "shikimi" poison in a pure state had not yet been accomplished, and it was of importance to learn more respecting it. I considered my attention should be directed first to the seed, because these were found in the vomit, and further, the investigation of Geerts appeared to indicate that the poison was to be expected in the oil from the seed.

But as at that time I had not a sufficient quantity of seeds at disposal, I began with the examination of the essential oil. The possibility was not excluded by the foregoing that the poisoning was attributable to the unripe seeds, which contain much essential oil, or at least that they contributed to it. As material for the preparation of this oil 40 kilograms of fresh leaves was taken, and by steam distillation and cohobation this quantity yielded 177 grams of essential oil, or 0·44 per cent. The oil was strongly light-refracting, nearly colourless, faintly yellow; when kept it became somewhat darker. In distillation, part of it sank in the water and part floated on the top; the mixture was heavier than water, and had a specific gravity of 1·006 at 16·5° C. The odour differed from that of ordinary anise and star-anise oil; smelling much more faintly of anise, and otherwise difficult to describe exactly. It recalled laurel, camphor, cajuput and nutmeg, the last being especially perceptible in the distilled water. As to the peppermint-like odour, which has been ascribed by some authors to the "shikimi" leaves, it was not observed, either in the essential oil or distilled water, or in the slightly bruised leaves.

When cooled in a mixture of ice and salt for some time no solidification of the oil took place, or separation of stearoptene, even at a temperature of − 20° C. With a Hoffmann's polarimeter the molecular rotatory power was found to be $[\alpha]_D = -8\cdot6°$.

By fractional distillation from 50 grams of the oil about one-sixth part was obtained as a terpene, having a boiling point of 173° to 176° C., and a sp. gr. of 0·855. With dry hydrochloric acid gas this terpene became a thick liquid, but not solid. The terpene—not perfectly pure, since it showed an anethol reaction—had a rotatory power of − 22·5°.

Secondly, about one-fourth of the oil was obtained as anethol, which did not solidify on cooling, had a boiling point of 231° to 233° C., molecular rotation 0°, and a sp. gr. of 1·048 at 12° C. In the first fractionation there remained at above 290° C. more than 8 grams of a brown extract-like residuum; while in the following fractionation, over 260° C., at which temperature the distillate was coloured yellow through decompositions, a portion of the oil was left as a resinified substance.

Besides its high boiling point and specific gravity, its negative behaviour towards polarized light, anisoine and other colour reactions, and faint anise or fennel odour, the anethol was identified by its oxidation products. Upon boiling it with nitric acid of sp. gr. 1·2 (Cahours) an energetic reaction took place, with evolution of red vapour. A portion of the resulting product remained undissolved as a yellow-brown resinous residue (nitraniside). From the filtrate there separated, after cooling, a crystalline mass, which dissolved in ammonia, and was again precipitated by nitric acid after the greater part of the excess of ammonia had been driven off by evaporation. After washing with water and drying, it partially sublimed in needles, having a melting point of 174° C. (nitranisic acid, anisic acid). The mother-liquor, containing nitric acid, yielded, upon evaporation, a considerable quantity of large colourless crystals, which gave the reaction of oxalic acid. The anethol oxidized with potassium bichromate and sulphuric acid developed distinctly the odour of acetic acid.

The essential oil of "shikimi" mixes in all proportions with absolute alcohol, chloroform, benzol, glacial acetic acid, carbon bisulphide, and fixed oils. In petroleum spirit (b.p. up to 58° C.) it is somewhat difficultly soluble, and it requires of 78·5 per cent. alcohol about 3½ volumes for complete solution. Various reagents behaved towards the oil as follows:—

Chloral reagent: colourless; afterwards dirty brown-yellow.

Brom-chloroform (1:20): colourless; afterwards green-blue; finally dirty bluish.

Alcoholic hydrochloric acid: colourless; afterwards a beautiful blue.

Concentrated sulphuric acid: (with development of heat) dark red; afterwards purple-red.

Fröhde's reagent: similar to sulphuric acid.

Fuming nitric acid: without action in the cold; upon gentle warming, orange-red.

Picric acid: dissolved in the cold to a yellow-red liquid.

Ammoniacal silver solution: slowly reduced, with separation of silver.

Iodine: gave no puffing.

Tannin: did not dissolve.

Sodium: slight evolution of gas, with browning and thickening of the oil.

Hager's reagent: like sulphuric acid; upon the addition of the alcohol a dark wine-red solution resulted, with a little reddish-white deposit.

Dry hydrochloric acid gas: beautiful violet-red, afterwards a beautiful blue.

Ten drops of the oil with sixty drops of alcohol and anhydrous ether (distilled over sodium and giving no reaction with anthraquinone) and about 150 grams of sodium: immediately a beautiful greenish-blue; after some hours this colour passed to yellowish, whilst the sodium became coated with a yellow layer.

The difference between the essential oil of the leaves of *Illicium religiosum* and other oils containing anethol used in medicine,—such as oleum anisi vulgaris and stellati and oleum fœniculi—are shown in the following table:—

·	Ol. Anisi vulgaris.	Oleum Fœniculi.	Ol. Anisi stellati.	Ol. Illicii religiosi.
Constituents. . .	Chiefly solid and liquid anethol.	Small quantity of terpene boiling at 190° C., and liquid and solid anethol.	Chiefly solid and liquid anethol.	Rather much of a terpene boiling at 173° to 176° C.; liquid anethol boiling at 232° to 233° C.
Melting Point . .	+6° to 18° C.	−2° to +18° C.	About 0° C.	Not solid when cooled 20° C.
Specific Gravity .	About 0·903.	0·94 to 0·998.	0·978.	1006.
Molecular Rotation	0° to +0·5°.	+13° to +19·6°	0° to −0·4.	−8·6°.
Alcoholic Hydrochloric Acid.	Colourless, afterwards reddish, then pale red.	Colourless.	Colourless.	Colourless, afterwards blue.
Chloral Reagent .	Colourless, afterwards yellow and brownish.	Colourless, then beautiful red.	Colourless, then beautiful red.	Colourless, afterwards dirty brown-yellow.
Ammoniacal Silver Solution.	In 24 hours no reduction.	Like ol. anisi vulgaris.	Like ol. anisi vulgaris.	Reduction in a few hours.
Hager's Reaction .	In alcohol, a portion of the sulphuric acid and oil mixture remains undissolved as a thick mass adhering to the sides of the tube.	Mixture of oil, sulphuric acid and alcohol is perfectly clear.	Like ol. anisi vulgaris.	Mixture is nearly clear; separation of a little reddish-white deposit.
10 drops of oil, with 60 drops of ether and about 0·150 gram of sodium.	Colourless; after 4 hours the mixture nearly colourless; deposit yellowish-white.	——	Colourless; after 4 hours liquid and deposit yellow.	Colourless; quickly bluish; after 4 hours liquid pale yellow, deposit yellow.

In order to ascertain the action of the oil various experiments were made with rabbits, to which it was given internally. In small doses of 2 to 5 grams it caused much acceleration of the heart's action and of respiration, afterwards weakness and lowering of the body temperature and respiration, increased flow of saliva, impediment to power of sight, paralysis, especially in the hinder extremities. A dose of 5 grams produced stiffness for several days, complete recovery, however, following. With doses of 8 to 10 grams the same symptoms were observed, but following more rapidly one upon another; in a few hours convulsive movements appeared, nearly complete paralysis of the extremities; afterwards collapse, death taking place within twelve to twenty-four hours. Diuresis was not observed.

Although these symptoms of poisoning correspond with those of essential oils generally, especially those containing anethol, the oil appears to act deleteriously in somewhat smaller doses than, for instance, ordinary oil of anise. The explanation of this is probably to be sought in the larger proportion of terpene contained in the essential oil of "shikimi."

From the large dose of about 10 grams, which given internally to rabbits are to be taken as fatal, it follows that the poisonous property of the air-dried fruit, which only contain a little essential oil, and that of the seeds and of the fixed oil expressed from them, which contain still less, cannot be attributed to the essential oil. According to the statement of Geerts 10 grams of the fixed oil sufficed to produce vomiting, convulsions, etc., in large dogs, and according to the Leeuwarden Commission 15 grams of the dried fruit sufficed to kill rabbits.

A further investigation of the seeds consequently appeared to be demanded for the discovery of the poison. I obtained, therefore, 2 or 3 kilograms of seed, collected in the previous autumn. A sample was freed from the testa, and with the kernels, which contain the fixed oil, the following experiments were made:—3 grams were given to a young dog. In a short time symptoms of poisoning set in, which generally and with a sufficient dose of the poison consisted of disquiet, sometimes strong barking, and frequent scratching of the belly and chest with the hind legs; then followed spasmodic yawning, with twisting of the head and tongue, salivation and foaming, strong spasmodic movements of the muscles of the stomach, vomiting in many cases several times repeated, sometimes defecation, diuresis, strong convulsive movements of the extremities, tetanic spasms, afterwards collapse and death.

The seed-kernels were consequently further examined. A quantitative estimation of the oil, extracting it by means of petroleum spirit, gave the percentage of fixed oil as 52·02 per cent. The weight of the kernel in proportion to the testa was as 58·6 : 41·4, which gives the proportion of fixed oil in the "shikimi" seed as at least 30·5 per cent.

The fixed oil was a clear, thick liquid, without any special smell, and had a pale yellow colour, which upon warming the oil almost entirely disappeared. It had a specific gravity of 0·919 at 16·5° C. It dissolved in all proportions in petroleum spirit, chloroform, ether, benzol, and carbon bisulphide; very slightly in cold absolute alcohol and glacial acetic acid, in about 15 parts of boiling absolute alcohol and 2·5 parts of boiling glacial acetic acid.

The oil contained no free fat acid; the alcoholic solution was perfectly neutral. Cooled to 0° C. it did not show the least solidification. Upon further cooling it thickened gradually, was opaque white at −7° C., but at −20° C. had not yet become quite solid, possessing at the latter temperature the consistency of butter and a wax-like white colour. It belonged to the non-drying oils and gave with the elaidin test yellowish-white elaidin, without, however, becoming perfectly solid. Twenty-five grams of the oil with 5 grams of concentrated sulphuric acid gave a dark red-brown mixture, the temperature of which rose 1—35° C., and which mixed with water yielded a white magma. Strong nitric acid or a mixture of equal parts of nitric and sulphuric acids produced no change of colour. Nitric acid containing nitrous acid was, however, coloured a beautiful bright red. With strong soda solution it was easily saponified. From 280 grams of oil I obtained 265 grams of a mixture of fat acids melting at 31° C.

Two grams of this oil was now given to a small dog. Beyond slight disquiet no other symptom of poisoning was observed. On the other hand, 2 grams of the seeds deprived of oil produced the symptoms described above in a high degree. Through a timely dose of 0·5 gram of chloral hydrate* death was prevented.

Through these experiments it was consequently demonstrated that the "shikimi" poison is not an essential constituent of the oil, and consists neither of the free nor combined fat acids, as was thought by Geerts.

The toxic property of the oil examined by Geerts must therefore be referred probably to the admixture of a small quantity of the active poison contained in the seed powder, which in the warm pressing passed into the oil; the large quantity of fat acids may probably have contributed to this.

The remaining 8 grams of powdered seed deprived of oil was macerated for some days in a displacement apparatus with 75 per cent. alcohol, containing 1 per cent. of acetic acid, and after running off the liquid displaced with 75 per cent. alcohol. The extract was coloured red by a colouring matter, which had its seat principally in the tunica interior. The entire quantity of the residual powder (about 5 grams) given to a dog produced not the slightest symptoms of poisoning; on the other hand, one-fourth of the percolate, after evaporating and re-dissolving in water, mixed with rice and flesh, produced in a dog strong symptoms of poisoning. The remainder of the percolate, into which therefore the poison had completely passed, was mixed with acetate of lead; the grey-white precipitate was filtered off, and washed with spirit. From the filtrate, as well as from the precipitate suspended in alcohol, the lead was removed by means of sulphuretted hydrogen. After evaporation of the alcohol both residues were examined as to their toxic property, which showed that the poison was not precipitated by acetate of lead. The evaporation residue from the lead precipitate was treated with water. The filtered solution gave a precipitate with gelatine and albumen, but not with solution of tartarated antimony. Gold chloride gave a strong turbidity with rapid reduction. Ferric chloride caused turbidity with a dark green-blue colour. The seeds consequently contain a tannic acid, agreeing in its properties with the tannic acid of the chestnut and rhatany. It is probably this tannic acid which caused the coagulation of milk boiled with "shikimi" fruit, as mentioned by the Leeuwarden Commission. The husk of the "shikimi" fruit doubtless also contains a tannic acid, since in its unripe condition it possesses a tolerably strong astringent taste. Meissner found also a tannin substance in the true star-anise fruit as far back as the year 1818. He gives the following numbers of an analysis of the carpels and seeds of true star-anise:—

Carpels.	Per cent.	*Seeds.*	Per cent.
Esssential Oil . . .	5·3	Essential Oil . . .	1·8
Benzoic Acid . . .	0·2	Fat Oil	17·9
Green Fat Oil . . .	5·6	Tallow-like Fat Oil .	1·6
Resin Insoluble in Ether	20.7	Resin Insoluble in Ether	2·6
Extractive, Tannin Substance, Salts, etc.	5·1	Extractive Matter . .	4·1
		Gummy Extractive Matter	23·0

The amount of fat oil is consequently smaller in the true star-anise than in the "shikimi" seed, in which I found 30·5 per cent.

The entire quantity of seeds (about 2½ kilos.) was then operated upon; the kernels were almost completely freed from fat with petroleum spirit, and then exhausted as before by percolation with 75 per cent. alcohol containing acetic acid.

The percolate was evaporated; the residual extract was warmed with some glacial acetic acid, and to the mixture chloroform was added gradually until it caused no further separation. The chloroform solution, which was only faintly coloured yellow, was filtered off, and the operation was repeated several times upon the residue. From the united liquid the chloroform was distilled off, and the acetic acid evaporated; there remained an amorphous yellow residue, which physiological experiment showed to contain the poisonous principle. Suspended in warm water, it swam in it like clear yellow oil drops. Upon cooling, it became solid and gum-like, and dissolved with difficulty in water. The aqueous extract showed a strong acid reaction, and gave a white turbidity with iodide of mercury and potassium. Heated with hydrochloric acid a blue-violet to greenish colour resulted, with the development of a characteristic odour. As after some time it showed no crystallization, a further purification was attempted.

As in the physiological experiment the poisonous principle proved to be soluble in water, the amorphous residue was extracted with a little water, which left a considerable quantity undissolved. After filtration it was shaken once with petroleum spirit, the separated watery liquid treated with potassium carbonate, and then shaken with chloroform. The chloroform separated from the watery liquid left upon evaporation a small yellow amorphous residue. Two small samples of this substance treated with dilute mineral acids, and left for some time, showed under the microscope crystals, among which rhombic plates occurred.

The entire quantity (1·5 gram) of amorphous substance was therefore treated with hydrochloric acid and placed in an exsiccator. The next day several wart-formed crystalline agglomerations had separated. Of these some were removed from the liquid, and dissolved in boiling water, and the filtrate, mixed with flesh and rice, given to a large dog. After ten minutes the ordinary symptoms were manifested; the stomach and duodenum were completely emptied by vomiting, but the dog died nevertheless, after strong convulsions, within a hour and a half.

The crystals consequently appear to contain the poison in a purer condition: but as they were still a little yellow they had to be submitted to a further purification. Nearly the entire remainder of the crystals was used, in order to obtain through repeated recrystallization from water a sufficient quantity of perfectly colourless crystals for physiological experiment.

After a considerable loss of material about 25 milligrams were obtained, of which about one-half, dissolved in boiling water and mixed with rice and flesh, was given to a young dog. The following symptoms were observed:—

After ten minutes: Disquiet, strong barking, twisting of the head and of the tongue in the opened mouth, scratching the stomach and chest with the hinder extremities, afterwards crossness.

After fifteen minutes: Violent cramps of the muscles of the abdomen with disposition to vomit, tetanic convulsions with simultaneous extension of the four extremities, stronger flexion of the head towards the back, and convulsive yawning, formation of foam, vomiting of a brown slimy mass, starting forward, sudden turning round of the entire body, afterwards strong convulsions in the extremities, then paralysis, lastly collapse and death after three hours.

From this experiment I consider I may draw the conclusion that from "shikimi" fruit can be separated a crystalline substance which is one of the most powerful of poisons; this I have provisionally named "sikimine," until its identity with a known substance can be established. Under the microscope it shows stellate-grouped pointed crystals; also in one case prismatic forms were observed.

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* By a communication from Mr. Sensai Nagayo I became aware that Dr. Langgaard had used chloral hydrate as an antidote to poisoning of animals with "shikimi" fruit with good results. As before mentioned, in two of the cases of poisoning at Uyeno, chloral hydrate was administered with good results and rapid improvement.

Upon the properties of sikimine I can only communicate the following very imperfect information, because the experiments could only be made with very small quantities.

The crystals are hard, heavy, dissolve with difficulty in cold water, better in hot water, ether and chloroform, easily in alcohol and glacial acetic acid, do not dissolve in petroleum spirit, nor in alkalies markedly better than in water. They do not reduce alkaline cupric solution, even at boiling temperature, nor after boiling with dilute sulphuric acid.

The still somewhat impure crystals melt at about 175° C. If heated more strongly they become red-brown and diffuse a peculiar odour and finally carbonize without leaving the least fixed residue. A small quantity submitted to sublimation between two watch glasses yielded a small quantity of oily sublimate, which did not crystallize from aqueous solution. The aqueous solution gave with iodide of mercury and potassium a faint turbidity which disappeared with excess. The solution in chloroform left on evaporation only an amorphous residue. In a small specimen no nitrogen could be detected.

(*To be continued.*)

THE INFLAMMABILITY OF VEGETABLE SUBSTANCES BY NITRIC ACID.*

In consequence of the burning of a freight car during the autumn of 1879, on one of the railways in Baden, which was suspected to have been caused by nitric acid, Professor R. Haas, of Carlsruhe, was called upon by the Government to report whether that acid could produce combustion or not. In the experiments made to solve this question the conditions which might be supposed to exist in freight cars containing nitric acid were imitated as far as possible. Small boxes of a capacity of 10 to 16 quarts were charged with variable proportions of hay, straw, tow and blotting paper—all of which substances are used in packing—and placed within larger boxes, while the space between them was filled with hay or tow, to prevent too rapid a radiation of heat, because the experiments were to be conducted in the open air, and the outer box at the same time represented the walls of a railway car. The material contained in the inner box was now saturated with acid, and rather tightly compressed, so that when the cover was put on it was pretty well filled. At first reddish and afterwards whitish vapours were given off, finally a distinct smoke. On lifting the cover, strongly glowing patches could be seen, which rapidly increased all through the contents, and which broke out in bright flames on access of free air or gentle fanning.

With red fuming acid, or with acid of sp. gr. 1·48, these results were obtained very rapidly and within a few minutes. With ordinary acid, of sp. gr. 1·395, it required somewhat more time, and the action was less energetic in the beginning; but, in three different trials, after about twenty minutes the same result was finally obtained, provided the material was packed tightly in the box, and was thoroughly saturated in its successive layers.

It seems quite probable that even a weaker acid can produce the same result in larger bulk and during warm weather in a confined space which prevents rapid cooling. Hitherto it has often been doubted that spontaneous combustion could be caused under such circumstances, but the above experiments and results are certainly incontrovertible.

CORRESPONDENCE ON THE SALE OF OXALIC ACID.

The following is the correspondence that passed between the President of the Pharmaceutical Society and the Coroner for Middlesex upon this subject:—

"*27th May*, 1881.

"Sir,—Assuming the report of the inquest held by you at the Clerkenwell Coroner's Court into the circumstances attending the death of Harriet Lambert, as reported in the *Clerkenwell Press*, to be correct, I feel it my duty to point out to you that you are clearly in error in your reading of the Act of Parliament relating to the 'sale of poisons.'

"All the poisons in the whole of schedule A. to the Pharmacy Act, 1868, are to be sold subject to certain conditions, viz.: That the proprietor of the shop at which they are sold must be a registered chemist and druggist; that the article must be labelled with the name of the article, the word 'poison' and the name and address of the seller.

"In addition to these conditions the poisons in part 1 of the schedule may only be sold to a person known to or introduced to the seller, and the sale must be entered in a book kept for that purpose, such entry being signed by the purchaser. This latter set of conditions *only* applies to articles in part 1 of the schedule and *does not apply* to those in part 2.

"The 17th section of the Pharmacy Act, 1868, commences as follows:—

"'It shall be unlawful to sell any poison either by wholesale or by retail unless the box, bottle, vessel, wrapper, or cover in which such poison is contained be distinctly labelled with the name of the article and the word 'poison,' and with the name and address of the seller of the poison.'

"That paragraph defines the regulations to be observed in the sale of poisons within the meaning of the Act and applies to all of them equally. The remainder of the section deals with the following details, viz.:—The special regulations to be observed only in the sale of those poisons which are in part 1 of the schedule; the amount of penalty for offences, and certain exemptions from the general provisions set forth in the section: but nothing subsequent to the section which I have above quoted alters the general regulations to which articles in part 2 of the schedule are alone subject.

"In framing the Act of Parliament regard had to be paid to the necessities of arts and trades in which poisons are extensively used, and restrictions which could not practically be carried out had to be avoided.

"I am anxious that you should clearly understand this matter, as unhappily cases of this kind will probably be frequently under your notice in your official capacity.

"I am, Sir, yours truly,
"THOMAS GREENISH,
"*President.*
"Dr. Danford Thomas,
"Coroner for Central Middlesex."

"Coroner's Office, Paddington, W., *May 28th*, 1881.

"Sir,—I beg to acknowledge the receipt of your letter of the 28th inst. concerning the 'Sale of Poisons Act,' etc.

"With regard to the inquest in Clerkenwell and the sale of oxalic acid I beg to enclose you a cutting from the *Clerkenwell Press* which satisfactorily concludes the matter as far as Messrs. Huxtable are concerned.

"With reference to the reading of the Act, to which you draw attention in your letter, I beg to say that at the inquest in question I was guided in my remarks by the admissions of Messrs. Huxtables' assistant who, I presumed, knew the Act well, rather than from the Act itself.

"I am much obliged to you for your letter which I shall keep for future reference.

"I am, your obedient servant,
"GEO. DANFORD THOMAS.
"*Coroner.*
"Thos. Greenish, Esq.,
"President, Pharmaceutical Society."

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* From *Ber. d. Deutsch. Chem. Ges.*, 1881, 597. Reprinted from *New Remedies*, 1881.

The Pharmaceutical Journal.

SATURDAY, JUNE 18, 1881.

Communications for the Editorial department of this Journal, books for review, etc., should be addressed to the EDITOR, 17, *Bloomsbury Square.*

Instructions from Members and Associates respecting the transmission of the Journal should be sent to MR. ELIAS BREMRIDGE, *Secretary*, 17, *Bloomsbury Square, W.C.*

Advertisements, and payments for Copies of the Journal, MESSRS. CHURCHILL, *New Burlington Street, London, W. Envelopes indorsed "Pharm. Journ."*

PHARMACEUTICAL REFORM AS REGARDS THE QUALIFICATION OF ASSISTANTS.

FOR the efficient treatment of disease one of the things most essential as a preliminary is a correct diagnosis, and in regard to that form of disease which we hear of in various ways as affecting the pharmaceutical body, nothing can be more useful for showing the way towards remedial measures than a clear exposition of the causes and conditions to which the grievances complained of by principals as well as assistants are referrible. In this sense our correspondent, who writes under the signature of "A Life Member for more than Twenty Years," has rendered good service, and we are glad to have the opportunity of asking our readers to consider his letter with careful attention, because we feel convinced that it goes straight to the root of much of the mischief which pharmacists throughout this country have to contend against.

It is we think impossible to be too persistent in our endeavours to expose the evil influence of certain usages in connection with the drug trade, which have acquired a kind of prescriptive sanction, but are nevertheless so inconsistent with the idea of pharmaceutical advancement that they can only be looked upon as obstructive, appertaining to a past condition of things, and requiring to be promptly done away with.

The remuneration of assistants in the establishments of pharmacists, or of chemists and druggists, was the especial subject by which attention was first directed to the evils which a "Life Member" regards from a more general point of view. Our correspondent, "Revolutionist," contrasted the salaries of chemists' assistants with those of drapers' assistants, as showing that the former were less advantageous, independently of the large outlay which a chemist's assistant is supposed to have had bestowed upon his training, and he gave his own case as an illustration of the argument that chemists' assistants are not paid by their employers in proportion either to the value of the business they transact or to the responsibility attaching to the kind of work they have to perform. Taking his statements as correct, we cannot wonder at his dissatisfaction, or at his resolve to leave the business and take up some other occupation. Incidentally his doing so will be the right thing to benefit those who remain, and, as remarked by "Assistant and M.P.S.," it might be well if many others could be prevailed upon to follow his example, since it is true there is not only a plethora of assistants competing for engagements at very low salaries, but likewise a desire among them to try and secure some improvement of that position by starting in a small way of business on their own account. It is in this way that the ranks of men in business are augmented beyond the requirements of the public and in order to attract custom a destructive system of competition is entered upon more detrimental in its effects than any abstraction of "patent or sundry" trade by co-operative stores. But it is not without some kind of loss that a man who has been for some ten years in a business, even as an assistant only, can leave it and take up another occupation. Even if he has by chance an opportunity of doing so with advantage, the abandonment of his previous pursuits, at a period when he might be regarded as an experienced person, may well be regarded as a loss. Consequently, the object of reformers should be rather to remove or curtail the causes by which the surplus of assistants is produced.

In some of the letters which have appeared on this subject we can occasionally trace indications of what the causes are to which we now refer; but they are referred to by the writers rather accidentally or instinctively than with any clear perception that all the mischief is due to them. Thus, for instance, in the letter of "Reformer" last week, he speaks of the necessity for an apprentice paying a premium and giving "four or five years' gratuitous service." This expression betrays a want of proper appreciation of what is or ought to be given on the one hand and on the other by the pharmacist and his apprentice during the period of pupilage. If there be any ground for the opinion that the apprentice is to be credited with services rendered during that period it is most probable that he will have been under such conditions as those referred to by "A Life Member" and engaged in doing the work that might be done by a light porter, but not receiving such technical training as would enable him at a future time to command a liberal salary as an assistant in a pharmaceutical establishment.

In trades of purely mechanical character it may be that after a brief period an apprentice becomes to some extent useful to his master, and moreover, the technical training which is the object of his being bound as an apprentice can in such cases be furnished by manual operations useful to the master. But in the case of the pharmaceutical apprentice there is a great difference. During a greater part of the four or five years that he is bound for, his services cannot be of much value at the dispensing counter or even in the pharmaceutical laboratory, and whatever work he can do there so as to be of future benefit to himself would involve the bestowal of a large amount of attention and instruction by the apprentice's master, which would more than counterbalance the value of the apprentice's work.

The reports of the Boards of Examiners too plainly show what is the result of the delusive system of apprenticeship which offers apprentices no chance of learning the essentials of their business, and when we reflect that though the Minor examination limits to some extent the number entering business on their own account the class of assistants is still quite unprotected, it is evident that the influx of rejected candidates into that class must be productive of serious injury.

The future of pharmacy, which may be regarded as being especially an assistant's subject, will evidently depend to a great extent upon what is now done towards removing the evils pointed out by a "Life Member." If no check is put on the addition to the number of ill-taught and untrained youths who are led to expect they may make a living as pharmacists, or rather by carrying on under that name the business of a general dealer, there will continue to be a glut of candidates for employment as assistants willing to accept any kind of remuneration, and there must be in consequence some proportionate disadvantage to properly educated men. It ought therefore to be the aim of assistants especially to promote the adoption of more rigid regulations as to the conditions under which qualification to act in that capacity is acquired. It would be distinctly to the advantage of competent men if recourse were had to the original intention of the Pharmaceutical Society's founders to make the Minor examination a test of qualification for assistants and if it were made legally requisite that every assistant should be qualified in that way.

As regards apprentices, moreover, there is at least equal need of establishing restrictive regulations for the sake of protecting the interests of educated members of the pharmaceutical body. Apprenticeship should be made unmistakably a condition for obtaining technical training and not one for obtaining gratuitous services of any kind. It should be a condition attainable only for youths who have had such an amount of school teeaching as would enable them to speak and write their own language correctly, to have command of the rules of arithmetic, a fair knowledge of Latin and a general acquaintance with the principles of physical science. As an indispensable preliminary to apprenticeship with a pharmacist, youths should be required to pass a satisfactory examination of the scope above indicated, and we feel convinced that nothing in the way of legislation or of such agitation as is referred to by some of our correspondents would confer one tithe of the advantage that might be expected to result from this latter course, which would also operate for the protection and security of assistants at the present time, as well as for the benefit of proprietors hereafter. We earnestly hope that by the discussion which has been raised, an opportunity will be afforded for regarding, not only the superficial aspect of this matter, but also the less obvious circumstances lying at the root of the grievances complained of.

PHARMACY IN VICTORIA.

We learn from the last number of the official organ of the Pharmaceutical Society of Victoria that the attempt at an arrangement with the trustees of the Melbourne Technological Museum for the establishment of a School of Pharmacy, which was made when the Senate of Melbourne University refused to establish a chair of pharmacy, has been successful. A large lecture hall, as well as the laboratories and apparatus, are to be available, and the lecturers are to be nominated by the Pharmacy Board. A hope is expressed that the offer of prizes may "render our new institute in its aspirations and designs in every respect identical with that of the School of Pharmacy of the Pharmaceutical Society of Great Britain."

At the April meeting of the Council Mr. **William Bowen** was elected President of the Victoria Pharmaceutical Society in the place of Mr. C. R. **Blackett**, who had held office for the previous three years.

A TECHNOLOGICAL MUSEUM FOR NEW SOUTH WALES.

One result of the international exhibition in Sydney will probably be the establishment of a permanent technological, industrial, and sanitary museum in that city. The management of the project is at present in the hands of the trustees of the Australian Museum, and they desire to solicit through these columns donations of typical collections of materials of economic value finding an application in pharmacy, perfumery, etc., as well as of the products in their different stages of manufacture. No expense will be consequent upon the donations; the proprietors of the *British Trade Journal* have undertaken to receive and forward cases, and the trustees will pay freight, etc., on the arrival of the goods in Sydney.

DALMATIAN INSECT POWDER.

Mr. Consul St. John, in a recent report on the trade and commerce of Ragusa, remarks that insect powder from *Chrysanthemum Turreanum* (*Pyrethrum cinerariæfolium*) is one of the few articles of export which the rocky soil of that part of Dalmatia allows to be produced there. He adds that it is very desirable that the powder should be imported into England direct from Ragusa, where it can be obtained unsophisticated, as when it passes through Trieste it undergoes considerable adulteration.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association will be held on Thursday, June 23, when a paper will be read by Mr. J. O. **Braithwaite**, on "Microscopy as an Aid to the Study of Structural Botany."

Transactions of the Pharmaceutical Society.

EXAMINATIONS IN LONDON.

June 15, 1881.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Corder, Ekin, Gale, T. E. Greenish, Linford, Martindale, Plowman, Taylor and Thresh.

Messrs. Stephenson, Borland and Kinninmont were present as a deputation from the Scotch Board.

Dr. Greenhow was present on behalf of the Privy Council.

MAJOR EXAMINATION.

Six candidates were examined. *Three* failed. The following *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Bilson, Frederic Eastall	Newark.
Cooper, Walter Temple	London.
Davies, Thomas	Bridgend.

MINOR EXAMINATION.

Twenty-four candidates were examined. *Sixteen* failed. The following *eight* passed, and were declared qualified to be registered as Chemists and Druggists:—

Bates, Edward	Bicester.
Bramald, Frederick Dixon	Wakefield.
Cook, Samborne	Nottingham.
Garry, Walter Finch	Canterbury.
Humphries, Charles Josiah	Ipswich.
Jackson, Frederic	Bawtry.
Jenkins, Evan Edward	New Radford.
Judd, Henry	London.

June 16, 1881.

Present—Mr. Greenish, President; Messrs. Allchin, Barnes, Benger, Brady, Corder, Ekin, Gale, T. E. Greenish, Linford, Martindale, Plowman, Taylor and Thresh.

MAJOR EXAMINATION.

Five candidates were examined. *Two* failed. The following *three* passed, and were declared qualified to be registered as Pharmaceutical Chemists:—

Millhouse, Henry How	Seaford.
Nettle, William Robert Pett	Plymouth.
Perkins, Thomas Frampton	Clifton.

MINOR EXAMINATION.

Twenty-three candidates were examined. *Seventeen* failed. The following *six* passed, and were declared qualified to be registered as Chemists and Druggists:—

Mackereth, Geo. Hemsworth	Thorpach Grange.
Powell, Ernest Geo. Burrup	Cheltenham.
Pritchard, Lewis T. Richard	Neath.
Robinson, Whiteley	Knaresborough.
Siuzininex, Arthur	Manchester.
Thompson, John	Bakewell.

MODIFIED EXAMINATION.

One candidate was examined, but failed to pass.

PRELIMINARY EXAMINATION.

The undermentioned certificates were received in lieu of the Society's Examination:—

Certificates of the College of Preceptors.

Brown, R. H.	Wigton.
Cooper, Henry Spenser	London.
Fellows, Vincent Litchfield	Hampstead.
Horrell, Harry W.	Dartford.
Limbrick, James Alfred	London.
Woodward, Moses Mellor	Nottingham.

Certificate of the Royal College of Surgeons of England.

Mondro, Thomas Frederick	Southampton.

Certificate of the University of Oxford.

Blain, Alfred Lucas	Bolton.

Proceedings of Scientific Societies.

SCHOOL OF PHARMACY STUDENTS' ASSOCIATION.

A meeting of this Association was held on Thursday, June 9, Mr. R. H. Parker, Vice President, in the chair.

Mr. R. H. Groves read a paper upon Boruträger's "Test for Aloes," which is printed on p. 1045.

A discussion followed the reading of the paper, in which the Chairman, Secretary, Messrs. Allen, Mitchell and Thompson took part.

A vote of thanks was passed to Mr. Groves for his paper.

The Secretary then read a Report on Inorganic Chemistry, by Mr. C. H. Hutchinson, F.C.S., on

BERTHELOT AND DITTE'S RESEARCHES ON THE HYDROCHLORIDES OF SOME METALLIC CHLORIDES.

The value of controlling experiments in all matters of research must be admitted by everyone, and in the present time of the rapid advance of knowledge in all directions it becomes additionally desirable to make sure of the ground on which our methods of reasoning are based. Chemists must then see with pleasure the many reactions of the elements with which they are familiar subjected again and again to fresh trials, being thereby shown to be trustworthy or not; amongst the various methods of research in use, an increasing study of the heat evolved or absorbed during the interaction of subsubstances, compound and simple, forms a most important factor, and one which is becoming increasingly resorted to amongst investigators.

Experimenting in this direction M. Berthelot has recently discovered some new compounds, to which I shall briefly refer in this report. Amongst these is a trichloride of hydrogen[*] which he believes to exist, for the following reasons.

The solubility of chlorine in water varies at the same temperature, according to the time of contact with an excess of chlorine, and the intensity of the light. Thus at 12° 1 litre of water will, under the ordinary pressure, dissolve 4 grams of chlorine, apparently the true solubility; but if the contact be prolonged, 6 grams may be dissolved, this increase being due to the decomposition of the water with accompanying formation of chlorine oxyacids. The heat evolved during the solution of the gas varies from 1·5 to 3·77 heat units per 35·5 parts chlorine, the first number being the equivalent of simple solution, the other of a more complicated reaction involving the decomposition of the water. Now the formation of hypochlorous acid is accompanied by an evolution of only 1·9 heat units, that of chloric acid by 2·0; therefore in order to account for the 3·77 units at first observed an explanation was sought in some unknown reaction, which was additionally interesting to the author as possibly accounting for an early observation in which he noticed that a dilute solution of potash in which two equivalents of gaseous chlorine had been dissolved, when acted on by an exactly equivalent dilute solution of hydrochloric acid, gave an excess of 2·9 heat units beyond that evolved during the formation of potassium chloride, whereas the heat of solution of the chlorine employed amounts only to 1·5. From this it would appear to be incorrect to imagine that chlorous and hypochlorous acids in solution, when acted on by hydrochloric acid, simply reproduce chlorine. A series of experiments on the solubility and heat of solution of chlorine in acid and alkaline liquids and solutions of salts showed that the solubility is less in strong solutions of the alkaline earths than in water. Thus a litre of a saturated solution of magnesium chloride dissolved less chlorine than a similar amount of water, but dilution with 10 volumes of water caused an increase in the solubility to 5·5, the subsequent formation of oxyacids of chlorine resulting as in the case of water. The behaviour with a solution of hydrochloric acid differed very notably, for here the amount dissolved and the heat evolved are both increased. Thus 1 litre of a saturated solution of hydrochloric acid dissolved 7·3 grams; a similar quantity of a solution containing about ½ hydrochloric acid dissolved 11 grams of chlorine, a further dilution of the acid causing a lowering of the equivalent of solution; an experiment on the heat evolved during solution gave as a mean 4·7 heat units per 35·5 parts chlorine. This number surpasses not only the heat due to the simple solution of chlorine in water, but also that of the formation of oxyacids, nearly reaching that of the displacement of oxygen (4·8), which, however, does not take place under these conditions; and according to the received ideas of the reaction between hydrochloric acid and the chlorine oxyacids it would be difficult to imagine that these could be formed at all in these circumstances. Since the solution of, and heat evolved by, the unit of chlorine in strong hydrochloric acid solution can in each case amount to three times that produced by simple solution in water, and bearing in mind the tendency of chlorine and of the halogens generally to accumulate in molecules such as are represented by the trichloride of iodine, the trichloride and the tribromide of potassium, the heat of formation of which are:—

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[*] *Comptes Rendus*, xci., 251.

$ICl + Cl_2 = ICl_3 + 9{\cdot}6$ heat. units.
$KI + I_2 = KI_3 + 10\text{–}10{\cdot}8$ „ „
$KBr. + Br_2 = KBr_3 + 10{\cdot}9\text{–}11{\cdot}5$ „ „

the author concludes that it is not unreasonable to suppose that a combination of hydrochloric acid with 2 atoms of chlorine may exist, a view which is strengthened by the heat unit 9·4 observed under the circumstances. He finally remarks that it ought not to be forgotten that a solution of hydrobromic and hydriodic acids acts with regard to bromine and iodine respectively in a similar manner.

Experimenting with manganous chloride, with the double object of determining the influence of this substance on the solubility of chlorine in water and of possibly obtaining additional information with regard to the reaction taking place during the preparation of chlorine from manganic oxide, it was found that a liquid of the composition $MnCl_2 + 11\ OH_2$ dissolved only 2 grm. chlorine per litre at 12°, a quantity which was increased to 3·5 grm. by prolonging the action until partial decomposition of the water was effected, the heat units evolved being 2·2-3·3. These, being in the same order as those obtained in the case of water, are but little favourable to the assumption of a perchloride of manganese existing under these conditions, although the liquid which had been thus acted upon deposited on standing an appreciable quantity of the dioxide of manganese, the presence of this being perfectly explicable by the known decomposition of metallic chlorides by water with production of hydrates or oxides, which in this case had been oxidized by the chlorine oxyacids present. This explanation was borne out by the fact that an increase in the dilution caused an increase in the amount of precipitation. If the manganous chloride solution was previously mixed with hydrochloric acid, these results were considerably modified, it being noticed that when a stream of chlorine gas was passed into a concentrated solution of manganous chloride, together with about half its volume of 30 per cent. hydrochloric acid solution, the liquid was at once turned brown and gave no precipitate even on standing three months; saturated at 14° it contained 5·9 grm. chlorine per litre. If the solutions be each diluted with 10 volumes of water and then mixed and saturated with chlorine, 5·35 grms. of this are absorbed per litre, no coloration being produced, nor any precipitate, excepting on standing for some weeks, when a sufficient quantity of manganic oxide separates out to show that this may be formed even in the presence of a large excess of hydrochloric acid. Thus in the case of the strong solution one finds that this dissolves nearly three times as much as the simple aqueous one, and at the same time heat units varying according to the stage of the reaction from 4·6 to 3·2 are evolved, this being more than double the evolution in the case of the aqueous manganous chloride solution (2·2). Judging from this alteration in the physical properties of the solution, the author concludes that the first action of chlorine on a mixture of manganous chloride and hydrochloric acid is the production of a compound not formed in the absence of hydrochloric acid, this being a true perhydrochloride of manganous chloride ($HCl_3 . nMnCl_2$), and that the facts observed during the preparation of chlorine from manganic oxide are due to the dissociation of this compound, one of the products being free chlorine, which is produced in increasing quantity at an elevated temperature, corresponding with the increased dissociation caused by agiven rise in temperature.

An explanation of the difference in action between the strong and the diluted acid solution is probably to be found in the loss of potent energy by the anhydrous acid consequent on hydration.

The formation of a precipitate of manganic oxide in the presence of hydrochloric acid when diluted may be similarly explained, as the hydrochloric acid, when in the presence of water, forms a hydrated compound, thereby losing a certain amount of potent energy. It would seem then that the loss of just this amount renders the formation of the double compound impossible, the reaction between the manganous chloride and the water, together with the oxidizing influence of chlorine oxyacids, then takes place in the manner which has been before described.

The experiments next to be described were undertaken with the immediate object of investigating the action of hydrochloric acid on solutions of metallic chlorides, certain compounds between these being of greater importance and more frequent recurrence than would appear to be generally recognized. Thus, to consider the case of cadmic chloride.* If to a cold saturated solution of this salt a concentrated solution of hydrochloric acid be added, a precipitate is formed in a similar manner to that which happens when a strong solution of sodium chloride is treated in the same way; but if a current of hydrochloric acid be passed into the solution, the chloride is transformed into a compound of a new aspect, in crystals, harder, and more brilliant than before; when separated by decantation and dried on a porous plate, an analysis gave numbers corresponding with the formula $CdCl_2HCl.7OH_2$. Exposed to the air they quickly lose hydrochloric acid, becoming dark and opaque; heat decomposes them: the heat of formation, in solution, is 20·1 units. In a similar manner the hydrobromide of cadmic bromide was prepared, an attempt to isolate the hydriodide was, however, less successful, it being found that cadmic iodide is extremely soluble in a saturated solution of hydriodic acid, and that the liquid on reduction to a temperature of −25° deposited a fine crystalline precipitate; but this when separated and placed on the porous plate liquefied. The hydrochloride of lead chloride, shown to exist by the increased solubility of this salt in a strong solution of hydrochloric acid, could not be separated even with the help of refrigerants. The hydriodide of this metal may, however, be easily obtained by saturating a mud of lead iodide and water with hydriodic acid gas; solution is, under these circumstances, quickly effected, the liquid becoming warm and depositing, on cooling, crystals of the formula $2PbI_2.HI.10OH_2$. These are yellow, and clearer than plumbic iodide; exposed to air and light they lose hydriodic acid, and become somewhat red owing to the presence of free iodine; heat decomposes them, leaving a residue of plumbic iodide, which is also produced if the crystals be treated with 25 or more times their weight of water. The heat of formation in solution is 23·3 units.

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* *Comptes Rendus*, xci., 1024.

Whilst the halogen salts of lead are under consideration a brief reference to the recently published work of M. Ditte* on the reaction between lead chloride, hydrochloric acid and chlorine would not be misplaced. He found that if chlorine gas be passed into a saturated solution of lead chloride at 12°, containing 13 grams per litre (according to J. C. Bell, *Chemical Society's Journal* [2], xxi., 350, the solubility of lead chloride is 1 part in 105·2 parts water at 16·5°, this would give 9·1 grams as the amount soluble in 1 litre water) a salt is deposited, and when saturated with chlorine the liquid contains only 5·5 grams of lead chloride. This solution gives, when diluted with water, a precipitate of brown hydrated peroxide of lead after standing a few hours, the liquid then containing hydrochloric acid; in fact, the same phenomena are observable as were recorded by M. Berthelot with regard to manganese, in his work on the preparation of chlorine, which may be explained in the same way, since a further dilution produces an augmented precipitation. If chlorine gas be passed through a solution of lead chloride in the presence of an excess of this salt together with hydrochloric acid solution, the lead salt will be slowly dissolved, yielding a solution of a red colour, increasing in intensity with its concentration; in this way a litre of solution containing 290 grams hydrochloric acid can be brought to dissolve 180 grams of lead chloride. The amount retained in solution varies with the temperature; thus an acid liquid dissolving 175 grams at +10° will contain as much as 312 at −15°. Heat decomposes the solution with evolution of chlorine and deposition of lead chloride; if the liquid be highly charged with hydrochloric acid a diminution of the solubility of the chloride is observed.† From the facts observed during his investigation the author concludes that the compound formed during the reaction is analogous to the double salt of manganese found by M. Berthelot, and is a perhydrochloride of plumbic chloride.

With regard to the halogen salts of silver, M. Berthelot corroborates an observation of H. Saint Claire Deville‡ as to the existence of a hydriodide of silver iodide. He found that the iodide of silver dissolves readily in hydriodic acid solution, and that the liquid thus obtained disengages on exposure to the air some of the hydriodic acid. At a certain stage fine transparent lamellar crystals are produced corresponding with the formula $3AgI.HI.14OH_2$. Exposure to light and air turns them yellow; they are decomposed by heat or an excess of water with the separation of silver iodide; the heat evolved during the formation of this compound in solution is 21·6 units. Another similar compound exists, but is so soluble in hydriodic acid that its separation could not be effected even with the aid of refrigerants.

Working on this subject quite independently of M. Berthelot, M. Ditte found that in relation to their reaction with hydrochloric acid the metallic chlorides may be divided into two divisions, in the first of which may be placed those whose solubilities are increased by the presence of hydrochloric acid, in the second those whose solubilities are diminished. As an example of the first class the chlorides of gold, platinum, bismuth, antimony and mercury may be quoted, in each of these cases definite hydrochlorides being formed. With regard to the compounds of mercury, the proportional constituents of the salts obtained differed considerably according to the temperature at which they were formed.§ One may well make a division of this class containing those metals whose chlorides, although additionally soluble in hydrochloric acid, are deposited, on cooling the solution, in an anhydrous form, such as argentic, cuprous and mercurous chlorides. Examples of the second class will be found in the accompanying table, with regard to which I have not thought it necessary to enumerate the details described in the original memoir.*

	Water.		Solution of hydrochloric acid saturated at 12°.	
Chloride of	1 litre dissolves	Crystals formed	1 litre dissolves	Crystals formed
Ca . .	700	$CaCl_2 6OH_2$	270	$CaCl_2 2OH_2$
Sr . .	500	$SrCl_2 6OH_2$	20	$SrCl_2 2OH_2$
Mg . .	720	$MgCl_2 6OH_2$	65	$MgCl_2 2OH_2$
Co . .	415	$CoCl_2 6OH_2$ (red)	205	$2CoCl_2 3OH_2$ (blue) (35°) $CoCl_2OH_2$ (blue)
Ni . .	600	$NiCl_2 6OH_2$ (green)	40	$NiCl_2OH_2$ (greenish yellow)
Mn . .	870	$MnCl_2 4OH_2$ (rose)	190	$MnCl_2OH_2$ (white)
Cu . .	630	$CuCl_2 2OH_2$ (bluish green)	290	$CuCl_2OH_2$ (yellow brown)

To this same class belong also the chlorides of potassium, ammonium, sodium, barium and thallium, whose solubilities are, as well known, very much lessened in the presence of hydrochloric acid, being deposited in the anhydrous form, thus showing that this second class may also be divided into sub-divisions, in the first of which may be placed those metals yielding hydrous crystals but containing less water than at first, and in the second those yielding anhydrous precipitates.

In conclusion I would draw attention to the remarks of M. Berthelot on the hydrochlorides of the metallic chlorides,† when he says that they are most important, determining as they do a large number of otherwise inexplicable reactions, of which we may find an example in the decomposition of mercurous chloride on boiling with, or even by cold, hydrochloric acid, with production of metallic mercury and mercuric chloride thus—

$$2HgCl + nHCl = HgCl_2nHCl + Hg.$$

Now the decomposition of mercurous chloride, considered alone, requires a considerable absorption of heat; thus $2HgCl = HgCl_2 + Hg, -9·5$ heat units, and as mercurous chloride gives no sign of decomposition at the temperature of the experiment, he believes the determining factor is the formation of a hydrochloride accompanied by an evolution of heat superior to 9·5 units. The same explanation by means of the heat of formation of certain double chlorides may account for the transformation of calomel into corrosive sublimate under the influence of alkaline chlorides, causing known cases of poisoning. To take an example from another set of phenomena, one may consider the reduction of the halogen salts of the metals by hydrogen. It is well known, for instance, that cadmic iodide, bromide and chloride suffer partial decomposition when heated in an atmosphere of hydrogen. So far as the first two of these is concerned, the presence of the hydrogen need only be considered as accelerating the decomposition, as M. Berthelot found, that when heated to the same temperature in an atmosphere of nitrogen decomposition was similarly effected. From this then it follows that the energy necessary for decomposition is supplied by the heat alone, the acceleration of the action in hydrogen being due respectively to the superposition of the energy of formation of the hydrobromide and iodide of the cadmium salt. In the case of the chloride, no trace of chlorine was obtained by heating in nitrogen, and as partial decomposition was effected in hydrogen it is not unnatural to suppose that this is brought about by the energy of formation of the double hydrochloride.

The reduction of lead and silver chloride by hydrogen appears to be due to a similar action, an action which is very general in chemistry, and shows the importance of these secondary and slightly stable compounds, the study of which has up to the present been neglected.

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* *Comptes Rendus*, xci., 765.

† With regard to the solubility of lead chloride in solutions of hydrochloric acid alone, M. Ditte finds (*Comptes Rendus*, xcii., 718) that this is diminished by the presence of quantities of hydrochloric acid less than 10 per cent., after which an increase in the strength of the acid causes a marked increase in the solubility.

‡ *Comptes Rendus*, xlii., 895.

§ *Comptes Rendus*, xci., 986, xcii., 358.

* *Comtes Rendus*, xcii., 242.

† *Comptes Rendus*, xci., 1024.

A discussion followed, in which the Chairman, Messrs. Allen, Atherton, Bird, MacDermott, Mitchell and Thompson, took part.

The Secretary having replied, a vote of thanks was passed to Mr. Hutchinson, after which the meeting adjourned.

Parliamentary and Law Proceedings.

Fatal Explosion of a Soda Water Generator.

A distressing accident occurred May 11, in Nashville, Tenn. Mr. J. R. Turner, who had a soda water stand at the Exposition building, fearing that he might get out of a supply before its close, went to his store to charge another fountain to be sent at once to the Exposition building. J. H. Farmer, who worked in the store, said that Mr. Turner first put in the soda and then the acid, which spurted out and burnt his clothing and face. He let out that charge, and was engaged in filling another when the needle of the gauge began to spin around until it marked 150 pounds pressure. Farmer says that, although he had not had much experience in charging fountains, he did not like to see the needle jump around the gauge so suddenly. He told Mr. Turner that he was fearful it was not all right, and said that he had better keep away, Farmer stepping back about four feet himself. He began to hear the fountain "siz" and again admonished Turner to get away. Farmer had no sooner said this than the fountain exploded, the concussion knocking him on the floor, and something falling upon his head. As soon as he returned to consciousness he found that the explosion had put out all the lights. He did not know what had become of Turner. The last he saw of him was when he had one hand on the fountain. He supposed that Turner had perhaps jumped into the alley, as he was standing near the door, which was open. He called him, but there was no response. Groping and crawling out of the house he got a candle and returned. He was greatly amazed when he saw Turner ten feet away from the fountain, with his head lying over a box, dead. A piece of the fountain had struck him in the forehead, crushing in the bones and scattering his brains all around the room, not leaving more than a tablespoonful in the cranium. One of his hands was torn to pieces and his arm was broken in two places.

The explosion made a report like that of a cannon, and soon after hundreds of people gathered on the spot.

Deputy Coroner Adams held an inquest over the remains, and the jury returned a verdict in accordance with the above facts.—*Druggists' Circular.*

Poisoning by a Disinfectant.

An inquest was held at the Castle Inn, Torquay, on Wednesday, June 8, by Dr. Gaye, coroner, on the body of Albert Mardon, a boatman, about 45 years of age, of Babbicombe, who died on the previous day, at the Torbay Infirmary, from the effects of accidental poisoning. Mardon, on the previous Saturday, whilst engaged on the Babbicombe beach painting boats, asked some other boatmen for a drink of water. He was directed by them to a certain shed, were there was water. He did not go then, but shortly afterwards went to another shed by mistake, where he found a jar, and thinking it contained water drank from it. From the burning effects of the liquid he discovered he had made a mistake. The jar contained "Casson's detergent," which is known to be a very deadly poison. Mardon was instantly taken to the Torbay Infirmary, where he lingered in great agony until Tuesday morning, when he died from the effects of the poison.

The Coroner commented very severely on the absence of any label bearing the word "Poison."

The jury returned a verdict of "Accidental poisoning."—*Plymouth Weekly Mercury.*

Suicide of a "Travelling Chemist."

At the Leeds Town Hall on June 8, Mr. Malcolm, the Borough coroner, held an inquiry into the circumstances attending the death of John Marks, aged 73, a "travelling chemist."*

Mrs. Ellen Oliver stated that the deceased had lodged at her house for some time past. Since Christmas he had been in a low state of health, not having been able to obtain sufficient nourishment. He had been especially depressed during the last fortnight. On Saturday morning deceased complained of having been bothered very much over some "society" he was in, and that he was afraid he was going to be turned out. She did not know to what society the deceased referred. On Whit-Sunday she did not see him until six o'clock in the evening, when she took him some tea. He told her not to call him on the following day, as it was a holiday, and he did not want to be disturbed. Accordingly, on Monday she did not go to his room until dinner-time, when she took him another basin of tea. His door was locked, and as deceased did not answer to her knocks and calls she listened at the key-hole, and heard him moaning heavily. She called her son, who tried in vain to burst in the door, and he therefore obtained a ladder and effected an entrance through the bedroom window. On the door being opened she saw deceased lying high up in bed quite unconscious, and moaning very much. His breathing was very heavy. A medical man was sent for, and the deceased was removed to the Infirmary. Under the deceased's arms in bed was found an old cream-jug, which had contained morphia, and a small powder was found under his pillow, as well as a letter written by the deceased, and addressed to the coroner.

John Fearnley, retired Excise officer, stated that he had known the deceased about seven years. He had met him on several occasions lately, when deceased complained of being ill. He last saw him about three weeks ago. Deceased had mentioned something to witness about his being a Freemason, and once said he should apply for relief, but witness never heard with what result.

Mr. Walter Henry Brown, house-surgeon at the Infirmary, deposed that the deceased was brought to that institution on Monday afternoon, apparently suffering from the effects of strong narcotic poisoning. He was in a state of profound coma; and notwithstanding that all the known remedies were applied, he died the same evening, from poisoning. There was nothing in the stomach to show conclusively what the poison was, but in all probability it was morphia.

The Coroner having offered a few remarks, the jury unanimously returned a verdict of "Suicide whilst labouring under temporary insanity."—*Leeds Mercury.*

Reviews.

Proceedings of the American Pharmaceutical Association at the Twenty-Eighth Annual Meeting, held in Saratoga Springs, N.Y., September, 1880; also the Constitution, Bye-Laws and Roll of Members. Philadelphia. 1881.

The new annual volume of the American Pharmaceutical Association is considerably less bulky than its immediate predecessors, but nevertheless still numbers more than six hundred and fifty octavo pages. The reduction is due to the section devoted to abstracts from current pharmaceutical literature, which is first presented to the American Pharmaceutical Association as a Report on Pharmacy, being considerably curtailed, whilst the proceedings themselves are shorter than usual.

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* This name is not on the Register of Chemists and Druggists.—Ed. P. J.

Of the papers that were read before the Association that which stands first, and is in a sense the most notable, is one on "Pharmacopœial Nomenclature," by Dr. Oldberg. Some of the propositions in this paper are already admitted in principle, the novelty lying rather in the illustrations by which their reiteration is justified. Thus no one would be inclined to dispute the rule that no name used should be one that does violence to established knowledge or perpetuates ignorance. The illustration given of the violation of this rule is the use of the substantive "oleum," both for a volatile and a fixed oil, and in the former case Dr. Oldberg proposes to substitute for it the word "ætheroleum." Thus "oleum myristicæ" and "oleum myristicæ expressum" in the B.P. would become "ætheroleum myristicæ" and "oleum myristicæ." Another instance is the occurrence of "acidum sulphuricum aromaticum" among the acids. Dr. Oldberg would prefer to call it "tinctura aromatica acida."

The next rule laid down is that the name should be clear and descriptive, as far as consistent with necessary brevity. Here the author appears to lean toward greater fulness, as in "myristicæ semina," instead of "myristica." He would also adopt the Berzelian nomenclature for chemicals, and in the Latin terms distinguish between the subsalts and persalts by the particle "ic" and "os," as "ferrosum chloridum" and "ferricum chloridum." The other rules are to the effect that official names that are capable of more than one interpretation are unsuitable, and that the generic portion of the name should precede the specific.

There are many details in the paper well worthy of consideration; but what is to be said of the following as to the writing of prescriptions in Latin, especially in view of the author's expressed opinion against the perpetuation of ignorance?—"Since reading the above paper before the Association it has occurred to me that it would be highly desirable and quite proper to ignore the possessive case in a nomenclature which is used by a class of men who have absolutely no need of Latin or Greek as a language, but only as a necessary evil, . . . and who certainly, as a universal rule, know little or nothing of Latin, and care less to waste their time in acquiring even sufficient knowledge of the Latin grammar to appreciate the correctness or incorrectness of the form in which the nomenclature may be put . . . Why not relieve physicians and pharmacists of the genitive everywhere, and simply use the nominative case? Latin scholars might criticize a nomenclature so constructed, but the pharmacopœial nomenclature is not intended to satisfy scholarly taste or even bare grammar." A long list of names, drawn up in accordance with the author's views, are given at the end of the paper.

Another paper in the volume, drawn forth by the pending revision of the United States Pharmacopœia, is the report, by Professor Diehl, on "Fluid Extracts and their Preparation."

MALADIES CANCÉREUSES. Observations par le Dr. GERARD VON SCHMITT. Paris: Leclerc. 1881.

This pamphlet consists of a series of observations upon the treatment of cancerous affections, according to a special method, which the author has considered it to be his "duty to publish." It is therefore better suited for criticism in the columns of a medical than of a pharmaceutical journal. The only point of interest to pharmacists is that the author indicates the use of preparations of *Mikania Guaco*, applied externally, and administered internally, in the treatment of cancer, and he says, "This valuable medicine has enabled me to cure, without operation, in the proportion of 40 per cent." It will be remembered that "cundurango," which a few years ago was the ephemeral specific against cancer, was attributed among other sources to *Mikania Guaco*,

Correspondence.

⁂ *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

ASSISTANTS' SALARIES.

Sir,—After reading the letters of your correspondents, "A Revolutionist," "A Reformer," and "An Assistant and M.P.S.," I must confess I agree with many of the opinions expressed by them, and regret the small salaries and long hours which fall to the lot of so many assistants.

Their remarks, however, naturally give rise to the following questions:—1st. On whose shoulders does the blame rest for the state of affairs complained of at the present time? and, 2nd. How can a permanent improvement be best secured?

In reply to the first, I am certain much of the mischief is caused by those employers who, living in agricultural and maunfacturing districts, do what is called a "heavy trade," and call themselves chemists, without being such. They induce large numbers of young men to enter the business solely for the sake of the premium they obtain, and for the benefit they derive from the employment of gratuitous labour, their so-called pupils being required during the greater portion of their term of apprenticeship to do only such work as could be done equally well by an intelligent porter. Hence, when the pupils are "out of their time" and ought to be useful assistants, seeking situations at a remunerative rate, they find, owing to the culpable neglect of their masters, they only possess the barest knowledge of the responsible duties which must devolve upon them should they wish to enter any respectable dispensing establishment, and thus they are fain to offer their services for the smallest pittance, oftentimes for their board, to anyone who will take them, and teach them that which they should have already been taught, in consideration of the premium paid to their master, who has neglected his duty in the most egregious manner.

Again, in another way, much blame rests at the doors of those who, while doing a better class of business, take apprentices, and who in their anxiety to secure a premium and gratuitous service, neglect to explain to the friends of their intending pupil the nature of the several examinations he will have to undergo, and the probable expense he will have to incur in preparing himself to pass them in a creditable manner ere he can "commence for himself." These are subjects which rarely either the youth or his friends have any knowledge of until after he is "bound." It is then too late for him to change his vocation should he unfortunately discover that from imperfect previous education and training he is not the proper kind of raw material out of which the future educated and trained pharmacist is to be formed. Nevertheless, many of the apprentices of both these classes, some with great credit to themselves, manage to pass the necessary examinations, and in due course swell the ranks of "qualified" assistants. Should they not have friends who can give them a little pecuniary assistance, they oftentimes save a portion of their salary, and at length invest £100 or £150 in either opening "another shop" or in purchasing one that has already been opened. Then they have to work from 8 a.m. till 11 p.m., or even later, from one year's end to the other, or rather, have to "remain in," for work is often scarce; they only dream of taking an "evening out twice a week," or "half-a-day's holiday once a week," until, perhaps, after the elapse of several years, they resolve to take an apprentice, and perpetuate the evils already pointed out.

Fortunately there are many masters who are notable exceptions to those I have described, and it is to them and their pupils we must look if we wish to see the status of pharmacy in this country raised to the level already attained by it in most other civilized countries.

Finally, there cannot be the least doubt that at present, as well as in the past, there are many more chemists in business and assistants in the trade than are required to supply the wants of the public, and assistants would do well to remember that their salaries, like the wages of all those who have their labour to sell, are governed by the universal law of supply and demand, and still further regulated by the quality of the service offered; but unhappily the supply is generally in excess of the demand and the quality very inferior.

In reply to the second query, viz., "How can a permanent improvement be best secured?" no doubt many of your readers will think me visionary, others may think me "A Reformer," and doubtless all will call me "A Revolutionist," for although the remedies I propose are somewhat of a drastic nature, yet I sincerely hope I shall live to see them carried out, or at any rate with only slight modifications, and that ere long.

1st. The pharmacist of the future must separate himself from the drysalter, the oil and colour man, the agent for Gilbey and other wine merchants, and from the general sundry trade, and become what he calls himself—a pharmacist.

2nd. It must be made compulsory for every intending apprentice to pass the Preliminary examination before his indentures are signed. The Registrar of the Pharmaceutical Society on the receipt of his name, intimating his intention of presenting himself for examination, should immediately send a circular to his parents or guardians, which should point out to them the nature of all the examinations he will have to pass, and the course of study he will have to pursue, thus giving him an opportunity of withdrawing himself, should he or his friends think that he is unsuited for the trade, before he has incurred much expense or lost any time.

3rd. At the expiration of his apprenticeship, which should be of not less than three years' duration, he should be required to pass an examination in such practical subjects as reading and dispensing prescriptions, and the method of making the various preparations of the Pharmacopœia, and should evinces a general knowledge of the nature and properties of drugs and of the elements of chemistry.

On passing, he should be registered as an assistant, and not until he has passed should he be allowed to take a situation.

The above subjects are only those which every master who takes apprentices should be competent to teach,—and if not, he ought not to receive a premium for pretending to teach that which he is incompetent to do,—and such as every person who offers his services as an assistant should be conversant with.

4th. The assistant should not be allowed to pass his final examination, which would entitle him to be registered as a pharmaceutical chemist and to commence business for himself, until after he has spent at least two years as an assistant, and another year in attending a course of lectures on botany, on materia medica, and on chemistry, the latter combined with practical instruction in the laboratory.

When this epoch in the "Progress of Pharmacy" is reached, then, and then only, will the assistant receive ample remuneration for his services, and find himself better off as an assistant than as the proprietor of a business "returning £5 a week." At the same time those who qualify themselves for the highest examination will find their reward by having all the surgeon's dispensing placed in their hands, and from the diminished competition now arising from so many petty shops which cannot pay their expenses without the addition of all kinds of miscellaneous undertakings.

In conclusion, if the educated pharmacists of this country would only put their shoulders to the wheel, and urge on the systematic education and training of their pupils, the Government of this country would soon recognize the fact, and grant as much protection to the public and the pharmacist as they contemplate granting to the inhabitants of Jamaica, and I feel sure more is not required.

A LIFE MEMBER FOR MORE THAN TWENTY YEARS.

Sir,—Your correspondents, "Revolutionist" and "Reformer," are, in my opinion, fair specimens of the large community of "grumbling chemists' assistants," and of the men who, instead of improving our condition, and elevating the trade generally, are endeavouring to degrade us, alike in the eyes of our employers and the public, by putting us on the same footing as striking mechanics and farm labourers, whose reasoning powers will not allow them to see far beyond the next week's wages.

"Revolutionist" is of course a stranger to me, and I will admit he was badly paid, if his business were as he described it; but he was to blame, more than his employer. Surely if he were the business man he described himself to be, he could have found something more worthy of his time and labour.

I have been frequently told by gentlemen not my employers, business men too, who in a commercial view were honours to the trade, that their greatest troubles in business were to get assistants, thoroughly conscientious, sober fellows, who understand their business, not men well up in dispensing and knowing next to nothing of the retail, nor *vice versâ*, but those that could take either one or the other with ease; and to such there are plenty of vacancies with very fair salaries,—equal to the much envied draper's assistant.

"Revolutionist" says directly a draper is out of his apprenticeship he can get a salary equal to what a chemist's assistant can command after years of hard work. This is not correct; drapers' assistants have great difficulty in getting situations at all. There are, I admit, some who get tolerably long salaries; so there are amongst our elder brethren. I have known several drapers' assistants out of berths for months; but very seldom are we so situated.

It is true our hours are long, but, then, if we are not earning money, we may be spending it. A draper's life must be awfully monotonous; same things over again, week after week, year after year. Now ours, on the contrary, is enchanting; always something fresh turning up for us to marvel at and experiment upon. No, my brother pill-rollers, we have quite as many enemies outside the camp as we know how to deal with, so do not let us be agitated by a few, who are not satisfied with the trade, but would have us make rods for our own backs. Let us remember we are not drapers, nor grocers, but chemists' assistants, and let us do for our employers as we, in time, trust our assistants will do for us, and doubtless they will remunerate us accordingly.

We want not only book knowledge, but practical business tact, so that we may rank as business men as well as partly professional men.

If I could afford the time I could enumerate many advantages we possess over the envied drapers' and grocers' assistants. I earnestly appeal to some gentlemen with more talent and time at their command than myself to endeavour to alter the tone of letters that have been appearing in the Journal for some time past. It is most disheartening to our younger brethren, and doubtless causes them to drive off their studies. We have grievances; so have every class of men, both professional and mechanics. Had I my time over again, I would choose this in preference to any retail trade.

Although I work hard from 7·30 a.m. to 9 p.m., I find pleasure in my work; so time flies quickly, and I am as contented as rambling nature will allow me to be.

F. W. DOUBLEDAY.

Sir,—May I be allowed to say a few words with regard to the inadequate remuneration assistants obtain for their services?

Considering the premium we pay, the long period we work for nothing, and the cost we are to our parents as apprentices, the wages we receive as assistants are not in due proportion to the expenditure of becoming such. I quite agree with "Revolutionist" and others that chemists who are doing a good business should pay their assistants a little better, and those who have not a very flourishing one and who cannot afford the pecuniary loss which larger salaries would create might allow them half-a-day holiday every week for recreation.

I think a vigorous agitation carried on amongst us for higher wages would ultimately be successful, though at present masters might plead their inability to raise our salaries because of the state of trade; this, they could not continually do, as I imagine trade is not always going to remain in the state in which it is at present.

As to shorter hours and more time for recreation, this can easily be arranged if assistants would meet together and discuss the matter with their masters. Where there are two or three assistants in one shop, the absence of one for half-a-day would not seriously inconvenience either his master or his fellow-assistants.

I think if a chemist's shop is open from half-past eight to seven it is quite long enough, and not from eight to eight, and eight to eleven on Saturdays, as is the case with a great number of shops.

Before closing this letter, which I hope you will publish if you think it worth while, allow me to utter my protest against masters opening their shops on Sundays, thereby forcing an amount of work upon their assistants which is quite unnecessary, for if the public be once thoroughly informed that they cannot obtain medicines from us on Sundays, they will not fail to get what they require beforehand.

INCOGNITO.

Sir,—At present, when so much is being said and done for the advancement of pharmaceutical knowledge, it may not be out of place to say a word on salaries. That the services of chemists' assistants are underrated remains no longer a matter of doubt. On comparing the salaries of chemists' assistants with those of grocers, drapers, etc., I find that they very much agree. The latter in general have shorter terms of apprenticeship and require to expend nothing on books, classes, lectures, etc., while on the contrary the former, if they have no other resources than their meagre salaries, find it a very hard task indeed to keep themselves respectable and obtain the education necessary to pass the examinations. Doubtless this is the reason why so few go in for the Major, the Minor qualification being sufficient to put an end to such strict economizing, and no one thinks himself bound either by duty or otherwise to remain longer on the rack. At the time when assistants receive least they are called upon to expend most, and while a system of compulsory education is required (for education must be compulsory wherever a standard of competence has to be attained and attested by proper means), it is absolutely necessary that salaries should advance at least one third more that what they are at present in order to conveniently meet the requirements of the assistant. Should payments continue as at present I am at a loss to understand how it will work when it becomes compulsory for assistants to attend a prescribed number of lectures. Surely employers cannot remain blind to the fact that in future the ranks must become miserably thin, when there will be a dearth of really good assistants; no doubt the disease will react and cure itself, but only after continued inconvenience. A high status of proficiency amongst pharmacists is a thing most devoutly to be desired, and a compulsory curriculum is certainly a step in the right direction for attaining such, but let those who think such a step necessary beware of being misled by the advantages to be gained and of overlooking the disadvantages to be incurred. Before making rules it is necessary to consider the position of those for whom they are intended, and in this case, from a pecuniary point of view, their ability not only to do justice to themselves but also to the profession.

EQUALITY.

THE DISCUSSION AT THE ANNUAL MEETING.

Sir,—May I crave your indulgence so far as to spare me space to say a few final words on the Journal account?

I cannot for a moment accept the suggestion in your Saturday's leader that the item of £680 in the Journal account is not an "adverse balance," or that I have made an error in regarding it as such. The postage, under existing arrangements, is part of the necessary expenditure incident to the issue of the Journal, and cannot therefore, rightly, be omitted or separated from the Journal account. If there were no Journal, there would be no postage, but as long as present conditions obtain, the postage must be paid, and I know of no other account to which the charge could properly be made. The item, therefore, must be regarded as an "adverse balance." In the annual financial statement it is put as "Balance, Journal Account," in other words, the postage has been charged to the Journal account, and thus has arisen the "adverse balance." No doubt with postage struck out the account shows a credit balance: a similar operation with respect to the cost of printing, or of paper, or of both, would give rise to a still more picturesque, though undoubtedly, very fallacious balance sheet, not more so, however, to my mind than the happy method of quietly shunting the postage out of the way of the Journal, and trying to imagine that it belongs to somebody or something else.

The "assets" I want to see have nothing to do with the 5770 copies gratuitously sent weekly to members, but are more of the nature of "cash received for advertisements," "ditto on account of sales," and so forth; the kind of assets, in fact, usually found in balance sheets.

The practice of bringing up balances from unpublished accounts is unsound and unsatisfactory. Limited liability companies sometimes issue very elaborate financial statements, bringing forward a balance from "trading account," without giving the latter, thus leaving shareholders absolutely without the least information as to the actual value of the business, or how or when profits and losses have been made; but surely the members of the Pharmaceutical Society are, as intelligent business men, fairly entitled to have the fullest possible information, more especially when that which is doubtless a "valuable property" involves an annual payment of nearly £700.

The contention "that there was no occasion to ask in reference to the Journal for further explanation than that given in the annual statement" is not likely to meet with general acceptance. I, for one, strongly protest against such a notion, for the withdrawal of the right to ask questions respecting the Journal may readily be extended to every other matter, resulting in the meeting passing the report *sub silentio*. The idea reminds one very much of the old, old game, "Shut your eyes and open your mouth and see what granny will send you." Grown up pharmacists may have "bees in their bonnets," but I hope they are not altogether "babies." On several previous occasions the Journal account has been asked for; I do not doubt but that the Council will eventually feel constrained, by force of circumstances, to give the more complete information desired.

The editorial foot-note to my letter says, "Mr. Smith's figures are all incorrect." This is a serious matter, and ought at once to be put right. The figures are, however, not mine. I quoted them on the authority of the President and publisher, and must therefore leave these authorities to make amends, if need be. If it is intended that the inferences I drew from the figures were incorrect, that point has yet to be proved.

I must earnestly protest against the intimation that the remarks I made at the Annual Meeting were "calculated to prejudice the Society's interest" in the Journal. No one values the Journal, from a literary point of view, more than myself, and nothing was further from my mind than to depreciate in any way, either the Journal or its management. My remarks were obviously aimed at the absence of any financial statement which would enable members to see how the Society stood in relation to its Journal.

One word more. "Fair Play," "an associate not in business," inquires if I contributed to the Society's funds as an apprentice. Well, I joined the Society nearly thirty years ago, and have, with little interruption, subscribed ever since. I have also, as a pharmacist in business, had ample opportunities during the last twenty years of noting the habits of assistants, and when "Fair Play" can claim the authority of an equally lengthened experience, he will probably have acquired a little more modesty, and at least be better able to judge of how far the "remarks" of his seniors are "uncalled for" and "most injudicious."

8, *The Strand, Torquay*. EDWARD SMITH.

Sir,—With reference to the discussion on the issue of the Journal, I must say I fail to see why the "authorities that be" should be so incensed with Mr. Smith for asking for a few particulars with regard to the "guaranteed circulation," and I cannot understand what figures of his are "shown at page 1030" to be "all incorrect," as the only figures quoted by him seem to be those used at the meeting, and working as he did on all the data vouchsafed to us outsiders, I do not see that he greatly erred in them. I quite agree with Mr. Smith, Mr. Wells, and others, in thinking that a supplementary Journal account might be published with the annual balance sheet, and cannot conceive why there should always be such a disinclination exhibited on the part of the officers of the Society to afford to the members a full account of the receipts and expenditure of the Society in connection with the production of its Journal. The statement might be printed on a separate page of the report, and would, I am sure, be fully appreciated by the members.

As regards the complaint made by Mr. Wells against the Professors that they append to their signatures a few words showing their connection with the Society, I fail to see in that anything more derogatory than the use by many members of the letters "M.P.S." on the labels they attach to their own proprietary articles, and as other analysts are allowed to affix the names of the societies with which they are connected, it would unjustly handicap our Professors to prevent them from doing the same. In the case of both members and Professors the idea is that the affix gives them greater importance in the eyes of the public, and as our Professors are hardly paid enough by the Society to allow them unaided by other resources to revel in the lap of luxury, I do not see why they should be deprived of a fair method of adding to the commercial value of their certificates.

Mr. Wells's excellent speech at the meeting touched on several subjects which will not, I hope, be allowed to sink undiscussed into oblivion. I know myself of one gentleman who sat on the Council for more than twenty years (I cannot at the moment say how many more) without ever putting the Society to the expense of a lunch; but even if it is now considered necessary to refresh our Councillors to the extent of £50 per annum, and certainly we must remember they do not (excepting, of course, the twelve country members who get their trifling expenses of £420) get any other remuneration for their trouble, I do think the Examiners might manage (say with the three odd shillings of their fees) to sustain their drooping forms from 10 a.m. till 3 or 4 p.m.

The insertion of the civil service store advertisement was doubtless an oversight, and will, of course, be prevented from occurring again; but the retention by firms of names of people who have been long deceased in their title, and still worse the trading under names quite different from those of any person in the firm, is a crying evil which may be well commended to the Council for rectification in any Pharmacy Bill they may consider necessary to bring forward.

I would also wish to appeal against the conversion of the *Pharmaceutical Journal* into an arena for political controversy, as, although confident of the staunch Conservatism of the majority of our profession, I think we should be able to find sufficient subjects of interest connected with pharmacy without venturing upon the engrossing topic of politics.

EDWARD H. STOREY.

42, Castle Street East, Oxford Street, W.

[*** If the data already published do not suffice to make Mr. Storey perceive the inaccuracy of Mr. Smith's figures we must give up in despair any hope of enabling him to do so. As regards other opinions put forward in his letter, we note that a contemporary regards them as among the indications "that the scale of intelligence, taste and humour in the Society runs down to a very low point," and it is with some humiliation we confess that we cannot say much in opposition to this inference.—ED. PHARM. JOURN.]

ASSISTANTS AT CO-OPERATIVE STORES.

Sir,—In your issue of the 28th May, a letter appears commenting upon the Annual Meeting, in which "A Qualified Chemist," whilst taking occasion to sound the praises of the co-operative stores, commits himself to statements which I think ought not to be allowed to pass unchallenged. Referring to the recent law proceedings, he states, that "the stores employ not only a qualified manager for their drug department, but all their assistants are qualified," and this, he adds, "compares favourably with the best houses in London in point of efficiency of staff."

Such statements as these, gratuitously puffing the stores at the expense of the trade, certainly deserve more notice, both from chemists and assistants, especially those employed in "the best houses in London," than they appear to have had, and, as a qualified assistant, I desire to enter my protest against such misleading assertions being accepted as facts, and also beg to differ entirely from the opinion expressed as to the comparative efficiency of the stores and the "best London houses."

Not being personally acquainted with any of the store assistants, I cannot speak so dogmatically upon the point of qualification as your correspondent does when he asserts that "all are qualified," but that the statement is inaccurate can easily be shown by reference to the same number of the Journal in which, singularly enough, his own letter appears.

On page 996 I find the report of an inquest on the body of a former dispenser at the Army and Navy Stores, and who must therefore, if "A Qualified Chemist" is correct, have been a qualified man.

I cannot find, however, that his name appears in the Register, either as possessing Minor or Major qualifications; in fact the only one he appears to have possessed was that of "dipsomania," a qualification scarcely to be regarded as compatible with the responsible duties of a dispenser.

Again, in the following week (June 4, page 1019), I find an assistant and manager in the drug department of the Army and Navy Stores is reported as being charged with stealing a box of pills from his employers, the same having been found on him on being "searched" when leaving the place.

The name of this "assistant and manager" is also absent from the Register, so that "A Qualified Chemist's" assertion that both managers and assistants are qualified must be taken for what it is worth.

From inquiries made respecting the last case, I find that assistants, on entering the employment of the stores, have to make an agreement, in which they submit to undergo the process of being searched.

Now, sir, I would ask, what young man having the smallest particle of self-respect or honourable feeling would consent to be the object of such a degradation, or would knowingly enter into the service of an establishment where such a demoralizing system was in force?

Is it possible that any respectable assistant would do so?

And further, what confidence can the public have in an establishment, the proprietors of which have so little faith in the honesty and trustworthiness of their *employés*, that they find it necessary to subject them to an espionage and surveillance similar to that which prevails at our police-stations and convict prisons?

Surely assistants who cannot be trusted in their employer's interests are not fit and proper persons to whom the health and lives of human beings should be recklessly confided. And yet that this is the case in the largest store establishment in London is proved by the two cases I have called attention to.

In conclusion, I think I have said enough to show that the stores do not always employ qualified managers, that the assistants are not all qualified (unless dipsomania and kleptomania be held sufficient qualification), and finally that to speak of the stores as comparing favourably in efficiency with the best houses in London is little less than an insult to the latter, and one which I should have thought "A Qualified Chemist" would have been the last person to offer.

Apologizing for trespassing on your space, I beg to sign myself,

A QUALIFIED ASSISTANT.

"*Country Major.*"—We believe the interview has not yet taken place.

"*Francais.*"—(1) The examination is a written one, and the papers in past years will be found in the Journal reports of the October Evening Meetings. (2) This question would be better addressed to a medical contemporary.

"*Beginner.*"—See a paper on the "Albumen of Commerce," in *Pharm. Journ.*, [3], vol. viii., p. 253, for so much of the information you require as can be supplied in these pages.

H. C. H.—*Alchemilla vulgaris.*

A. H. Claypole.—(1) *Poa trivialis.* (2) *Festuca ovina.*

J. Hutchinson.—(1) *Carex pilulifera.* (2) *C. vesicaria.* (3) *C. panicea.* (4) *C. vulgaris.*

Woodbine.—(1) *Stellaria Holostea.* (2) *Lychnis diurna.* (3) *Solanum Dulcamara.* (4) *Anchusa sempervirens.*

Unlucky Junior.—We think the subject of the position of English assistants in France has already been sufficiently discussed in the present volume.

C. F. Passmore.—The point is one that can be settled by a practical experiment.

A. C.—No such process is known.

COMMUNICATIONS, LETTERS, etc. have been received from Messrs. Ward, W. S. Brown, Baker, Gostling, Parker, Junior, Ophrys, Michel, Islander, F. R., H. M. H.

"THE MONTH."

Owing to the lateness of the season June may almost be said this year to concentrate in itself not only the wealth of foliage which has given the name of "leafy June" to this month, but likewise the floral beauty and freshness of colour characteristic of May. The rose, the queen of flowers, has already begun to render the air fragrant, and if one may judge from the abundance of flowers in this country, it may be hoped that a similar luxuriance will obtain in Bulgaria, or otto of rose, which has already become quite scarce at Kijanlik and Constantinople, will be still dearer. At present, however, no reports have been received with regard to the new crop.

At the Kew Gardens several interesting plants may be seen in blossom. Among these are the *Aloe Perryi*, the species from Socotra, which has been proved by Professor Bayley Balfour to be one which yields the Socotrine aloes of commerce, and is distinguished from the Barbadoes aloes plant, *Aloe vera*, in the perianth having short segments and in the stamens not projecting beyond the flower.[*] One of these specimens is now being drawn and will shortly be figured in the *Botanical Magazine*. Another plant of interest, the Chica (*Salvia columbaria*, Benth.), has already been mentioned in these columns as an important article of food. In this little plant the flowers are rather small and blue, and are produced in whorls, so that a comparatively small plant produces a large quantity of seed. Among other plants of pharmaceutical interest now in bloom are the fœnugreek (*Trigonella Fœnum-græcum*), the coca plant, *Dictamnus Fraxinella*, *Gillenia trifoliata*, *Linum usitatissimum*, *Bryonia dioica*, *Tamus communis*, *Levisticum officinale*, *Ruta graveolens*, *Valeriana officinalis* and bistort. Other plants of interest to the botanical student, and which are now in good condition for examination are the aconite and several specimens of *Delphinium* and *Thalictrum* The flowers of the latter should be examined in bud, as the sepals, for there are no petals, are caducous in many species. The clavate filaments of the anthers and the tendency to repeatedly ternate division of the leaves in this genus are also worthy of notice. *Ranunculus arvensis*, with its prickly achenes, of which pheasants are said to be very fond, is now in fruit. The pretty variety, *Lancastriense*, of *Geranium sanguineum* is now in full blossom. It is singular that this form should apparently be confined to a single island, and yet grow intermixed with the typical plant. Several natural orders are now in good condition for observation, among others the Hypoxidaceæ, numerous specimens of which may be seen in the house containing succulent plants. The plants of this family differ chiefly from the Amaryllidaceæ in their dry, linear, almost grass-like leaves, and in the calyx being often hairy and green. The roots of some species are aromatic and bitter, and one North American species, *Hypoxis erecta*, is used as an application to ulcers. Other families worthy of examination as presenting a considerable number of genera in flower at the present time are the Ranunculaceæ, Papaveraceæ, Boraginaceæ, Campanulaceæ, Cyperaceæ and Graminaceæ. Those who live in chalky districts will find *Bromus erectus* one of the most easy grasses to examine.

At the Regent's Park Botanical Gardens the *Rheum officinale* rears aloft its handsome panicles of white flowers, easily recognized at a distance by the elegantly drooping and tapering spikes of which the panicle is composed.

Among our wild plants a very singular looking umbelliferous plant may be found abundantly in cornfields, *Scandix Pecten-Veneris*. In this plant the cremocarp becomes enormously elongated after flowering, so as to be sometimes nearly 2 inches in length. These, like the fruits of dandelion and oat, etc., are furnished with small upward prickles, which enable them to bury themselves in the earth.

Another umbelliferous plant now in blossom, *Œgopodium Podagaria*, sometimes called wild masterwort, from the resemblance of the leaves to those of *Imperatoria Ostruthium*, but more commonly known as *Herb Gerarde* or gout weed, deserves notice on account of its being furnished with abundant stolons, a rare occurrence in British umbellifers. It appears to be chiefly propagated in this way, for where once established it extends rapidly. Gerarde says of it: "This root, stamped and laid upon members that are troubled or vexed with the gout, swageth the paine, and taketh away the swelling and inflammation thereof, which occasioned the Germans to give it the name of podagraria, because of his vertues in curing the gout."

Asimina triloba, or, as it is sometimes called, *Uvaria triloba*, the papaw or custard apple of the Americans, is now in flower at the Cambridge Botanical Gardens. Mr. Lynch, the curator, has noticed that the inner surface of the inner petals below the middle is thickly furnished with warty masses of glandular tissue, the secretion of which is attractive to flies and ants. The flowers are proterogynous, *i.e.*, the stigmas are ripe before the anthers, and the flowers are therefore probably fertilized by insects. A small spider has speedily discovered that this exotic plant possesses attractions for insects, and takes up its abode in the flower, in some cases before the secretion is formed, in order to be ready for the insects which will come to it. It would be interesting to learn under these circumstances whether the rapacity of the spider is sufficient to prevent the fertilization of the flowers. The ruminated seeds of this plant are strongly marked by the infolding of the endopleura, so that the seed when cut open has much the appearance of a cockroach's egg.

Some further remarks on the compass plant, *Silphium laciniatum*, are contributed to the *Gardeners' Chronicle*, May 28, p. 699, in which Brigadier-General Alvord, of the United States Army, states that every possible experiment was tried on the plant, and that it could not be moved by a powerful magnet, nor did the most delicate instruments show the existence of any magnetism. It doubtless points to the north under the influence of light. He attributes the occasional east and west position of the leaves to the action of a strong glare of light at midday. The number of stomata on each side of the leaf being equal, it would face the rising and setting sun as a position of stable equilibrium and hence point north and south.

In a recent lecture before the Royal Horticultural Society (May 24), the Rev. G. Henslow stated his belief that the irregularity of corollas was caused by the visits of insects, for when insects could only enter the flower in one way such flowers were mostly, if not always, irregular, but when the flowers could be visited by insects from all sides they were regular.

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[*] See before, p. 747.

The fact that under cultivation pansies and exotics, such as pelargoniums, gloxinias, etc., showed a strong tendency to become regular was due, he considered, to the fact that the insects which usually fertilized the flowers in their native countries were not forthcoming, and that the flowers hence reverted to their ancestral form. Hence in the pelargonium, which has a tube or spur adnate to one side of the pedicel, the flowers have become irregular, while in the geranium they are regular. He also alluded to the fact that some of our wild species of geranium, like other plants with conspicuous flowers, are evidently intended for insect-fertilization, while those with small flowers are self-fertilized. Thus *G. pratense*, with large flowers, is proterandrous, both whorls of stamens maturing before the stigma, and in *G. pyrenaicum*, which is smaller, only one set of stamens ripens before the stigma, so that there is a chance of self-fertilization if insects have not visited the flowers, while in *G. pusillum*, which has very small flowers, the stigma matures before either row of stamens. This arrangement he considers is brought about by the fact that where the corolla is large, and the stamens produce much pollen, so much nourishment is required that a delay is caused in the development of the pistil, but if the corolla be very small the pistil matures rapidly. It was also noted as a curious fact that in a new variety of pelargonium, in which pollen was found to be very poor, the petals gained an advantage in being firmer and more tenacious, so as not readily to fall off.

According to *Nature*, an attempt is to be made by the members of the Livingstone (Congo) Inland Mission to cultivate different species of cinchona in the mountain valleys of the Congo. Seeds have already been obtained from the Government plantations in India for this purpose.

The *Journal of the Royal Microscopical Society*, under its present able editorship, is becoming one of the most valuable of our scientific periodicals, inasmuch as it gives a most valuable and complete *résumé* of the scientific papers at home and abroad. One of these, translated from the *Botanische Zeitung*, is well worthy of careful reading by those who are interested in starches. It contains the observations of Professor A. W. Schimper on the mode of formation of starch within the chlorophyll grains. So long as examiners in science ask for the most recent information and expect the knowledge of the candidate to equal, if not, exceed their own, the columns of the *Microscopical Journal* will form a most valuable mine to the student who cannot find the information he needs in the most recent text-books. Whether such a procedure in our science schools tends to produce a sound foundation of practical knowledge or no the future must show. Another subject on which the most recent information is given in a condensed form is on bacteria. One interesting fact connected with this group of schizomycetes is the discovery by Dr. G. Thin that the *Tricophyton tonsurans*, a fungus which produces a form of ringworm, grows only when moistened with vitreous humour, but not when immersed in it, and that hence inflammatory exudation from the blood-vessels of the scalp, such as is artificially produced by croton oil, etc., cures ringworm.

One of the prettiest of flowering shrubs, and one often cultivated in pots in London, is the oleander. Few, however, who grow this plant are aware of its poisonous character. In the *Gardeners' Chronicle* for May 28, p. 696, a case is quoted from the *New York Tribune* of a single tuft of leaves eaten by a fine healthy mare causing its death within twenty-four hours. The flowers even have been stated to cause death to those who have carelessly picked and eaten them. The branches divested of their bark and used as skewers have so poisoned the meat roasted on them as to kill seven of twelve people who partook of it. This plant, therefore, evidently possesses similar properties to those of *Nerium odorum*, a plant well known in India and Persia to be poisonous, and in which Mr. H. Greenish recently found two bitter principles, neriodorin and neriodoreïn, both of which proved to be powerful cardiac poisons.*

In the last "Month" a short notice was given of the use of *Arum maculatum* in gout. In connection with this subject Mr. Martindale states (*British Medical Journal*, p. 908), that he had some juice of the plant expressed soon after it was shown in this Journal that the active ingredient of tonga belonged to the same family of plants as the arum, and that recently a medical friend tried this juice in one drachm doses in a case of obstinate neuralgia which had been relieved on a previous occasion by tonga and found it to give similar relief. It would have been interesting to know whether the case in question was one of neuralgia arising from rheumatism, in which case the former reputation of the arum as a remedy for rheumatism and gout would be explained, and also the uncertain action of tonga, which seems to give marvellous relief in some cases and not in others. If *Arum maculatum* and tonga contain a substance in common which cures rheumatic neuralgia, the sooner a chemical and physiological investigation is made of it the better.

In a letter to the *Lancet*, Dr. A. Paggi records an observation which cannot be too widely published. He states that in Paris he saw a case in which under the inhalation of chloroform the heart ceased to beat and artificial respiration for ten minutes failed to restore circulation, when Dr. Labbé dipped a large cloth in boiling water and applied it to the region of the heart with the result of immediately restoring the action of that organ.

The use of chloral as an antidote to strychnine is apparently not so well known as it should be, and as the chemist is not unfrequently in a case of emergency asked to give an antidote to a pet dog, the following instance of its successful use deserves to be recorded. Mr. E. K. Mansell in the *Lancet*, June 18, p. 1015, states that he gave to a fox-terrier bitch, which was suffering from severe symptoms of strychnine poisoning, 60 grains of chloral in crystals, putting it on the tongue and holding the dog's mouth until it was dissolved, because owing to the spasmodic movements of the head, he failed to get it down in the liquid state. The animal gradually went to sleep and in three hours was able to walk, and has since slowly recovered.

In the *New York Medical Record*, Dr. J. Waner states that he has found Fowler's solution of arsenic given in drop doses on an empty stomach the best remedy in the sickness of pregnancy, when this is purely sympathetic in character, the effect being almost magical. Dr. W. M. Campbell, of Liverpool, in a letter to the *British Medical Journal*, June 4, p. 881, states that he has found belladonna in repeated small doses most effectual in the same complaint, so that he is able to promise relief with an amount of confidence which could not be justified by the usual effects of bismuth, bromide of potassium, etc.

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* See before, p. 875.

Dr. Bouger, of St. Pierre de Fursac, finds the use of salicylic acid in small pox lessens the eruption and diminishes the fever of suppuration. The formula he uses is, alcohol, 10 to 15 grams; salicylic acid, 1 gram; simple syrup, 20 grams; water, 50 grams. The dose is a tablespoonful every six hours at the commencement, or every four hours in the more advanced stage of the disease.

M. Bouchut, in further experiments with papain, finds that it is a tænifuge, for after administration to a child, segments of tapeworm, 25 c.m. long, and in a partially digested state, were voided. In the Mauritius it has long been known as a remedy for round worm, and it seems probable that this new remedy may have a future before it as an anthelmintic.

According to a note in the *Répertoire de Pharmacie*, when musk is triturated with quinine in the proportion of 3 grains of the former to 10 of the latter, the odour gradually disappears, so much so that when the mixture is made into pills with mucilage and liquorice powder, it is possible to distinguish the odour of the liquorice powder.

A new method of detecting the comparative freshness of eggs has been devised by M. Leppig, of Dorpat, founded on the well-known fact that eggs on long keeping lose water by evaporation and absorb air, whereby the albuminous bodies are gradually decomposed. He found by experiment that the specific gravity of normal fresh eggs is tolerably uniform, and that they undergo uniform alterations in proportional intervals of time, the specific gravity an hour after being laid being 1·087 on the average. From his experiments he concludes that good eggs for cooking, if not more than a week old, should have a specific gravity of 1·06, and eggs which refuse to sink in a solution of salt of specific gravity 1·05 should not be purchased, if it can be avoided, but when the specific gravity falls to 1·028 and below, they should be rejected as unfit for use (*New Remedies*, p. 182).

According to *New Remedies*, an American firm of Peoria, Illinois, has offered three prizes for essays relating to the actual average quality of the following powdered drugs, ordinarily obtainable in the American market:—Rhubarb, ipecacuanha, opium, cinchona bark, jalap, gamboge, socotrine aloes, ergot, and extract of liquorice. The names of manufacturers and sources of supply are not to be mentioned by the essayists, the object being to accumulate information of general usefulness, and not for business purposes. This is a step in the right direction, and should lead to improvement in the drugs; for judging from a recent paper in the *American Journal of Pharmacy* on cinchona bark, and from another in the June number of the same journal, in which it is stated that ipecacuanha was found to be adulterated with almond meal, liquorice, corn meal, and potato starch, some American drugs must be of very bad quality, and require examination.

An examination, in France, of some feeding-bottles in which a fetid odour had become manifest whilst in use has made some revelations that are the reverse of palatable (*Comptes Rendus*, xcii., 1146). Sulphuretted hydrogen, which has on some previous occasions been detected, was not present, but the milk was found to be acid, semicoagulated, with the fat globules misshappen, and containing a number of very lively bacteria, and some vibriones. When the india-rubber tubes were slit up longitudinally coagulated milk was found containing the same microbes, and in the cavity formed by the teat a varying quantity of cryptogamic vegetation, which being placed in skim milk gave in a few days a considerable proportion of ovoid cellules that developed into mycelium. This led to a further investigation, and out of thirty feeding bottles taken from ten different *crèches*, twenty-eight were found to contain in the india-rubber tubes similar microbes and vegetation, whilst in two cases pus and blood corpuscles were found in the teat cavity. It is conjectured that the acidity noticed in the milk having been first developed by the bacteria it then formed a favourable nidus for the fungoid growth. However this may be, such a development at the cost of the constituents of the milk must cause a profound alteration in its constitution, and the whole investigation indicates that in feeding bottles it is safer to avoid possibilities of fouling than to trust the detergent instincts of those who have charge of them.

Mr. G. U. Kennedy reports in the *American Journal of Pharmacy* that he has examined the yellow crystalline principle obtained by Mr. J. U. Lloyd from the root of American calumba, *Frasera Walteri*, and finds it identical with that obtained by himself, confirming his opinion that the root contains the same principles as *Gentiana lutea*. He finds that the only difference between the two roots is that *Frasera Walteri* contains more of the gentisic acid, and gentian more of the gentiopicrin.

M. Jaillett describes (*Répertoire*, ix., 270) the preparation of three iodides of bismuth, the therapeutic properties of which have been found, by M. Dujardin-Beaumetz, in various forms of diarrhœa, to be more energetic than those of the subnitrate of bismuth. The first, which is of a magnificent golden-yellow, is prepared by moistening 30 grams of subnitrate of bismuth with a solution of 5 grams of potassium iodide, and adding, with constant stirring, 100 grams of tincture of iodine (Codex); excess of iodine is removed with 60° alcohol and subsequent washing with water, and the product dried. For a second iodide, which is canary-yellow, the subnitrate is first moistened with a little caustic soda solution, then treated with tincture of iodine until the mixture is of a dirty yellow colour (taking care not to use excess of tincture), and next with the solution of iodide of potassium, and finally repeatedly washed and rapidly dried. The third iodide, which is orange-red, is produced by pouring tincture of iodine upon powdered subnitrate of bismuth with constant trituration until the mixture is of a dirty yellow colour, then adding a concentrated solution of iodide of potassium until a thin paste results, and leaving the whole to stand for several days, after which it is washed with water to remove free iodine and dried slowly in the air. The results obtained appeared to show that these preparations are best administered in doses of two to three grams.

The marked progress which has been made recently in the investigation of the alkaloids will receive a fresh impulse from the contribution that M. Grimaux has just made (*Comptes Rendus*, xcii., 1140), to the history of one of the most important of them, namely, morphia. This chemist was led by a consideration of the reactions and properties of morphia to the conclusion that it is a body with complex functions approaching the phenols in its characters, in which case codeia, differing from it in composition by CH_2, might be considered as its methylic ether. To test this the transformation of morphia into codeia was attempted by heating gently a mixture consisting of 1 mol. of morphia dissolved in alcohol containing 1 mol. of soda and 2 mol. of iodide of methyl. The operation was so far successful that a considerable quantity of iodomethylate of codeine was formed, identical with the addition product of codeine and iodide of methyl, together with a smaller quantity of "iodomethylate of morphia-soda." When, however, half the proportion of iodide of methyl was used a small yield of free codeine was obtained (the principal product being the morphia-soda compound), which was dissolved out with ether, and, after purification by conversion into hydrochlorate and decomposition by a salt of potash, presented all the characters of codeia extracted from opium. In operating with iodide of ethyl a new base was obtained, homologous with codeine, which may be considered to be the ethylic ether of morphia, as codeia is the methylic ether. M. Grimaux is of opinion that by analogous treatment morphia may be made to yield a series of new bases as numerous as the series of ethers of an alcohol. To such a series he proposes to give the generic name of "codeines," whilst systematically codeine itself would be called "codomethyline;" the new base already prepared would be "codoethyline," and others accordingly. Some physiological experiments which have been made with the new base show that it acts as a *convulsivant*, and is toxic in small doses.

As an illustration of the closeness with which the chemical preserve is now being beaten, it may be mentioned that a month before the reading of M. Grimaux's paper, M. Chastaing had called the attention of the Société d'Emulation pour les Sciences Pharmaceutiques to the complex functions of morphia, and pointed out that whilst in some respects it had the properties of an alkali, in others it presented those of an acid or a phenol. At a subsequent meeting, but still previous to the date of M. that morphia is a phenol, and had given the formulæ Grimaux's paper, M. Chastaing had stated definitely of a crystalline morphinate of potash and a double salt of morphinate and carbonate of potash. M. Chastaing's researches, however, do not appear to have been printed until the present month (*Répertoire de Pharmacie*, June).

Other additions to the list of artificial alkaloids have been contributed by M. Tanret. When an acidified solution of a peptone, obtained either with pancreatine or pepsine, is treated with the ordinary reagents for alkaloids a precipitate is formed differing from those yielded by alkaloids only in being soluble in an excess of peptone, alkaloidal precipitates not being soluble in presence of an excess of salts of the alkaloids. This reaction, however, is not conclusive of the presence of an alkaloid, and therefore M. Tanret was induced to make some experiments to determine whether alkaloids are produced in the act of digestion (*Comptes Rendus*, xcii., 1163). He found that when a solution of a peptone is treated with neutral carbonate of potash or caustic potash and shaken with ether, a volatile alkaline liquid is dissolved out, presenting all the characters of an alkaloid. If, however, the peptone is first allowed to become putrid there is obtained a considerable quantity of a solid non-volatile alkaloid. Crystalline hydrochlorates of both these alkaloids have been prepared. When instead of a carbonate or a caustic alkali an alkaline bicarbonate is used no alkaloid is removed by the ether, and from this M. Tanret infers that the alkaloids do not exist already formed in the peptone, but are produced by the action of the alkalies, because he finds that the base of the salt of a peptone alkaloid, as prepared by him, is set free by a bicarbonate. This, however, would not appear to be the only possible explanation. The peptone alkaloids give by their action upon ferricyanide of potassium the prussian blue reaction indicated recently by Messrs. Brouardel and Boutmy as characteristic of ptomaine alkaloids,* but not immediately.

With respect to this ptomaine test, as was to be feared, there appear to be so many exceptions as to very much restrict its usefulness in forensic toxicological investigations. M. Gautier says (*Répertoire*, ix., 278), that besides morphia the reaction is doubtful with hyoscyamine, emetine, igasurine, veratrine, colchicine, nicotine and apomorphine. M. Tanret (*Répertoire*, ix.; 280) also obtained the formation of prussian blue gradually with crystallized ergotinine, crystallized aconitine, and amorphous and crystallized digitalin, and immediately with eserine, liquid hyoscyamine, and amorphous aconitine and ergotinine. In addition to these vegetable alkaloids, there are a considerable number of artificial alkaloids, some being very poisonous, which in the presence of ferricyanide of potash and a persalt of iron comport themselves like ptomaines; for instance, aniline, methylaniline, paratoluidine, diphenylamine, pyridine, collidine and others. The prussian blue reaction is also, according to M. Lebaigue (*Répertoire*, ix., 279), produced by solutions of gelatine and extract of meat; though this like the reaction of the peptone alkaloid would be explicable, and would not affect the value of the test. The weak point in it is that the behaviour of the alkaloids formed naturally in the body is simulated by so many powerful poisons of which the presence could not be so satisfactorily explained.

In the domain of physics the subject which probably has attracted most attention during the present month has been M. Faure's secondary battery for the storage of electric force. It is just now passing through the sensational stage, which seems to have become almost as inevitable to new inventions as the measles to juvenile humanity; but if one-half what has been predicated concerning it turns out to be true, it might work almost as great a revolution as the application of steam as a source of power. In a letter to *The Times* (June 9), Sir William Thomson describes the results obtained with a "box of electricity," containing "four Faure batteries, each about 5 inches in diameter and 10 inches high, forming a cylindrical leaden vessel, and containing alternate sheets of metallic lead and minium, wrapped in felt and rolled into a spiral wetted with acidulated water." The batteries in this box, weighing altogether about 75 lbs., were charged in Paris with electricity from an ordinary Grove's battery to the estimated extent of one million foot-pounds and then taken to Glasgow, where they were submitted by Sir William Thomson to tests extending over three weeks. Sir William Thomson expresses an opinion that it is not an exaggeration to say that that amount of dynamical energy was retained in the box during its seventy-two hours' journey, and that the waste of the stored energy by time is not great. For instance, one of the four cells, after being discharged, was recharged and left undisturbed during ten days, at the end of which time it was tested and yielded upwards of a quarter of a million foot-pounds, or an excess over M. Faure's estimate. Curiously enough the first practical application made of the invention in this country was the ignition of the platinum wire of an *écraseur* for the removal of a nævoid tumour of the tongue, for which purpose one of the cells was taken out and carried to the place of operation. But the largest useful application which Sir William Thomson conceives to be at present waiting for the Faure battery is to do for the electric light what a water cistern in the house does for an inconstant supply, and he estimates that a battery of seven such "boxes" as that described would suffice to give the incandescence in Swan or Edison lights to the extent of one hundred candles for six hours without any perceptible diminution of brilliancy. Such an accumulator he would appear to anticipate being set up wherever a store of dynamic energy is required and kept charged from the engine by the house supply wire, the supply being controlled by an automatic check.

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* See before, p. 984, where by an inadvertence the terms "ferrocyanide" and "ferricyanide" are transposed.

But *The Times*, warming into unwonted enthusiasm, sees more in the Faure battery than a mere fixed accumulator of energy derived from the burning of coal. It looks forward to a possible near future when black diamonds may have passed out of the range of practical application, and "when we may see electricity brought by electric railways from the coast, or from the estuaries of tidal rivers, and delivered in the great towns for the fulfilment of all the purposes for which coal is at present directly or indirectly employed." A future is foreshadowed "with some certainty for our descendants, if not for ourselves," when the atmosphere of London will be smokeless and clean, uncontaminated either by the solid or gaseous products of combustion; when flowers and fruits will once more flourish in town gardens, and many other blessings will accrue as the result of the substitution of electricity for coal.

In fact, by thus assuming that the problem of the porterage of electricity is solved, as well as that of storage, in M. Faure's apparatus, *The Times* outran the facts altogether, and an illustration is thus furnished of the mischievous effects of professorial puffs in misleading the public upon scientific subjects. This was made obvious to some extent also by *Punch*. But in a letter from Professor Osborne Reynolds, it is still more pertinently remarked that the large-sounding "million-foot pounds," stored up in the apparatus weighing seventy-five pounds, was just equal to the energy contained in an ounce and a half of coal, "which might have been brought from Paris or anywhere else in the waistcoat pocket." In respect also to the proposed application of the accumulators in driving cars, the great weight of the apparatus is an important drawback. In an experiment made in Paris, one hundred and sixty Faure accumulators, weighing eighteen pounds each, were used as the source of motive power for driving a tram holding forty persons a distance of six miles in one hour. But Sir William Thomson points out (*Nature*, June 16), as a feature of peculiar scientific interest, that whatever work is done by gravity on the carriage going down hill may, by providing other accumulators, be laid up in store ready to assist afterwards in drawing the carriage up hill.

Another eminent physicist, Professor Tyndall, appears, also, to be somewhat dissatisfied at the cloud of incense being burnt to the honour of M. Faure. He considers (*Times*, June 17) that the real discoverer of this battery was Ritter; that Ritter's effects were greatly intensified by Planté; and that Faure, following and improving upon the work of Planté, *appears* to have produced a secondary battery of great power and considerable promise. Professor Tyndall is also particularly caustic respecting the use of the phrase, "box of electricity."

In turning to the "Dispensing Memoranda" of the month, before dealing with them *seriatim*, attention may be called to the communication from one correspondent, who, alluding to an alleged decomposition in a prescription, suggests the use of distilled water; this is a subject deserving of more consideration than it generally receives at the hands of dispensers.

The "water" of the B.P. is "natural water, the purest that can be obtained, if necessary by filtration. Tests free from odour, taste and visible impurity." But when water, that is, the natural water, is directed to be employed, distillation forms a subsequent part of the process, as for instance, in the medicated waters; otherwise, the water employed throughout the B.P. is distilled water. In the solution, therefore, of substances, when the resulting solutions are not subjected to subsequent distillation, distilled water is employed.

This method of procedure should be a guide to the dispenser, and distilled water should invariably be used in the dispensing of prescriptions, or a decomposition to a greater or less degree will occur, which will detract very much from the elegance of the result, and sometimes also from its efficacy.

If natural water be used in the manufacture of the preparations of the B.P. used in dispensing, it will be very difficult for a dispenser to avoid those instances of decomposition which have been referred to in these columns and which it is otherwise difficult to account for.

The mixture from prescription No. 550 should be fairly bright and clear. But this may be in some measure dependent on the condition of the vin. ferri, which is usually slightly acid; if otherwise, the carbonate of potash in the liq. Fowleri may throw down a little iron and thus make the combination a little turbid. Turbidity in the finished mixture may result from the use of water which has not been freed from its natural impurities, inorganic salts, etc., by distillation.

The liq. ferri acet. of No. 551 is not a preparation of the B.P., and therefore not official. In the Dublin Pharmacopœia of 1826, however, there existed a formula for its preparation. It was a solution of carbonate of iron in acetic acid, and there is also a formula in the German Pharmacopœia, where it is directed to be made by dissolving oxide of iron in acetic acid. The dispenser had better use the Dublin formula in preference to that of the German, as the prescription has no foreign character about it.

The dose of the tinct. ferri acet., B.P., as compared with either the Dublin or German liq. ferri acet. is pretty nearly the same; the compilers of the B.P. very probably introduced it with the view of superseding the liquor official in the Dublin Pharmacopœia, and it is very likely that the prescriber intended the tincture to be used.

The sol. mag. sulph. of prescription No. 552

pretty well a saturated solution, and when water is abstracted by the addition of sp. æth. nit. the salt must fall, and very quickly after the appearance of the first crystal. On mixing the two fluids it will be seen that the supernatant portion gradually increases in bulk by the absorption of the water until at last the magnes. sulph. gradually crystallizes out of solution. The result described is merely a separation of the salt previously held in solution by the water.

In reply to "Student," No. 553, it may be assumed that the decomposition, in reference to which inquiry has been made, is nothing more than the deposition of the oleo-resin of the capsicum on the addition to the tincture of capsicum of the carbonate of ammonia.

The gargle of No. 554 is an illustration of the difference which will result from a different order of mixing the ingredients of a prescription. If, for instance, the alcoholic solution of iodine be mixed directly with the phenic acid it soon becomes colourless; but if the glycerine be previously added, the contact of the iodine with the phenic acid is not so immediate, and the solution, instead of being colourless, still retains some traces of iodine; but even then the yellow colour disappears on the mixture standing for some time. The different results here indicated have been referred to by a correspondent.

THE BOTANICAL RELATIONS OF ILLICIUM RELIGIOSUM, *Sieb.*, ILLICIUM ANISATUM, *Lour.**

BY J. F. EYKMAN.

(*Concluded from page* 1050.)

The cases of poisoning in Leeuwarden, caused by mixing the true star-anise fruit with that of "shikimi," has again renewed the old controversy which was formerly carried on rather vigorously by Siebold and De Vriese, namely, whether the "shikimi no ki" (*Illicium religiosum*, Sieb.), growing in Japan, and the mother plant of the star-anise official in Europe (*Illicium anisatum*, Lour.), are identical or two different plants from different species of the genus *Illicium*.

Many authors have again communicated their opinions upon this subject in the *Pharmaceutisch Weekblad* (Nos. 15, 24, 25, 26, 27 and 30), but these depend principally upon older authorities. Opinions are therefore divided equally as formerly, and the question itself cannot be considered to be yet settled.

In my opinion the question will probably not be sufficiently solved before an exact comparative botanical description is published, by some competent person, of undoubtedly authentic specimens of both plants. Such polemics appear to me to be unfruitful so long as the true mother-plant of the official star-anise, the Cochin Chinese *Illicium anisatum*, Lour., is not more exactly known, in order that it may be compared with the better accessible Japanese "shikimi no ki" and the differences between them precisely established.

Probably it would not be undesirable if I add here some general remarks upon both plants.

JAPANESE PLANT.

Illicium religiosum, Sieb. (1837); *Illicium Japonicum*, Sieb. (1825); *Illicium anisatum*, L., Jap. "Shikimi no ki;" "Hana Shikimi" ("Shikimi," also written "Sikimi" and "Skimi," appears to be derived from "Ashikimi" = Evil Fruit); "Moso"—*Chin.* "Mang-tsao."

According to Iwasaki Jose, author of the 'Honzo Zofu,' it is also called "Hana no ki" (in the province of Harima) and "Koshiba" (in the province of Enshu = Totomi).

According to Yamamoto Boyo, author of the 'Hiakushinko' (Description of a Hundred Drugs), *Illicium religiosum*, Lour., both in China and Japan, is called "Dai ui Kio." According to Ito Keisuke it is also called "Iririshi ya mu."

Illicium religiosum, Sieb., has been imported into Japan from China, and probably also from the Korea, since the earliest times of the Buddha priests. In the present day it is still looked upon as a sacred plant, and therefore often cultivated near Buddhist temples, and displayed in consecrated vessels at religious feasts. It is also found near graves, a use which is due to the general veneration for it, perhaps also on the ground that as a poisonous plant it has the reputed power to keep insects, etc., at a distance from the dead.

The powder of the bark and leaves also is used in long thin cylindrical pastilles ("sen-ko") as incense in the Buddhist temples and in religious services. Formerly such straight or circularly bent cylinders, which when lighted burned regularly, were used as time measures.

The plant grows wild now in Japan everywhere, on the mountains and in the valleys. It was found in the neighbourhood of Nagasaki (Oldham), in the centre of Nippon, near Tokio (Thunberg), upon the Iwaya mountains (Siebold), near Yokosuka (Savatier), in large quantities upon the island of Hachijo, in the province of Izu (Iwasaki Jose), and in the provinces of Sagami, Enshu, Tamba, Musashi, Hizen, Chozhu, etc.

The plant attains a height of from 6 to 20 feet. The leaves are shortly (about 1 centimetre) petioled, coriaceous, thick, feel waxy to the touch, evergreen, oblong or oblong obovate, acuminate, cuneate at the base, entire at the margins, free from hairs (like the whole plant), about 7 centimetres long and 3 to 4 centimetres broad. The flowers open in the spring, about April. The petals are greenish or very slightly yellowish-white and have a wax-like appearance; they are from 1 to 3 centimetres long, 0·5 centimetre broad, and 12 to 20 in number. The stamens are 15 to 20. The fruit consists of about eight carpels, arranged side by side in a closed circle, which attains a diameter of 2 to 3 centimetres and a depth of 0·5 centimetre. Each carpel has on the upper side the persistent pistil. In the unripe condition the fruit is green, juicy, and contains much essential oil. When it commences to ripen, in the autumn, the carpel rapidly dries up, especially upon the dorsal side, shrivels, and becomes a red-brown colour.

When ripe the fruit opens rapidly lengthwise along the upper side. I have frequently observed that the yellow-brown seeds, which are about 0·7 centimetre long and 0·5 centimetre broad, provided with a hard testa, and occur one in a carpel, are hurled out with considerable force, often to a distance of three or four metres.

The bark of the tree has, as usually stated, an aromatic smell that is not disagreeable; the fruit, on the contrary, has a less agreeable odour and an unpleasant taste. The seed kernel tastes sweetish. The leaves smell like the essential oil present in them.

All parts of the plant are looked upon as poisonous by the Japanese, especially the fruit.

The "shikimi no ki" is indigenous in China, and grows there also in the valleys and on the mountains. It is called by the Chinese "Mang-thsao" (*mang* = mad; *thsao* = herb: Jap. "*moso*"), because it is said to cause paroxysms of frenzy in human beings.

The different parts of the plant are used in China similarly as in Japan. According to the 'Penthsao-kang-mu' (Chinese Natural History), the dried leaves are used in medicine. Powdered and mixed with rice or barley flour, they are used to kill fish, which, however form an innocuous food.

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* Translated from the "Mittheilungen der Deutschen Gesellschaft für Natur- und Völkerkunde Ostasiens," vol. xxiii. (Yokahama, 1881.)

MOTHER-PLANT OF THE TRUE OFFICIAL STAR-ANISE.

Illicium anisatam, Lour.; *Anisum peregrinum*, Bauh. Chin. "Hwai hiang" (Jap. "Kai-Ko"); "Pah-koh-hwui-hiang" (Jap. "Hakkaku uikio"=octagonal anise).

"Ta hwui hiang" (Jap. "Dai uikio"=greater anise, to distinguish it from "Sho uikio"=smaller anise= *Fœniculum vulgare* or *Anethum graveolens*, in Jap. "Inondo," and Chin. "Jira").*

In Japan the true star-anise is also called "Haku uikio" (=foreign anise).

This plant is indigenous in Cochin China, Siam and the south-west provinces of China, as Yunnan. The fruit of this plant, the true star-anise, is imported into China and Japan. To Europe and India it is generally sent *viâ* Hong-kong.

According to Rondot, the best kind is brought from Foukien to Canton and from thence exported through Tsiouen-tchou-fou. The fruit is also collected in Kiang-si and Kuang-tung. A perfectly exact description of this plant is at present wanting. It is said (Loureiro) that it differs from the Chinese and Japanese *Illicium religiosum*, Sieb., in its inferior height (about 8 feet), its smaller and more oval leaves, which are not, like the "shikimi," accuminate at both ends, but rounded, and in its greater number of stamens (up to 30). The fruit of the true star-anise differs from that of the Japanese in its distinctly sweetish, agreeable, strong anise- or fennel-like odour and taste, and further in not being poisonous.†

Distinctions in odour, taste, chemical composition (the different amounts of fats present, the poisonous constituent, etc.), and physiological action, cannot, from the point of view of the systematic botanist, contribute to characterize two plants as different species, since these properties, which possibly are due only to quantitative differences, may depend upon climatic conditions. Yamamoto Boyo, author of the 'Hiakushinko' (1843) remarks upon this as follows:—"The Japanese fruit resembles exactly the 'hakkaku uikio' (true star-anise) except in the smell; this difference is, however, a result of the influence of locality and climate, exactly as in the case of Chinese cinnamomum. Planted in Japan this tree loses its pungent taste and acquires moreover the aroma of 'shikimi.'" There remain consequently only the few morphological differences. In the *Pharmaceutisch Weekblad* (No. 30, Jahrg. 17), an anonymous writer (B.) states that he once saw in Belgium the true *Illicium anisatum*, Lour., and describes its characters as distinguished from those of *Illicium religiosum*, Sieb.; but the greater part of his description exactly contradicts the foregoing.

B. says—

"*Illicium anisatum*, Lour., is not large. Fruit with an agreeable aromatic fennel-like odour and taste. Leaves *about* 8 *centimetres long and* 2½ *cm. broad, lanceolate, acuminate at the cuneate base*; drawn in to some extent at the apex. Stamens usually 20.

"*Illicium religiosum*, Sieb.—Tree 5 or 6 feet in height. *Leaves 6 cm. long and 3 cm. broad, nearly without odour. Stamens present in larger number.* Fruit with scarcely aromatic odour, and a bitter turpentine-like taste."

According to B., consequently, the leaves are the smallest and the stamens are the most numerous in *Illicium religiosum*, Sieb., and not in *Illicium anisatum*, Lour. Also, leaves with a cuneate instead of a rounded base are ascribed to *Illicium religiosum*. He agrees, however, with the statement of Loureiro concerning the smaller habit of *Illicium anisatum*. But this is opposed to the statement in Flückiger and Hanbury's 'Pharmacographia' that at an altitude of 2500 metres in the province of Yunnan, in south-west China, the *Illicium anisatum*, Lour., attains a height of 12 to 15 feet, which is nearly the same height as that of the Japanese "shikimi."

With such diversity and imperfection in statements, also bearing in mind the generally divided opinions of authorities such as Baillon, Miquel, Bentley and Trimen, and Maximowicz, it cannot yet be concluded that the Cochin Chinese and the Japanese plants are systematically identical, or that both constitute different species, as has been done by some authors recently upon the ground of differences observed between commercial specimens of true star-anise and the fruit of *Illicium religiosum*, Sieb.

It is therefore of interest to ascertain how far the two commercial articles differ pharmacognostically from each other, and how far these differences justify the two mother-plants to be considered as separate species.

From the report of the Leeuwarden Commission (*Pharmac. Weekblad*, No. 4, 17 Jahrg.), I take the following:—

"The suspected fruit in the star-anise examined was smaller than the true. The carpels attained a length of 1 centimetre and a depth of 4 to 6 mm.; they were more shrivelled and wrinkled, and the carpels were mostly provided with a beak, which was frequently thorn-like, and at a right angle or pressed in towards the centre. In the true star-anise fruit the carpels usually have a small blunt apex, which stands out horizontally. The colour of the false fruit was shining brownish-yellow; that of the seeds yellowish-brown and slightly darker than that of the true star-anise seed."

Hager ('Handbuch der Pharmaceutischen Praxis') also describes the beak in the Japanese fruit as bent strongly upwards.

Geerts found in a comparison of a sample of fruit of *Illicium religiosum* with true star-anise the following differences:—

(1) The ends of the carpels of the Japanese fruit are acuminate and bent back upwards; on the contrary the ends of the true star-anise fruit are much less sharp and are either horizontal or very slightly bent upwards.

(2) The fruit of the Japanese star-anise is more woody and rougher on the surface.

(3) The seeds of the Japanese star-anise are of a paler yellow colour.

(4) The Japanese fruit are more shrunk in upon one another and more boat-shaped than the Cochin China fruit of *Illicium anisatum*, Lour.

I myself have compared six samples of star-anise purchased from Japanese druggists, which could be recognized as true by their sweet anise-like taste, with a sample of fruit of *Illicium religiosum* that was collected from a specimen in my garden.

The comparison showed that none of the above-mentioned distinguishing characters are constant.

Among the Cochin Chinese fruit many occurred, especially among the smaller ones, which contained seed of exactly the same brownish-yellow colour of the fresh "shikimi" seed; many of them were at least as much boat-shaped as the Japanese, and many were not larger than them.

The difference in the beak was usually tolerably distinct, but there were numerous exceptions in this also. Especially in respect to the separate carpels and among the best formed there occur many in the Japanese of which the beak is not more strongly developed nor more bent upwards than in the Cochin Chinese drug, and among the fruit of the latter I found some with a sweet anise taste, the beaks of which appeared exactly and as much bent back as in the unripe "shikimi" fruit.

Quite in accordance with this von Siebold, gives in his 'Flora Japonica' (vol. i., tab. 1), a figure of the fruit of his *Illicium religiosum* in which the beaks of the carpels correspond perfectly with those of the true star-anise.*

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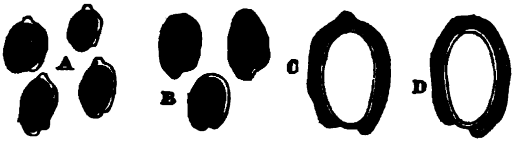
* Older naturalists probably also name *Fœniculum vulgare* (Jap. "Kureno-omo") "Dai-ui-kio." Li-si-chin, a Chinese naturalist, calls only the fruit of *Fœniculum vulgare* exported from Nehia "Dai-ui-kio"; all other commercial kinds of *F. vulgare* he calls "Sho-ui-kio."

† The Leeuwarden Commission states upon this point that the injection of the extract of the true star-anise into frogs and rabbits did not induce the slightest abnormal symptoms.

Schoor mentions further (*Pharm. Weekbl.*, No. 27, 17 Jahr.), that he had found in the museum at Leyden a specimen of the fruit of *Illicium religiosum* that came from Siebold, which appeared exactly like true star-anise. On this specimen it was stated that it had been plucked from a very aromatic tree.

In the samples compared with one another by me, I found further, that in the seed of the Japanese fruit (in exceptional cases less clearly perceptible) the apex of the seed was not rounded, but at the end of the keel terminated in a raised point, which I never observed in the true star-anise. In another larger sample of "shikimi" seed these exceptions became somewhat more frequent, especially in the larger well-developed seed.



A. Seed of *Illicium religiosum*, Sieb. B. Seed of *I. anisatum*, Lour. C. Section through the testa of *I. religiosum*. D. Section through the testa of *I. anisatum*.

Althlugh in a superficial comparison of a sample of "shikimi" fruit with one of true star-anise differences of form cannot be denied, and these taken in conjunction with the difference in odour and taste between the two drugs appear to me sufficient for a pharmacognostical distinction, because it is possible generally to discover "shikimi" fruit in the Cochin China commercial article,† yet none of these morphological differences can be taken as sufficiently constant to give certain information upon the settlement of the question whether the two mother-plants must be separated as distinct species.

The observed differences in form are therefore very probably connected with the age, the manner and time of collection, the conveyance, climate, etc.

A nearer study of the mother-plant of the true star-anise, and of its fruit, as a drug, carried out by competent persons, appears to be very desirable in order to decide whether *Illicium religiosum*, Sieb., and *I. anisatum*, Lour., are botanically different or form different species. What was said upon this point by Daniel Hanbury ('Science Papers,' p. 189), therefore, still retains its importance:—"Information should be collected by an eye-witness as to the production of this spice in Southern China. Botanical specimens of the tree and full particulars respecting the collection of the fruits are desirable."

Meanwhile, probably, we cannot go further than to consider the Japanese "shikimi no ki" as a poisonous—probably only as a more poisonous—variety of *Illicium anisatum*, Loureiro.

But from a hygienic point of view a distinction must be made between the Japanese and Cochin China star-anise as a commercial drug. For pharmacognostically distinguishing the true star-anise from the fruit of "shikimi" the following characters can be taken in consideration:—

True Star-Anise.	*Shikimi Fruit.*
Taste sweet, anise-like; odour faintly of anise.	*Disagreeable taste, not sweet or like anise. Smell not like anise, but faintly resembling laurel, clove and nutmeg.*
Somewhat larger than "shikimi" fruits. Surface more resembling cork. Beak short, horizontal, or slightly bent upwards, pointing outwards. Carpels less woody, shrivelled in one upon another, and wrinkled. Seed mostly dark brown with rounded apex.	Somewhat smaller than true anise. Surface more shining, red-brown. Beak thin, frequently bent strongly upwards or crooked backwards. Carpels more woody, much shrunk in one upon another, wrinkled. Seed mostly yellow-brown, with a stout keel and a raised apex.

Tokio.

THE PRODUCTION OF PEROXIDE OF HYDROGEN BY HYDROGENIZED PALLADIUM.*

OZOBENZENE.

BY DR. ALBERT R. LEEDS.

Peroxide of hydrogen is to be bought at the druggist's, but the article that is so procured is water containing about 1 per cent. of the real chemical, and looks exactly like water. It is called oxygenated water. Its chemical symbol is HOOH. It is usually sold under the familiar name of the golden liquid, from the property it possesses of giving ladies' hair that extremely beautiful golden colour which is by many so very much admired. I once brought home a bottle of it, but the ladies to whom I showed it felt no interest in it as a chemical product; when, however, they learned of its effect on the hair, they became greatly interested, and one of them cut off a lock, washed and immersed it, and it came out a beautiful yellow. This effect is produced by the chemical's violent oxidizing action, and its breaking up the colouring pigment of the hair.

The first set of experiments that I instituted were to determine whether oxygen alone, in sunlight or diffused light, or oxygen together with platinum black, in sunlight or diffused light, would oxidize benzene after long continued exposure. In every case a negative result was obtained, except in that of oxygen and platinum black brought into contact with benzene and a little water in a litre flask, and exposed to the direct sunlight. In the course of a few hours the liquid became slightly yellow, and at the end of eight days was dark yellow and intensely acid. A large amount of oxalic acid had been formed, but no acetic acid and no phenol.

The earliest experiments upon the action of ozone upon benzene were made by me two years ago with the object of further studying the remarkable products obtained by Houzeau and Renard in the course of their investigations upon this subject (*Compt. Rend.*, lxxvi., 572). Along with small amounts of formic and acetic acids they obtained a gelatinous body, which when dried formed a white amorphous solid, and which they called ozobenzene. It was permanent only at low temperatures, and on gentle warming exploded with tremendous violence. Fearing the possible formation of this dangerous substance, I made my first experiment upon 1 gram of benzene; but the amount operated upon was gradually increased until in the eighth and final trial it amounted to 35 grams. In some experiments the benzene was cooled by a freezing mixture; in other trials it was ozonized at common temperatures; and in the last, the temperature was kept at 50°. The benzene was exposed to the oxygen, strongly ozonized by the silent discharge, and containing about 70 m. grams of ozone in the litre, either in shallow dishes placed under a receiver, through which the perfectly dry ozonized gas was kept flowing, or in Geissler bulbs connected with other bulbs to arrest the volatile products of ozonation. But in every case the results were the same. Large volumes of carbonic acid were given off; and the benzene, as it diminished in volume, became converted into a dark yellow oily mass, containing crystals of oxalic acid. In other cases, when the ozonation was performed in bulbs, an amorphous blackish mass separated out on the sides of the vessels. From these residues no crystalline bodies could be obtained, either by the use of solvents or by sublimation. No indications whatsoever were noted of the white explosive body spoken of by Houzeau and Renard.

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* I have never seen the beaks standing out horizontally in the "shikimi" fruit in the unripe condition; Siebold's figure is, therefore, probably that of a ripe fruit. This, however, on account of the rounded form of the carpels, not shrunken in upon one another, is not very exactly shown.

† In three of the above-mentioned samples of true star-anise four fruits of *Illicium religiosum*, Sieb., could be recognised by these characters, chiefly those of smell and taste. In two of these fruits, which appeared old, the seed were very dark coloured, exactly like most of the seed in true star-anise.

* At a meeting of the Academy of Sciences, New York, on Monday, March 14, Dr. Leeds, of the Stevens Institute of Technology, Hoboken, N.J., gave an account of experiments he had made, relating chiefly to peroxide of hydrogen, benzene and ozone. From the *Oil and Drug News*, March 29, 1881.

Besides carbonic and oxalic, formic and acetic acids were obtained, the latter in considerable quantity. Especial care was paid in making the experiments to the detection of phenol; but, as far as the tests used were concerned, no evidence of the presence even of a trace of this body was obtained. Hydrogen peroxide was likewise absent.

The fact that triatomic oxygen (O_3, ozone or active oxygen) is not capable of oxidizing water to the form of peroxide of hydrogen, while monatomic oxygen (O, or nascent oxygen), is, rendered it probable that a similar difference would be observed in the effects of ozone and of nascent oxygen upon benzene. This supposition has been confirmed by experiment. The nascent oxygen was obtained by the action of phosphorus partially submerged beneath the surface of water upon air at common temperatures. When no benzene is present, the nascent oxygen oxidizes the oxygen molecule to the form of ozone; the water molecule to hydrogen peroxide; and the nitrogen molecule in the presence of water to ammonium nitrate. But on the addition of benzene the ozone action disappears. The resulting products differ according as the reaction takes place in the sunlight or in diffused light. In the former case, after prolonged exposure, large amounts, both of phenol and oxalic acid, are formed; the phosphorus is converted into yellowish-red amorphous phosphorus, and the liquid remains colourless.

In the latter case, the flask being kept in a warm place, the liquid becomes of a dark brown colour, and abundance of oxalic acid, but no phenol, is formed. At common temperatures the phosphorus goes into solution in the benzene, and is gradually converted into a mass of white dodecahedral crystals, the liquid remaining colourless. It is only when the temperature is above the melting point of the phosphorus (in these trials 50° to 70°) that the dark brown liquid is produced. Curiously enough, though the flask becomes filled with dense white fumes, no inflammation took place at these elevated temperatures, the benzene vapour apparently protecting the phosphorus from ignition.

Excess of calcium chloride was added to the syrupy liquid, the dense precipitate of calcium phosphate and oxalate (somewhat dark from a portion of the organic matter carried down at the same time) filtered off, and the filtrate evaporated to dryness. The soluble portions were then dissolved out with the least possible amount of water, the excess of calcium precipitated out by potassium sulphate, the whole evaporated to dryness, and treated with absolute alcohol. As a small portion of the potassium chloride was taken up by the alcohol, this extract was again evaporated to dryness, and the operation repeated three times, when only the organic matter remained in solution. It was of a yellow colour, and pasty consistence; but as it could not be made to crystallize, and, furthermore, was in small amount, its further investigation was abandoned.

After my research had been in progress, I found that Professor F. Hoppe-Seyler (*Ber. der Deutsch. Chem. Gesell.*, xii., 1551), starting out from similar views as to the effects resulting from the action of nascent hydrogen upon oxygen, had performed a series of interesting experiments with hydrogenized palladium foil. A piece of such foil shaken up along with benzene, water and air, in a flask, and allowed to stand for a time, yielded an amount of phenol sufficient, after its conversion by the addition of bromine water into tribromphenol, for analysis. Besides the phenole, Hoppe Seyler obtained a body which turned brown on the addition of potash.

On repeating the experiment, I obtained a very abundant reaction for phenol. On addition of lime water, the colouring matter, which had been formed at the same time, was thrown down as a yellowish-brown precipitate. Not a trace of oxalic acid was present. To my mind, no satisfactory explanation could be given of the formation of phenol under these circumstances, except upon the supposition of the production of peroxide of hydrogen as an intermediate step. In the case of phosphorus oxidizing in moist air, the contemporaneous formation of both ozone and peroxide of hydrogen by the action of the nascent oxygen upon the oxygen and water is a demonstrated fact.

Three suppositions, therefore, were admissible: Either the phenol was formed by the direct action of the nascent oxygen; or, second, by the action of the ozone; or, third, by the action of peroxide of hydrogen. The first supposition requires that the oxygen should produce by direct synthesis a molecule of phenol, which is in the highest degree improbable. The second supposition is inadmissible since the non-formation of phenol by treatment with ozone had been abundantly proven. The third supposition admitted of the rational explanation expressed by the formula—

$$C_6H_6 + HO,OH = C_6H_5\text{-}OH + H_2O.$$

Two modes of testing the validity of the third hypothesis presented themselves. The first was that of bringing the hydrogenized palladium foil into contact with water and air in a flask, and ascertaining if the oxygen rendered nascent by oxidation of the hydrogen would oxidize the water to the form of hydrogen peroxide. In case an affirmative result was obtained in this experiment, it would be important to try the second test of treating benzene directly with a peroxide of hydrogen solution.

A strip of palladium, after remaining for several hours as the negative pole of a battery of six Bunsen elements, in water acidulated with sulphuric acid, was placed along with 10 c.c. of ammonia-free water in a half-litre flask filled with air. At the end of three days the water was tested with guaiacum and a solution of diastase. It developed a deep blue colour. On addition of cadmium-iodide-starch solution, iodide of starch was formed, and on titration with sodium hyposulphite it was found that the total quantity of hydrogen peroxide present in the 10 c.c. of water amounted to 0·67 milligram.

It is not improbable that both ozone and ammonium nitrate are likewise formed in the course of this reaction; but of the former no satisfactory indication was obtained, and the latter was not looked for, inasmuch as it would have required the repetition of the experiment on a much larger scale, and with many additional precautions.

The successful issue of this experiment encouraged me to try what otherwise would not have been attempted, the treatment of the benzene with H_2O_2, and 20 c.c. of benzene were allowed to stand at common temperatures for two days in contact with 300 c.c. of a slightly acidulated 1·2 per cent. solution of hydrogen peroxide. The liquids remaining colourless, the flask was attached to a reflux condenser, and placed in a water-bath. After the water in the bath had been kept boiling for several days, it was saturated with chloride of calcium, and the digestion continued at this temperature for two days longer. At the end of this time the liquid had become yellow, and was found to contain, beside the colouring matter, oxalic acid and phenol. A very abundant precipitate was thrown down from the aqueous solution on addition of bromine water, and this precipitate of tribromphenol, after recrystallization from alcohol, was found to weigh 0·25 gram.

Not only is the direct conversion of benzene into phenol by the action of hydrogen peroxide of much interest, phenol having hitherto been obtained only by some indirect process, but it supplies a satisfactory demonstration of the validity of the third hypothesis above stated.

FRUIT SYRUPS.*

BY ADOLPH G. VOGELER, PH.G., CHICAGO.

Already largely prescribed by practitioners in the United States, syrup of raspberry constitutes a most pleasant addition to many medicines, especially those containing mineral acids. In many compounds it cannot be advantageously replaced by any other corrective, owing to its agreeable aroma. This syrup is particularly adapted for saline antifebrile mixtures, or for potions otherwise insipid, as for instance solutions of pepsin, lactopeptin, etc., while it is also desirable for preparing cooling draughts for the patient.

Strawberries, mulberries, and black cherries may be mentioned as yielding palatable syrups, but in nowise equal to that of raspberries.

The preparation of the syrup may be accomplished in two ways: either the juice is expressed from the fruit and then combined with sugar; or the unimpaired berries are mixed with sugar, when the latter will extract the juice, leaving the berry shrivelled and tasteless. Owing to the circumstance that practically but two months would have been at my disposal for comparative experiments, I refrained from endeavouring to determine the most preferable method of making fruit syrups (two years would be short allowance for such a purpose), and shall for that reason only enumerate various methods as compiled from different sources. I wish to remark, however, that I should give preference to the process as exemplified by the German Pharmacopœia, modified by an addition of five per cent. of alcohol to the contused berries previous to fermentation (process No. 2).' Pectin in this manner will separate more rapidly, while the juice is less liable to deteriorate. It may be found best to direct the pure filtered juice to be preserved by means of Appert's process, and to have the syrup prepared for this in small quantities for actual use only. The raspberry syrup as found in the market is quite a thin fluid, keeping indefinitely, from which I infer that it contains an appreciable amount of alcohol. According to my personal experience fruit syrups will undergo fermentation if exposed in shelf-bottles; if then the presence of a specified percentage of alcohol will preserve the same, I can see no valid objection to its introduction. Before proceeding to enumerate the different processes for making fruit syrups or juices, a test for distinguishing natural syrup of raspberry from a spurious article may not be out of order. I copy from 'Handbuch der Pharmaceutischen Praxis,' ii., pp. 830, 831.

Test for Syrup of Raspberry.—*a.* Mix equal volumes of the syrup and of ammonia 10 per cent. The colour of true syrup changes to violet with a slight tinge of green. If, however, the colour changes instantly or soon to green or yellow, some foreign vegetable colouring matter is present; and if it should become colourless or nearly so, it is adulterated with rosaniline.

b. If the syrup is coloured with red aniline the latter may be detected by macerating in it some white silk or wool, and rinsing the cloth in water. Water removes the raspberry stain, but not the aniline. If the fabric be dipped in ammonia the aniline dye will vanish, but reappear on moistening with acetic acid.

Syrup of Raspberry.—1. Contuse the berries, place them in a vat, add 2 per cent. of sugar, and ferment the mass at a temperature of between 70° and 80° F. for three or four days until all pectin has separated and no more signs of fermentation are visible. Then express the juice, which allow to settle in a cool place for two days, decant carefully from the pulverulent pectin, and filter. Preserve the juice by Appert's process (see *The Druggists' Circular*, 1878, p. 61), or convert into syrup by dissolving in 5 parts of the clarified juice 9 parts of sugar, and heating to the boiling-point.—'Handb. d. Pharm. Praxis,' i., p. 796.

2. A better and safer way is to add at once to the freshly bruised fruit 5 to 6 per cent. of alcohol, and then proceed as in the foregoing. This formula would seem to deserve preference.—*D. C.*, 1880, p. 99.

3. Crush the raspberries in a glass vessel with a wooden pestle to a pulp, add to it 5 to 10 per cent. of cane or grape sugar, and allow the whole to stand, stirring occasionally. When the mass ferments the juice becomes clear; it may then be filtered and bottled, or converted into syrup. *D. C.*, 1873, p. 130.

4. Put 6 pounds of raspberries into a china bowl, with a quart of water in which has been dissolved 2½ ounces of citric acid, and let it remain twenty-four hours; then strain, taking care not to bruise the fruit. To each pint of clear liquid add 1½ pound of sugar, and stir until it is dissolved.—*D. C.*, 1872, p. 128

5. Proceed as in No. 1. When the fermentation is nearly ended (indicated by the appearance of a small yellow fly) express the juice, add to every pound of the latter 1 ounce of deodorized alcohol, set aside for one night, and then filter. Bottle the juice, or convert into syrup.—*D. C.*, 1878, p. 109.

6. Macerate the berries in layers interspersed with sugar, 1¾ pound of sugar to 1 pound of berries, for twenty-four hours in a cool cellar, and then drain off the juice. Preserve the syrup by means of Appert's process. —Parrish's 'Pharmacy,' p. 264.

7. Add to the foregoing product some alcohol, or a little bisulphite of lime. The flavour is not supposed to be impaired by the latter.—*D. C.*, 1870, p. 43.

8. Pure fruit juice, 16 fluid ounces; dilute acetic acid, 1 fluid ounce; water, 7 fluid ounces; granulated sugar, 3 pounds. Dissolve the sugar without heat. Preserve in air-tight vessels in a cool place. The acetic acid is objectionable.—*D. C.*, 1874, p. 208.

Syrup of Mulberry.—Mulberry juice, 1 pint imp.; sugar, 2 pounds; rect. spirit, 2½ fluid ounces. Heat the juice to the boiling-point, and when it has cooled filter it. Dissolve the sugar in the filtered liquid with a gentle heat, and add the spirit.—B. P.

Syrup of Strawberry. — Put 2 parts of strawberries deprived of the calyx, without crushing them, into a large-mouthed jar; add to them 2½ parts of sugar, and frequently shake, keeping the vessel in a cool place. The sugar absorbs the juice, leaving the fruit shrivelled and tasteless, the latter being removed by means of a strainer without pressure. Mix the clear syrup with 20 per cent. of alcohol. (Source, some German journal.) I have made syrups of strawberry and of pineapple in this way for soda-water, not adding any alcohol, but I bottled it as soon as made. These syrups were excellent, and I have kept some of them for three years without change, only that a slight sediment would form, which was easily separated. But this syrup will spoil as soon as exposed to the air, except when kept on ice. The above addition of alcohol overcomes this defect.

Syrup of Cherry.—Employ the black, sour variety. Crush the cherries, together with the stones, and follow the directions given in No. 2.

Fruit Syrup for Lemonade.—Raspberries, 1000 grams; blackberries, 500; bilberries, 500; lemon, 3 fruits. Mash in a stone mortar, and add of cold water, 1500. Let stand for three days, or until fermentation has finished. Express and filter. In every 2500 dissolve citric acid, 40; and sugar, 4500. Boil up once in a copper kettle.—'Handb. d. Pharm. Praxis,' ii., p. 831.

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* From a paper read before the American Pharmaceutical Association. From the "Transactions."

The Pharmaceutical Journal.

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SATURDAY, JUNE 25, 1881.

MISCONCEPTIONS AS TO THE SALE OF POISON.

THE correspondence between the President of the Pharmaceutical Society and the Coroner for Central Middlesex, published in last week's Journal, ought to be of service as evidence that sufficient attention is not always paid to the provisions of the Pharmacy Act, when complaints are made concerning the sale of poisons. It is above all things desirable that coroners should not fail in this respect since any remarks from them conveying censure upon persons from whom poisons may have been obtained are calculated to inflict considerable injury upon those referred to. It is clear that Dr. DANFORD THOMAS was misled by the evidence given before him at the inquest, but it must also be admitted that there was much reason for his presumption that the remarks of Messrs. HUXTABLE's assistant as to the practice in registering sales of poison were based upon a knowledge of what was required by the Pharmacy Act. There was no occasion to offer an excuse for not registering the sale of oxalic acid, because the law does not demand that this shall be done, and this irrelevant excuse was the only basis for the coroner's opinion that the law had not been complied with, and that the chemist was consequently liable to a penalty of five pounds.

We are glad to see that this view of the case has been taken by Dr. DANFORD THOMAS and that he admits having been misguided by the statements made before him. There is however another part of his remarks to which we feel constrained to refer, not in any captious spirit, but because we think the statement that "people could go and buy as much poison as they liked at anyone's shop without being asked a question," is neither justified by the facts of the case nor an evidence of the imperfect state of the law on the subject. Whether, in the case of those poisons that may be legally sold without subjecting the purchaser to examination as to the use they are to be put to, it be requisite to impose more rigid restrictions upon their sale may be a question for consideration; but having constantly occasion to observe and record the circumstances attending the sale of poisons in cases where their misuse has led to inquiry before coroners, we have no hesitation in saying that as a general rule the existing provisions of the law are carefully observed by registered chemists and druggists, who are the only persons legally qualified to sell poisons. The statement made in the above terms by Dr. DANFORD THOMAS at the Clerkenwell Coroner's Court, and reported in the local paper as having been an expression of what he knew to be the case, was therefore unmerited by the class to which he referred, not only so far as relates to strict compliance with the provisions of the Pharmacy Act, but also as regards the precautions voluntarily taken by chemists and druggists in the sale of poison.

There is, however, another reason for objecting to statements such as those just mentioned, and that is the miserable exaggeration to which they are subjected, and the perverted application made of them by the "young lions of the press." The remarks of a coroner at an inquest are eagerly seized upon by some member of this fraternity, and blown up into a portentous leading article, in which the chemist and druggist is represented, almost like IAGO, as the malignant instigator of foolish or wicked people to provide themselves with poisons, and try their effects upon themselves and others. An instance of this kind was lately offered by a London daily paper, containing an account of three inquests, held upon June 6, over persons who had poisoned themselves with carbolic acid, opium and oxalic acid. The verdict of unsound mind was given in all cases, and, we think, it is no reproach to the common sense of juries to say that it is the "usual" verdict in such cases, though the writer of the article now referred to appears to suggest the contrary, and thinks it strange "no effort was made to ascertain who supplied the poisons." But he sapiently adds there can be little doubt that they were severally purchased at druggists' shops, where it is manifest that the provisions of the law regulating the sale of deadly articles of this nature are very frequently infringed.

Here we have almost the words made use of by Dr. DANFORD THOMAS, at the inquest above mentioned, reproduced as if for the information of the public, though in reality conveying to the appreciation of anyone conversant with the law and with the other circumstances of the case nothing more than a demonstration of the ignorance of the writer and a conviction that in many respects the liberty of the newspaper press is capable of being a nuisance to be feared rather than a privilege to be proud of. We trust, however, that by means of such communications as have passed between the President of the Pharmaceutical Society and Dr. DANFORD THOMAS it may be possible to prevent, or at least to mitigate, the injury which is done by heedlessly supplying "young lions" with provender they cannot digest.

THE BRITISH ASSOCIATION.

WITHIN a very short time the British Association for the Advancement of Science will have been in existence for half a century, and it has been decided that the next meeting is to be held during the first week of September next in York, the city where its first annual meeting was held, in 1831, under the presidency of Earl FITZWILLIAM. To mark the importance of the forthcoming meeting, at which Sir JOHN LUBBOCK will be President, the General Committee of the Association has resolved to appoint Past Presidents of the Association as Presidents of nearly all the sections, and it has been thought that on this occasion advantage should be taken of the opportunity to show in some degree the beneficial influence that has been exercised by the Association and the progress that has been made since its inauguration in the construction of instruments of scientific research. There is, therefore, to be, as we have previously notified,[*] an exhibition of scientific instruments used at various periods during the last fifty years, the object being to contrast the instruments of to-day with those in use at the time of the formation of the Association. It may therefore be expected that the meeting of the Association this year will be one of unusual interest and that it will be very numerously attended.

We note these facts partly for the information of those among our readers who are in the habit of attending the meetings of the British Association, and partly also because the British Pharmaceutical Conference will, in conformity with previous custom, hold its annual meeting at the same place and about the same time as that of the British Association. As yet we are not in possession of any detailed information respecting the arrangements that will be made for the Conference meeting, but we learn that the local committee which has undertaken the duties of providing for the reception of visitors is taking steps to make the meeting a successful one. Rooms have already been engaged at the Station Hotel for members of the Conference, and in all probability we shall be able in a few days to give every requisite information.

Meanwhile we may usefully take this opportunity of pointing out some of the features of attraction which York affords, and of stating what is being done to prepare for the meeting of the British Association. In the first place we may remind our readers that among the attractions of the city of York its noble minster, its Norman castle, its Roman remains and mediæval walls are pre-eminently objects of general and antiquarian interest. York also contains several manufactories interesting to scientific men, and we understand that opportunities for visiting these will be offered to members of the British Association during their stay.

The city of York also presents in various other ways considerable attraction as a place of meeting. It enjoys exceptional railway facilities, being within four hours of London and of Liverpool, and about five of Edinburgh and Bristol. In York itself the hotel and lodging accommodation is ample, and at the New Station Hotel recently erected by the North Eastern Railway Company, the ordinary tariff of charge will not be raised during the meeting. The North Eastern Railway Company has liberally arranged for the issue of periodical tickets at cheap rates to members and associates, for going and returning as often as desired during the time of the meeting between York and the chief places in the district. By this arrangement residents and visitors at Leeds, Newcastle-on-Tyne, Scarborough and Harrogate, will be enabled to attend the meeting, and for those who may not desire to stay in York, there will be a further opportunity of obtaining lodging accommodation in some of the neighbouring towns.

Ample accommodation for the sittings of the several sections of the British Association and of the Pharmaceutical Conference will be afforded by the public buildings of York. The Great Hall of the Yorkshire Fine Art Institution, capable of seating 3000 persons, will be used for some of the Evening Meetings.

The Lord Mayor and Corporation of York have placed their Guildhall at the disposal of the Local Secretaries for use as a reception room. The Theatre of the Museum of the Yorkshire Philosophical Society, in which the first meeting of the Association was held in September, 1831, will be the place in which the Geological Section will hold its sittings. This museum, besides containing many of the type specimens collected by the late Professor PHILLIPS, when he was its curator, has recently been much enriched by the addition of other collections. The beautiful grounds adjoining, which contain the ruins of St. Mary's Abbey and many other objects of interest, Roman, mediæval, and modern, will also be open to visitors.

Among other places of interest it may be mentioned that the Yorkshire Fine Art Institution, to which the members and associates of the British Association are invited by the Council, will contain the Prince of Wales's Indian presents, lent by His Royal Highness on account of the visit of the Association, a collection of scientific instruments, and a valuable collection of pictures, including the celebrated Duncombe Park collection of old masters. The minster will also be thrown open for inspection. At Middlesborough, Messrs. BOLCKOW, VAUGHAN and Co. will show their new process for the production of steel from the Cleveland iron, and Messrs. BELL and Co. their boring for salt, both striking illustrations of the utility of applied science. Excursions will be made to Scarborough, Whitby, Castle Howard, Duncombe Park, Rievaulx Abbey, Aldborough—the Roman Isurium—and to other places.

AN AMERICAN DEFINITION OF DRUG ADULTERATION.

AT the commencement of the present month an "Act to Prevent the Adulteration of Food and Drugs" came into force in the State of New York, which presents some points of interest in its definitions. To commence with, the term "drug," as used in the Act, includes all medicines for internal or external use. A drug is to be deemed "adulterated," (1) if, when sold under a name recognized in the United States Pharmacopœia, it differs from the standard of strength, quality or purity laid down in that work; or (2) if, when sold under a name not so recognized, but found in some other pharmacopœia or standard work on materia medica, it differs materially from the standards there laid down; or (3) if its strength or purity fall below the professed standard under which it is sold. The State Board of Health, which is entrusted with the supervision of public analysts and chemists under the Act, is also charged with the duty of from time to time fixing the limits of variability permissible in any drug or compound the standard of which is not fixed by any national pharmacopœia. The penalties under the Act are for a first offence fifty dollars, and one hundred dollars for a second or subsequent offence. The Act is almost identical with one that has been recently passed by the Legislature of the State of New Jersey.

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[*] See *ante*, p. 1030.

Proceedings of Scientific Societies.

CHEMICAL SOCIETY.

A meeting of the above Society was held on Thursday, June 16, Professor Roscoe, President, in the chair.

The following certificate was read for the first time:—F. Sear.

During the evening a ballot was held and the following gentlemen were declared by the scrutineers, Messrs. Groves and Warington, to be duly elected Fellows of the Society:—A. B. Avarne, G. H. Bostock, W. Bedford, B. Browning, J. M. Collett, A. W. Duncan, J. E. Doyle, A. E. Davies, H. Frankland, A. J. Hailes, C. W. Marsh, A. Philip, T. K. Rogers, J. Schwartz, O. Trigger, G. Tate, J. P. Wilkes.

The President read a letter which he had received from Lieutenant-Colonel Malcolm, Honorary Secretary of the Museum Sub-Committee of the British Association:—"17, Blake Street, York. It is intended to illustrate at the forthcoming meeting of the Association, as far as possible, the progress which has been made in the construction of instruments of scientific research during the past fifty years. With this view scientific men, societies and manufacturers are invited to exhibit instruments of the latest patterns and tools used in their construction, together with the instruments used in 1831. The Exhibition will last only from August 31 to September 8." The President therefore invited Fellows of the Society who could exhibit such apparatus to forward, as soon as possible, details of the apparatus and space required to the above address.

Mr. W. H. Perkin then communicated a paper on—

The Isomeric Acids obtained from Coumarin and the Ethers of Salicylic Aldehyde.—Some years ago the author showed (*Chem. Soc. Journ.*, 1877, i., 388), that by the action of acetic anhydride and sodium acetate on the hydride of methyl salicyl, an acid (methylorthoxyphenylacrylic acid) was produced. By treating the hydride of salicyl in the same way coumarin was formed. Tiemann has since shown that this is preceded by the formation of coumaric acid, which has a constitution analogous to the above acid, but has an atom of hydrogen in place of methyl. Now coumarin, when treated with alkalies, gives a coumarate which, however, splits up into coumarin when treated with acids, but if treated with methylic iodide it produces a methylated acid of the same composition and apparently the same constitution as that obtained by the action of acetic anhydride on the hydride of methyl salicyl; its fusing point is, however, nearly 100° lower than the acid from the hydride of methyl salicyl. It can be converted into it by the action of heat. The cause of this isomerism being unintelligible, the author has undertaken the present investigation for the purpose of examining the acids, their derivatives and any homologues which might be formed from the other coumarins. The acid obtained from coumarin is called by the author the α, the other β methylorthoxyphenylacrylic acid. The α acid was obtained in magnificent highly refracting crystals; it is changed into the β acid by heat and by violet or ultra violet light. The two methylic ethers and the α and β ethyl acids were prepared and examined. Nascent hydrogen converts both acids into the same acid, dihydromethylorthoxyphenylacrylic acid. The actions of nitric acid and bromine were also studied, and various derivatives obtained. Isomeric dibromides were obtained and experiments made with the methylic ethers of the acids; the β ether yielded 70 per cent. of a dibromide, melting at 68·7° and 30 per cent. of a dibromide melting at 125°: the α ether yielded as a principal product a dibromide fusing at 125°, with a small quantity of the body melting at 68°. The action of bromine on the α and β ethylic ethers was also studied. The actions of fuming hydriodic and hypochlorous acids were examined. The derivatives from propionic and those from butyric coumarin were next prepared. These coumarins yielded acids analogous to that from ordinary coumarin. From the author's research it appears that in general the effect of chemical action on the α acids is to convert them into the same compounds as are yielded by the β acids under similar circumstances. This is probably due to the heat evolved by the chemical action converting the α into a β derivative. The limited action of bromine is an exception, but in this reaction but little heat is evolved. The hypothesis that the isomerism results from the difference of structure of this group is considered, but is not thought by the author to be established. The physical differences of the α and β ethers described in the paper are considered, and the author concludes as the boiling points, densities, refractive indices, etc., of the α compounds are all lower than those of the β body, and the α compounds are the less stable, that it is probable that the molecules of the α body are further apart than those of the β body. Reference is made to the fact that the formation of these α bodies is always connected with dehydration and rehydration, and a suggestion is made that if a difference of proximity of the groups is the cause of the isomerism, it is probably due only to a difference of distance between the radical and the hydroxyl. It is also pointed out that in most cases where bodies are what is called physical isomerides they are hydroxylized products.

Mr. Fletcher then gave a short statement of the results which he had obtained from the measurement of the various crystallized bodies prepared by Mr. Perkin.

Dr. Wright suggested that it would be interesting to determine the heat of combustion of one or more pairs of those α and β bodies.

Professor Hartley thought that probably some difference might be found in the optical transparency of these isomeric bodies.

Dr. Armstrong then communicated a paper by Mr. G. Lowe and himself entitled—

Notes on Naphthalene Derivatives.—The authors have continued their investigations as to the action of sulphuric acid on naphthalene and confirm their previous statement that three and not two disulphonic acids may be obtained. By operating at 180° a mixture in about equal proportions of the α and β disulphonic acids of Ebert and Merz is obtained; but at 100° a third acid is also formed, corresponding to the dihydroxynaphthalene melting at 156° which they have described. This third acid is obtained in relatively small quantity and the authors have not yet established the conditions which are most favourable to its production, nor have they devised a satisfactory method of separating it from the isomerides. They have confirmed their observations on the action of fused potassium hydroxide on potassium β naphtholsulphonate, but doubt whether more than a single body is produced in the reaction. It crystallizes from hot water (in which it is much less soluble than the dihydroxynaphthalene previously described) in small plates, melting at 218°–220°, it separates from acetic acid in large ammonium-chloride-like forms. The alkaline solution exhibits a blue fluorescence and rapidly darkens on exposure to air.

Dr. Armstrong then described an isomeric β napthol-sulphonic acid obtained by Mr. Stallard and himself by dissolving β naphthol in cold concentrated sulphuric acid. The authors were led to the discovery of this substance by noticing that when less sulphuric acid than Schaefer prescribes for the preparation of β naphtholsulphonic acid is used, it is difficult to obtain the salts in the clear transparent crystals so characteristic of the β naphthol sulphonates. The salts of the new acid are much more soluble and when submitted to the action of bromine or nitric acid readily exchange the sulpho-group for bromine or NO_2, forming bromo and nitro derivatives of naphthol. The acid previously known retains its sulpho group under similar treatment. Dr. Armstrong demonstrated this reaction to the Society and pointed out that it was a good lecture illustration of the extraordinary difference of the SO_3H group according as it occupied the so-called α or β position in naphthalene.

Mr G. S. Johnson then read a paper—

On the Synthesis of Ammonia (third notice).—This paper is practically an answer to the criticism of Mr. L. Wright on the previous communication of the author. Mr. Wright stated that the nitrogen used by the author was not pure, that it contained nitric oxide, and that the ammonia formed was due to the presence of this impurity. The author of the present paper points out that he relied for the purification of his nitrogen from nitric oxide, not on an acid solution of ferrous sulphate, but on pumice impregnated with hydrated ferrous oxide precipitated by the ammonia evolved on boiling the ammonium nitrite. He has repeated his previous experiments and tested the N carefully for NO by mixing with air and bubbling through starch and potassium iodide solution. Although no blue colour was seen in half an hour, yet this pure N when mixed with H still formed ammonia. Other experiments were made in which the nitrogen was purified by mixing with air and allowing the mixed gases to stand for some hours over water rendered alkaline with potash. This also produced ammonia when mixed with hydrogen and passed over spongy platinum. The author finds that when the pure nitrogen is passed through heated asbestos before mixing with hydrogen it is no longer capable of combining with hydrogen in the presence of spongy platinum. This experiment was exhibited to the Society; as long as the asbestos was hot no ammonia was produced, but on allowing it to cool, after about twenty minutes a Nessler solution became distinctly yellow. The author thinks that this experiment indicates the existence of an active allotropic nitrogen analogous to ozone and hopes to produce further evidence on this subject. He concludes that he has proved that the synthesis of ammonia from hydrogen and nitrogen obtained by the action of heat upon a solution of ammonium nitrite is possible in the presence of spongy platinum.

Mr. J. Mond said that after two years' work at every conceivable means of causing the direct union of nitrogen and hydrogen with spongy platinum, platinized asbestos, etc., he had only met with negative results, and had come to the conclusion that the silent discharge was the only means of effecting the direct union of these two elements.

Mr. W. A. Shenstone then read a paper—

On the Alkaloids of Nux Vomica.—The author has, with the aid of Messrs. Hopkin and Williams, extracted the alkaloids from 56 lbs. of the seeds of *Strychnos Nux-vomica*. His object was to extract and examine the alkaloids prepared by using as little heat as possible, and avoiding heat in the presence of acids or alkalies altogether. The process used is similar to that employed by Dr. C. R. A. Wright. A solution of sulphate of brucine was finally obtained, from which the alkaloid separated on exposure to ammonia vapour. The brucine was finally purified by conversion into hydriodide and regeneration with sodium carbonate, etc. The brucine obtained did not yield any evidence of the presence of strychnia, and gave a crystalline acetate. Many analyses of the product are given, which agree with the formula $C_{23}H_{26}N_2O_4$. About 20 oz. of mixed crystalline alkaloids were obtained. The author searched the mother liquors very carefully for the so-called igasurine; but all such bodies were proved to be brucine with a trace of some persistent impurity. By the action of alcoholic soda on brucine a hydrobrucine, $C_{23}H_{28}N_2O_5$, was obtained. Its colour reactions are distinct from those of brucine.

Professor Hartley than read a short paper, entitled—

Notes on Photographs of the Ultra Violet Emission Spectra of Certain Elements.—The author draws the following conclusions:—The ultra-violet spectra are comparatively free from air lines. All the most important groupings of metallic lines appear in the ultra violet region. The sharp clear cut appearance and the nebulous character of certain lines are even more strongly marked than in the visible spectrum. Not only are long and short lines noticeable, but many rays which consist of mere dots are characteristics of certain spectra, while certain strong lines appear to stretch not only across the spectrum, but above and below its boundary edge. When the photographs of the elements are arranged in Mendeljeff's series, certain well-defined groups exhibit similarities in their spectra, *e.g.*, Mg, Zn, and Cd; Fe, Co, and Ni; Al, In, Tl; Cu, Ag, Hg. Palladium also has a spectrum somewhat similar to the spectra of the iron group.

Professor Hartley exhibited some of the beautiful photographs on which the above statements are based.

Mr. S. U. Pickering gave a brief statement of the results arrived at in his paper "On the Sulphates of Aluminium." He has sought for the seven or eight sulphates of aluminium which are said to exist, but has in most cases not been able to find any evidence of their existence.

On Two New Oxides of Bismuth. By M. M. P. Muir.—The author has repeated Boedeker's experiments on the action of aqueous potassium cyanide on a hot nitric acid solution of bismuth nitrate; but finds that the puce coloured salt which is produced has the formula Bi_2O_7, and not $Bi_2O_8, 2H_2O$, as assigned to it by Boedeker. The new bismuth heptoxide is a fairly stable compound towards heat; it begins to part with oxygen about 200°, soluble in acids, giving deep red liquids, which are only very slowly decomposed, and decolorized by boiling. A hot concentrated solution of caustic potash dissolves 25 per cent. of the new oxide, forming a very deep red liquid, from which acids throw down a red-brown substance, containing bismuth, oxygen, and much water; but, after washing with hot water, free from potassium. The portion insoluble in hot potash consists of another new oxide of bismuth. Bismutho-hypobismuthic oxide, Bi_4O_7, sp. gr. 8·5, unacted on by potash, dissolves in acids to purple-red liquids, only very slowly decomposed by boiling, does not lose oxygen till heated over a Bunsen lamp; neither oxide takes up water from moist air.

The Society then adjourned over the summer recess.

CHEMISTS' ASSISTANTS' ASSOCIATION.

The annual general meeting of the Chemists' Assistants' Association, was held at 32a, George Street, Hanover Square, on May 25, 1881, Mr. Branson in the chair.

Messrs. J. R. James and W. Wyles were appointed scrutineers to examine the voting papers for the election of Council.

The Honorary Secretary then read the following report of the Council:—

"The Council have pleasure in presenting the Annual Report of Fourth Session.

"The Association numbers eighty-four ordinary and seven honorary members. Thirty-three new members have been enrolled during the session; an increase of nine for the current year. Seven members have commenced business during the session, including four members of the Council.

"It is satisfactory to note that the financial position of the Association is very favourable, the balance in Treasurer's hands having increased to £31 5s. 2*d*.

"The programme of papers, issued in October, has been followed with but three deviations, and in addition five extra papers on pharmaceutical subjects were volunteered, making a total of sixteen, as follows, viz.:—'Electro Metallurgy' (illustrated by experiments); 'British Mosses;' 'Sir Humphrey Davy;' 'Michael Faraday;' 'Geology of the London District;' 'Strength and Impurities of Medicinal Hypophosphorous Acid;' 'The Physical and Chemical Properties of Blood;' 'Induction of Currents and some Practical Applications thereof' (illustrated by experiments); 'The Quantitative Analysis of Tinfoil;' 'Resorcin;' 'Quebracho Bark, true and false;' 'Preparation and Strength of Commercial Pepsin;' 'Brewing;' 'Sulphur;' 'Oleate of Bismuth;' 'Phosphoric Acid and some of its Combinations.

"Of these, twelve were contributed by members of the Association.

"Five social meetings have also been held.

"The average attendance for the session has been twenty-four, the lowest being fifteen, and the highest forty-eight.

"A successful Annual Dinner was held at the Holborn Restaurant, on January 26, 1881, at which Professor Bentley, presided, supported by several eminent pharmacists.

"Arrangements were made with the Council of the St. John Ambulance Association for the delivery of a course of eight lectures on 'First Aid to the Injured.' Thirty-two members subscribed, and at the conclusion of the course an examination was held and certificates awarded to the successful candidates.

"In conclusion, the Council tender their thanks to donors to the funds of the Association, to the authors of papers, to all who have rendered assistance to the Association, and to the members generally for the cordial support rendered to the Council at all times, and trust a continuance of the same will enable their successors to carry on the work of the Association with credit and success."

The Hon. Treasurer then presented his balance sheet, of which the following is a summary:—

Balance from last year . . .	£10	5	0
Subscriptions	21	0	0
Donations	32	15	6
	£64	0	6
Expenditure.			
Rent	£20	0	0
Printing and other expenses .	12	15	4
Balance in Treasurer's hands.	31	5	2
	£64	0	6

Mr. F. Carter moved and Mr. Wyatt seconded the adoption of the report and balance sheet. Carried *nem. con.*

After several rules had been slightly amende, a vote of thanks to the Chairman brought the business to a close.

The Council for the current session consists of the following gentlemen, viz.:—President, Mr. J. E. Stuart; Vice-Presidents, Messrs. C. R. Killick and W. A. Wrenn; Hon. Treasurer, Mr. J. Hills Hartridge; Hon. Secretary, Mr. C. Parkinson; and Messrs. F. W. Branson, Edmund Jones, E. Lapthorne, T. S. Pearson, A. J. Phillips, W. H. Priestley, G. F. Snow and Owen Wallis.

Parliamentary and Law Proceedings.

PROSECUTION UNDER 17TH SECTION PHARMACY ACT.

At the Greenwich Police Court, on Thursday, June 16 last, before Mr. H. V. K. Measham (Stipendiary), Thomas Watkins, of 14, Broadway, Deptford, S.E., was charged with having sold to George Revill Templeman, Assistant Secretary of the Chemists and Druggists' Trade Association of Great Britain, certain poison, to wit, strychnine, in a certain packet, the cover of which packet did not set forth the name and address of the seller of the same, and that the said sale was effected the purchaser being unknown to the seller and not introduced to the seller, and the date of the sale, the name and address of the purchaser and the name and quantity of the article sold, not being entered in a book, kept by him for that purpose, in contravention of the statute in such cases made and provided.

Mr. Glaisyer, Solicitor of the Chemists and Druggists' Trade Association, appeared for the prosecution, and defendant appeared in person.

Mr. Glaisyer said this was a case under the 17th section Pharmacy Act, 1868, to regulate the sale of poisons. The defendant, who was an oil and colour dealer, sold at his shop in the Broadway, to Mr. Templeman, a packet of Battle's vermin killer, which was subsequently analysed by him and found to contain strychnine, which is poison within the meaning of the Act; the packet in which the poison was contained was not labelled with the name and address of the seller. Mr. Templeman was unknown to him at the time of the sale and not introduced, as required by the Act, neither was the sale entered by him in a book kept for that purpose,

The defendant stated he had no recollection of the sale, but had no doubt it was true that he sold the article in question. He had been in business a long time as oil and colour dealer, and several of his colours contained poison. He was not aware that he had done anything illegal in selling the vermin killer and for the future he would cease to keep it in stock. If the Act applied to the colours sold by him containing poison, then his business would be gone.

Mr. Measham said the Act only applied to certain poisons mentioned in the schedule, and he advised the defendant to obtain a copy of the Act and peruse it carefully.

Mr. Measham: I suppose you do not press for a heavy penalty in this case, Mr. Glaisyer?

Mr. Glaisyer said he would be content with a small fine. The object which his clients had in view was to prevent the sale of poisons by incompetent persons, a practice which was now carried on to a great extent, and to show the public that it was illegal to do so.

Mr. Measham, addressing the defendant, said he would advise him to be careful as to what he sold, and as he had promised to comply with the requirements of the Act for the future, he should only inflict the small penalty of 5*s.* and costs.

A DISPUTED MILK ANALYSIS.

At the Birkenhead Police Court, on Tuesday, June 14, before Mr. Samuell, an adjourned summons against James Stewart, milk-seller, for selling skimmed milk, came on for hearing. Mr. Waln prosecuted on behalf of the local authorities, and Mr. Spence (R. B. Moore and Spence, Liverpool), appeared for the defendant. At the previous hearing, Mr. Smith, inspector of milk, had proved the purchase of a pint of milk on May 27, and had put in a certificate from Dr. Vacher, the borough analyst, stating that the milk had been deprived of 15 per cent. of its cream. Mr. Moore, who appeared for the defence on the previous occasion, had produced a certificate from Dr. Campbell Brown, public analyst of Lancashire and Liverpool, relative to the quality of the milk, but this had been ruled to be inadmissible, unless Dr. Brown was present. Dr. Brown was now in court.

Mr. Waln objected to any evidence being called as to the quality of the milk other than that of the borough analyst. This objection the bench overruled.

Mr. Spence urged a number of minute technical objections, all of which were overruled, except one as to the inadequacy of the certificate. With regard to this the magistrate expressed his opinion that the certificate was all that the Act required; but, as it might be desirable to have more information as to the constituents of the milk, he was willing to adjourn the case in order that might be more fully set out.

Dr. Vacher said he had his laboratory book in court, and was quite prepared to give any particulars. Having been sworn, he stated in answer to Mr. Spence that in analysing the milk he first weighed out 10 cubic centimetres of milk, which weighed 10·29 grams. In ascer taining the proportion of solids, instead of totting up to 100, he totted up to 102·9, a very useful mode, and then the constituents came out:—

Water	90·21
Fat	1·70
Solids not fats	10·99
Total	102·90

The ash was 0·70. The result of the analysis was to show that 15 per cent. of fat had been abstracted from the milk. The standard amount of fat that he required was 2·00, but the sample showed but 1·7. He had analysed milk in which the fats were as high as 6·08, but if this sample had come up to 2·00 he should not have certified against it.

Mr. Spence asked Dr. Vacher what was his experience as an analyst, and if he had not been unsuccessful in three or four examinations, but Mr. Samuell said he could not go into that, and it was not a proper question to ask. He was satisfied that the corporation of Birkenhead had appointed a fit and proper person to be the analyst for the borough, and he was not the person to examine Dr. Vacher as to his qualifications. He might as well ask Mr. Spence if he knew more law than Mr. Waln, or *vice versâ*.

Dr. Vacher said it was not the fact. He never was plucked at any examination.

Mr. Samuell said it would not make any difference to him, because the very best men had been sometimes unsuccessful. He was quite sure he should be plucked if he went in for any examination now. He went on to say that he had not the slighest doubt but that both the analyses were right, but it must be shown that the same sample of milk was examined by both parties.

Dr. Campbell Brown was then called and stated that on June 4, he received a bottle of milk from Mr. J. Stewart, who was accompanied by another farmer. The bottle was sealed with a red seal marked "C.I.N. Borough of Birkenhead." The seal was intact and had not been tampered with. He produced the bottle. When he received it the seal was in better condition than that of the third, and as yet untouched, sample produced by the inspector.

Mr. Samuell said it appeared a very insecure method of sealing the articles. He could draw the cork of the third sample without injuring the seal.

Dr. Vacher, who was examining the empty bottle produced by Dr. Brown, said it appeared to have previously contained sweet oil, which would add to the quantity of fatty ingredients in the milk.

Chief Inspector Smith said the bottle was clean when he filled it. He believed it previously contained spirit.

Dr. Brown said it was butter and not oil that was in the bottle. He analysed the milk. He found lumps of butter floating about in it, caused by the churning it had received in its journey, sufficient to show that it must originally have been a rich milk. Having taken out the lumps of butter he ascertained the quantity of fat in them, and found it of itself to be more than Dr. Vacher had extracted from the whole of the milk. Then he analysed the milk that remained and found an additional quantity of fat, which had not been converted into butter, and that, added to the butter found floating, made a total of 2·83 per cent. of fat, a standard somewhat above the average of good Cheshire milk. He did not at all find fault with Dr. Vacher's standard, it was rather lower than his own; therefore it was merely a question whether Dr. Vacher got the whole of the fat out of his sample of milk. There was internal evidence quite sufficient to show that Dr. Vacher failed to get the whole of the fat out. The proof of that was that he found 10·99 solids not fats. That was almost the total solids found in ordinary pure milk as it came from the cow with the fat still in it. Whenever he got a result like that from an analysis he knew that he had failed to get out the whole of the fat, and he did the analysis again. It was an exceedingly rare thing to get anything like 10·9 solids not fat; 9·2 or 9·3 were much more common. Deducting 9·3 from 10·9 left a difference of 1·6, and this was probably the quantity of fat that Dr. Vacher failed to extract.

Mr. Samuell: Then your contention is this: that a portion of the solids which Dr. Vacher classed as solids not fats ought to have been a portion of fat?

Dr. Campbell Brown said there was no doubt about it in his mind, from Dr. Vacher's own analysis, and that allowance would make it correspond with his, or, in fact, show the milk to be somewhat richer. That would be accounted for by the fact that when he analysed the milk it was a fortnight old, and the solids not fats had decreased by decomposition.

Dr. Vacher said he could not think with Dr. Brown that the solids not fats never reached beyond the point of 9·2 or 9·3.

Dr. Brown said it was extremely rare for them to be beyond 9·5. The standard adopted by the Society of Public Analysts was 9·0.

Dr. Vacher quoted a work by Dr. Wakelin (*sic*), but Dr. Brown said that authority was not worth anything for judicial purposes, because he put forward a number of analyses of milks at a much higher standard than were commonly met with. If Dr. Vacher would become a member of the Society of Public Analysts, he would be aware that the matter had been very fully discussed by them, and that they had fixed on a standard of 2·20 for fats, and 9·00 for solids not fats. Dr. Vacher, by working on his standard, would in two cases out of ten prosecute for the addition of water where no water had been added. He (Dr. Brown) had done over nine thousand milk analyses up to the present, and something like two out of ten would have been below the mark if the standard of solids not fats was put as high as 9·60.

Dr. Vacher asked Dr. Brown whether, the two samples being analysed, one in a fresh, the other in a sour condition, the results obtained by the analyst who analysed the fresh would not, *cæteris paribus*, be more likely to be correct than those of the analyst who analysed the sour.

Dr. Brown replied that the answer to that was that there was a regular diminution of the solids not fats owing to the decomposition of the milk, and allowance was therefore made corresponding to the age of the milk.

Mr. Samuell said this was a very interesting discussion, and he would sit and listen to it with a great deal of pleasure, but he did not think it would aid him in forming his judgment in the case, because where two gentlemen disagreed so markedly as in this case as a matter of course nothing remained for him but to dismiss it.

Summons dismissed with costs.—*Birkenhead News.*

Review.

Practical Botany for Elementary Students. By D. Houston. W. Stewart and Co., London, E.C. 1880.

The tendency to examine students in practical rather than in theoretical knowledge is certainly increasing at the present day and this is a matter for congratulation, inasmuch as examination must always lead education either voluntarily or involuntarily.

The object of the little book under consideration is to meet this requirement of science schools, since it is intended "to supply a practical hand-book for the use of students of elementary botany who desire to obtain, by the examination of actual specimens, some real knowledge of the general structure of flowering plants, so far as may be worked out by the aid of a sharp penknife, a few dissecting needles and an ordinary lens." The preliminary instructions contain some good hints, and the recommendation to sketch the dissected parts of plants is a good one. The main portion of the book consists of very full descriptions of a selected types of each of the fifteen natural orders included in the syllabus of the first step of elementary botany issued by the Science and Art Department. After the description of each type follows a short list of some of the commoner species of the order, a brief account of the general properties, uses and distribution in time and space of the plants of the order, a synopsis of the orders, another of all the natural orders of British plants, and an index. It is difficult to understand the use of such a book except in the hands of a teacher, since one of the primary recommendations issued in the preface is to procure "an elementary text-book on structural and physiological botany, preferably Dr. Hooker's." None of the terms are explained and the plants are mentioned only by their English names. Thus, the meadow buttercup is described as having "roots, fibrous," without any allusion to the fact that one meadow buttercup possesses a corm; and in the same natural order no description is given of aconite, one of its most important plants and one most difficult for a beginner to understand. The natural orders being arranged in their systematic sequence, it would be impossible for the student to go consecutively through the list of plants, since in it white goosefoot comes before the wild hyacinth and the sweet pea before the hazel, spotted orchis and other spring plants. The only possible use that can be conjectured would be to use it as a key to ascertain, after describing the plants mentioned in a schedule, whether the description be correct. But even this would fail in some particulars, in such a case as that of the meadow buttercup, if the student gathered any but *Ranunculus acris*; nor would probably the student, unaided, gather specimens of the plant suitable to show all the characters mentioned in the description. On the other hand, if a student carefully examined these fifteen plants without examining others, he would be able, in case any of these common plants happened to be given for examination, to get more marks than another who had not done so, and whose practical knowledge might be more extensive. No one could, however, carefully go through these fifteen plants and dissect them under the eyes of a teacher without having gained at least a knowledge of how to examine plants practically, and on this account the book may be safely used in science schools, but can be of little use to the unaided student.

Correspondence.

*** *No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.*

THE SOCIETY'S JOURNAL.

Sir,—I cannot see that Mr. E. Smith, if he at the Annual Meeting said no more than he is reported to have said, "raised a presumption of mismanagement" of the Society's Journal. Whether or no he indicated it by manner, tone of voice, or in some more subtle way, I, not having been present, cannot say.

His inquiries seem to me genuine and business-like, pointing fairly to the demand for a supplementary detailed Journal account, which year after year has in vain been urged upon the compilers of the annual statement.

The copyright of the *Pharmaceutical Journal* is without doubt a valuable property, and its owners have a right to know all about its working. Nor is it fair to the memory of Jacob Bell that his generous gift to the Society should be so manipulated in the annual statement as to appear to outsiders a source of loss rather than gain to the amount of hundreds of pounds.

I can see no valid reason against a separate Journal account in which credit should be taken for the wholesale price of the numbers distributed gratis by the Society. The Society would, on the other hand, place the like sum on the expenditure side of its annual statement, to be each year, I believe, more than balanced by a substantial and unmistakable item—"Profit of *Pharmaceutical Journal.*"

So much time has in my remembrance been wasted by inquiries directed towards the clearing up of the Journal mystery, that I hope our worthy Secretary, a notoriously good accountant, will be authorized to present in future the Journal account in such a form as to render further inquiries unnecessary. THOS. B. GROVES.

Sir,—Mr. Smith, in his criticisms on the Journal account appears to be suffering from a very obstinate attack of mental obliquity of vision for which there seems to be but slight cause and I am afraid no relief.

Not many years since Mr. Smith was a member of the Council; he surely ought then to have become acquainted with the method of bringing forward the Journal account into the several balance sheets; if he were not satisfied he should have impressed on his colleagues the advisability of publishing a full and particular debtor and creditor account of the Journal: possibly his intelligence at that time had not been awakened to the enormity of the offence.

Had the question respecting the Journal account been put by an ordinary member of the Society the supposition would have been that it was really for the sake of gaining information; but coming as it did from an ex-member of the Council one is quite at a loss to account for the apparent lack of knowledge evinced.

It was somewhat unreasonable to expect the President to give him office figures without previous notice. He might on another occasion, with as much reason, or rather with as little reason, ask for particulars of the salaries of the several clerks, etc., employed at Bloomsbury Square. The President's statement at the Council Meeting on the 4th inst., supplemented by your leader on the 11th inst., offers an ample and satisfactory account of the disposal of the Journals; if Mr. Smith is still unable to understand the figures as published we may reasonably despair of provincial education.

It appears that last year there was a weekly issue of about 7000 Journals, the whole of the expenses incidental to the publication during the year being paid by the advertisements and Messrs. Churchill's sales, with a gain to the Society of about £10. Had it not been for the expenses attendant on the publishing of the index to the last ten volumes the profit to the Society would have been about £150. This seems to me to be very satisfactory. About 6000 numbers of the Journal are handed over every week to the Society, which has engaged to give a Journal to each person connected therewith who pays the subscription, and thus becomes entitled to receive it. The postage paid for the delivery of those numbers of the Journal, therefore, should surely be charged to the general fund, and should not be considered as a Journal charge at all. As I take it, the postage of the Journal is an actual charge as against the subscriptions received.

Mr. Smith's remark, "if there were no Journal there would be no postage" is quite true, but very absurd, and not pertinent to the point at issue; he might as well say if there were no Pharmaceutical Society there would be no Journal.

I had not the pleasure of hearing Mr. Smith's speech at Bloomsbury Square on May 18, but as published in the Journal he evidently takes full advantage of an Englishman's privilege of grumbling; he commences by grumbling, he goes on grumbling, and ends by grumbling. What a time of it his assistants must have if he usually gives vent to his feelings with such splenetic vigour!

No person can object, and the Council least of all, to fair and honest criticism upon the annual report. Mr. Smith's captious remarks and opposition come from him, as an ex-member of the Council, with an especial ill grace; he, as one who has shared its labours, ought to be the first to give all due credit to the Council in its honest endeavour to do the best for the advantage and benefit of the Pharmaceutical Society.

Kilburn. W. T. TUCKER.

PHARMACEUTICAL EDUCATION.

Sir,—The subject of education and the claims of the provinces appear to have engaged the attention of the last Annual Meeting. Would you allow me through your correspondence columns to say that it has frequently occurred to me that if some good scheme could be devised and carried out by means of which the pharmaceutical centre in

Bloomsbury Square could keep up more frequent communications with the young men throughout the country who are to form the future pharmacists, that a great advantage would be gained by the Society and a great benefit conferred upon the young men themselves? Perhaps one of the best possible means by which the Council in London could connect itself with the various extremities of the trade and profession throughout the kingdom, would be through the agency of the provincial pharmaceutical associations already in existence. I would suggest that the Council institute local examinations, to be held say in June in each year, in all the large towns where a responsible committee, satisfactory to the Council, can be formed to take charge of the examinations.

Taking it for granted that all youths pass the Preliminary before they enter the trade, their term of apprenticeship might be profitably spent in working up for these local examinations year by year. Suppose there were two grades in each subject with questions suitable for each, and it be a rule that the grades be taken consecutively and the subjects in a certain order, a constant incentive to study would be held out to the young men during the time of their apprenticeship, and if it was thought desirable prizes or books might be offered for those students who obtained a certain proficiency. One of the evils of the present system is that young men pass much of the leisure time of their apprenticeship without due regard to their studies, and then when they attain majority think to "cram" all they need for the Minor in a few months' time by attendance at some of the schools specially organised for the purpose of meeting the wants of such students, when, if they do succeed, much of the information obtained thus hastily is as quickly lost; whereas if the student could be induced to take these progressive steps, year by year, he would be much more likely to retain his knowledge. I would not by any means seek to dispense with, or supersede, the present examinations, but let them be the final ones of a series instead of as now the only ones. Such an organization, somewhat on the lines adopted by the "Science and Art Department," might meet the case; indeed many students who now pass the "Science and Art Examinations" as helps in their studies would, I think, be glad to have some examinations specially relating to the applications of science to their trade or profession.

Suppose a youth (as all should) passes his Preliminary before he is apprenticed, he might in the first year take the second grade examination in chemistry and botany.

Second year, the first grade in these subjects.

Third year, an examination in materia medica, second grade, and one in reading and translating prescriptions, second grade.

Fourth year, examinations in the first grade of these subjects.

The papers set in these examinations should not be difficult ones, but such as would tend to lead a student up by degrees to the final examination in London. It does seem to me that if some such scheme as I have roughly suggested could be worked in a liberal spirit by the Council it would be the means of very materially helping the provinces by quickening the languid, and in some cases almost expiring, local associations, by giving them something to do, some purpose to serve in advancing the interests and welfare of apprentices and assistants, and some more intimate connection with the vital centre in London.

Leeds. GEO. WARD.

ASSISTANTS' SALARIES.

Sir,—After the voluminous correspondence in the Journal of to-day, dealing with the subject of chemists' grievances, as well as your leading article on reform as to qualification, I am in hope the question will be taken in hand at the headquarters of the Pharmaceutical Society. The suggestions offered by "A Life Member for more than Twenty Years" are worthy of deep consideration, and if adopted would, in a very great measure, lighten the burdens of those in the trade.

In your leading article you say, "It would be distinctly to the advantage of competent men if recourse were had to the original intention of the Pharmaceutical Society's founders to make the Minor examination a test of qualification for assistants, and if it were made legally requisite that every assistant should be qualified in that way." I should be glad to see this become law, but think it will be some years before we are ripe for it, not until we cease to be general dealers. What is to my mind the greatest evil that we have to contend with, is, that chemists may have any number of branch shops, leaving them under the management of assistants who are not qualified. What legislation can we ask for against co-operative stores, grocers and stationers in the face of such a legality? Every branch shop should be under the management of a qualified assistant. Let the question be taken up by our leading men and pushed forward, its consistency will commend it to the minds of all but those interested in maintaining the law as it stands. It may be said that this would throw many competent men out of employment. It would drive them either to Bloomsbury Square or to some other vocation, in either case a desirable result. At any rate we must not neglect the interests of the trade generally for the sake of those who have neglected their opportunities. I will give, as shortly as possible, what in my opinion are the advantages to be derived by compelling chemists to have a qualified assistant in each branch shop.

1. The proportion of assistants who are not qualified being decidedly greater than of those who are, there would be a greater demand for qualified men and a consequent higher price offered for their services.

2. If the remuneration were higher, young men would not be so eager to rush into business for themselves, so that there would be fewer but better shops, and masters would be better able to pay and assistants to demand higher salaries.

3. If chemists had to pay their managers higher salaries there would not be so many branch shops.

In advocating the change I have mentioned, I do not write in the interest of either class, masters or assistants, but in the interest of the trade at large. It is not desirable that a few should have such facilities for monopolizing (or nearly so) the trade. Putting that view of the matter aside, there cannot be two opinions as to the policy of bringing about this alteration in the law. We cannot look for assistance from the owners of branch shops, but let not the Pharmaceutical Society attach too much importance to the possibility of losing some subscriptions by moving in the direction indicated.

I am aware that this subject is not being brought forward for the first time, but it is a pressing one, and one which ought to be thoroughly ventilated.

SPERO.

Sir,—I quite agree with your correspondent who signs himself "A Life Member for more than Twenty Years," in reference to assistants' salaries, as much of the mischief does result from the employers calling themselves chemists and thereby obtaining apprentices.

I could quote an instance of a chemist in a fashionable watering place who styles himself "Associate of the Pharmaceutical Society of Great Britain by examination both classical and technical," also assayer of drugs, etc., and yet at the same time probably his principal trade is in paraffin oil and benzoline, selling all kinds of paints (even lending brushes), postage stamps and envelopes, tea, cigars, etc., etc., so when by accident a prescription is brought in it causes a sensation and a search all over the shop to find, if possible, the various ingredients.

I do, for one, sir, consider it would be absurd to call my place a pharmacy when, as before observed, my chief trade is in oils and paints, also tobacco, cigars, etc.; and to take an apprentice would be cruel to him and also robbing his guardians. ANTI-HUMBUG.

Sir,—May I again trespass on your valuable space with a few remarks on the above subject, and especially on the letter of Mr. Doubleday which I think forms a striking contrast to the broader views taken by "A Life Member" and "Equality?" Although I do not object to be included in the category of grumblers, yet the statement of Mr. Doubleday, that, in my course of procedure, I am endeavouring to degrade the community to which I have the honour to belong, is a direct offence to my *amour propre* which I cannot let pass.

That we have no cause for grumbling seems not only adverse to the general opinion, but also to the dictates of common sense. It would be interesting to know how Mr. Doubleday intends to improve our condition or status by other means than promoting shortened hours and increased remuneration. I am desirous of seeing pharmacy in a still higher state of proficiency, but I am of the opinion that the public are at present well served, yet the rapid progress and increased intelligence we have acquired as a scientific body has so far done little to increase our privileges. I would commend the last two sentences of the letter signed "Equality" for Mr. Doubleday's perusal. From ample opportunities of observation I have had, I am convinced that there is more scope for men of tact and smart business qualities in almost every other business than our own. It is well known that young men of business habits attain salaries of £300 and £400 in some of the London silk and drapery houses, whereas I have authority for stating that there are not a dozen chemists' assistants engaged in retail dispensing who receive £150 a year outdoor; I am including the largest West-end houses, where presumably the best men are employed. I can, however, give the names of one or two jewellers in London who pay their assistants £300 a year.

If Mr. Doubleday takes an engagement in any first class dispensing establishment during the London season, he will find precious little time to conduct amateur experiments or marvel at their results, which alike are sternly regarded by principals as involving both waste of time and chemicals.

It is difficult to understand how any young man of spirit can content himself "in making nails for his own coffin" from 7.30 a.m. to 9 p.m., when our contemporaries with shorter hours of business are spending their evenings at this season of the year in cricket, boating, or country rambles. I still maintain that a shortened system of hours is (at present) the first step in the right direction.

Let us then make a vigorous effort to secure for ourselves the enjoyment of those privileges which, as principals in a few years hence, we may generously and ungrudgingly grant to the generation of assistants who shall serve us.

REFORMER.

Sir,—I read "A Revolutionist's" letter in the Journal on the inadequate remuneration of chemists' assistants, but as his letter lacked a remedy for ameliorating our position and having himself left the trade for a more lucrative sphere, I fail to see what object he could have in making known his grievance except a desire to disseminate that dissatisfied feeling amongst assistants which his letter was calculated to produce.

He appears to have drawn a one-sided picture of the case. He unfavourably compares our pay with that of drapers' assistants, and beholds a white mountain in the cotton trade where men receive £350 a year, but omitted mentioning the number that attain that exalted position without interest in less than ten years after apprenticeship. If he turns his attention to a university graduate who has spent a small fortune on his education, engaging himself as curate for £120 a year, and maintaining his position in society, he will find some consolation in the fact that he is not the only educated person who has not been able to save money out of his earnings. Or he may take the case of a surgeon, who is little better paid than we during assistancy.

He says it is necessary to lay out £80 to £150 as premium in good houses. That is true, and a great deal more would be required to get into some houses. But young men who can afford to pay that amount can generally buy an established business without the aid of their earnings.

Then he describes the nature of his work, and gives his salary as £40. Assuming him to possess ordinary business abilities he has disposed of his services below market value, and deserved something more worthy. But on the subject of salary he has betrayed himself, as he says—"A young man immediately after apprenticeship is expected to pass the Minor, and then receives £30 or £40 a year." If "A Revolutionist" has done what is expected in others and passed the Minor, even in his fifth year, and received a salary of £40, his salary, instead of increasing as is the case with other young men, has remained stationary ever since.

The letters of "Assistant" and "Reformer" are written in about the same strain, the gist being a suggestion for forming a sort of trade union amongst assistants to resist the masters' terms. Though I have myself been an assistant for many years, I would gladly hail any improvement in our ranks, but would be sorry to see such a crisis in the trade, and in all seriousness I advise the assistants to avoid to importune the masters with their plaint, and accept their position as it stands, since they entered the trade with open eyes, and they admit an improvement in it since. It would be well for "Reformer" first to seek the experience of those who have, to their bitter cost, tried what he now advocates, and he would then probably see that this agitation in the Irish fashion deserves to be suppressed.

I have read "Life Member's" letter and have given it my serious consideration. Excellent as his remarks appear in theory, most of them are totally impracticable; he and you, judging by your leader, seem to be quite ignorant of the state of pharmacy in the country, and if his suggestions were carried out it would shut up quite 80 per cent. of the shops which are at present carrying on a dispensing business in connection with other trades.

R. W.

Sir,—Mr. F. W. Doubleday evidently began his letter with the intention of proving that assistants are not underpaid, and that the opinion expressed by some to the contrary is incorrect. If such was the task he set himself he achieved a splendid failure.

I fail to see how we are degrading and placing ourselves on the same level as farm servants and striking mechanics, simply because we are trying to remedy a grievance admitted by every correspondent who has written on the subject, and not refutingly referred to in your leader of last week.

Mr. F. W. D. says that masters find great difficulty in obtaining thoroughly conscientious and sober assistants, who are able to take charge of either the retail or the dispensing counter. It does not require any great amount of pentration to perceive that, if chemists require competent assistants, they must be prepared to offer salaries in proportion to the experience and practical knowledge they desire their assistants to possess, otherwise they will have to accept the services of those, who, from lack of experience and defective education, cannot secure a good situation, hence are compelled to take the first they can get so long as it will prevent them from starvation. Firms that pay well are generally able to obtain efficient assistants, but if others think they can do so for sums which any farm servant or striking mechanic would refuse, I am afraid they are mistaken.

It is quite refreshing to find that one amongst us is not only not dissatisfied, but is even enchanted by having to work from 7.30 to 9 p.m. I would suggest that he applies for an extension of hours, and his request would doubtlessly be complied with; then he would be able to live a life in which he seems to revel. I think that such long hours of hard work in an impure atmosphere tend to ruin the strongest constitution amongst us and the life of seclusion we are made to lead eradicates any desire we may have possessed to associate with our fellow-men, and so leaves us a class of men isolated from the general public and never interesting ourselves in anything beyond what immediately concerns us or our trade.

The letter of a "Life Member" clearly points at the root of the evil existing among chemists at present. By the adoption of the principle of his letter, the chemist would soon be better qualified to take up and hold a higher position in public estimation than the one he occupies now, which though much lower he is not so well qualified to fulfil. If such conditions as he names were in force and known to the public, the number of apprentices would not be near so large as heretofore, because of the expense which such a course of training and instruction would be to their parents. The decrease in number of apprentices would be followed by a gradual corresponding decrease in assistants, who not being so numerous, and steadily becoming a more efficient staff, would be able to command better situations and higher wages. Then when the assistants are better paid they will be able to save a little capital, open a shop and carry on business without the destructive competition so rampant among chemists at present, and which is caused to a great extent by young men beginning without any capital, and, to enable them to keep going, selling articles at prices which are simply infamous. Masters will say, that if assistants were better paid there would soon be an overplus of chemists, as directly they had amassed a little capital, they would commence for themselves. This, I think, would not be the case, as the supply of assistants would be much smaller in consequence of the falling off in the quantity of apprentices, and the number beginning business would not be greatly in excess of the deaths of chemists or not more than the increase of the population of the country demands.

INCOGNITO.

Sir,—Surely no one can have perused Mr. Doubleday's letter in Saturday's Journal without feeling envious of his position.

An uninterrupted shower of contentment must have inadvertently fallen on the head of this fortunate monitor of "pill rollers" when we consider that our greatest source of enjoyment, viz., "rambling nature," is the only barrier which stands between our hero and the climax of happiness.

It is most unjust of anyone, who perhaps by a chance tide has been safely landed, to cast dirt in the faces of those poor unfortunates who are left to struggle with the waves. It is amusing to notice the method which Mr. Doubleday adopts in trying to reconcile "grumbling chemists' assistants" to their lot. First, he classes them far below their station, classes them with mechanics and farm labourers, then he quietly reminds them that though in this condition they are his brethren, and advises them to do to others in future as others have done to them in the past. No wonder that Mr. Doubleday finds his work enchanting when he has so much time to marvel and experiment. This may account to some extent for his long hours of business. A little more experience, and perhaps he will be able to compress two days into one. Some may be inclined to think that the discussion which is at present being carried on in the Journal will tend to degrade the profession; it cannot be said to be elevating, but surely it is requisite, and I earnestly hope it may have the desired effect.

Before closing I would like to state my own experience. On being apprenticed I was told that it was necessary to pass two examinations, which were quite simple. My employer undertook to give me lessons in Latin, a task which he was utterly unable to perform, consequently after the expiry of my apprenticeship I had to attend classes for Latin and arithmetic, the fees for which I could ill afford to pay. After failing several times I got through my Preliminary examination, and only began to work for the Minor (*minus* lectures, time and means not allowing such) at a time when I ought to have been over it. I have got over it now, however, and after nine years' experience receive a salary equal to £25 indoor. When I shall be able to start in business on my own account remains a mystery.

DEFENCE.

Sir,—In answer to Mr. Doubleday's letter, I beg to say that I am one of those "fair specimens of the large community of grumbling chemists' assistants;" but then I consider I have something to grumble at, the hours being long, Sunday work required and the remuneration slender. Again, I do not always find business so "enchanting" when customers have a prescription for twelve pills, and want half the number, and they would be glad if you would kindly give them a "copy" of the prescription for the mixture, which they do not happen to want just now, but they like to have it by them. In this sense perhaps, "something fresh may always be turning up for us to marvel at and experiment upon."

For my part I cordially agree with the views of "Revolutionist" and "Reformer," and it is only when some sweeping alterations have been made in that enchanting, fascinating calling, "where time flies so quickly," that we shall be "as contented as rambling nature will allow us to be."

"7·30 A.M. TO 10 P.M."

Sir,—Your correspondent "F. W. Doubleday" must be a man of very peculiar temperament if he is content to stand behind the counter every night until 9 p.m.

As to our salaries, I do not think there is much to complain about, for a a young man who is well up to his business, and who has passed the necessary examinations can always find a situation and obtain a good salary. But to return to our long hours, for that is our real grievance, I ask any man of common sense if it is fair to keep young men behind the counter until 9 p.m. for six days a week, with five hours of Sunday duty? Such are the hours which the majority of Edinburgh chemists think fit to confine their assistants. I write as an Edinburgh qualified assistant. Now, what time is there for healthy recreation after that hour? It is true that a great many chemists' assistants acquire intemperate habits from the fact that innocent amusements are withheld from them, owing to the late hours.

"Incognito" writes a very honest letter, and it would be well for us if masters would follow his advice.

Although "F. W. Doubleday" is contented to ramble thirteen hours and a half daily behind the counter, I am sure the majority of us would prefer to ramble elsewhere after 8 p.m. on week-days, and every alternate Sunday at least.

"LIBERTY."

REPETITION OF PRESCRIPTIONS.

Sir,—I have read with considerable interest what you say about the repetition of prescriptions, and beg to acquaint you with a case in point. A few days ago a young lady, apparently (and as it proved actually) hardly fourteen years of age, brought here to be dispensed, for herself, a prescription of which I enclose a copy. It had evidently been originally written for her mother (whose maiden name it bore), but of whose age at the time I knew nothing. The dose of tinct. canthar. is, as you will notice, nearly fifteen drops. Should I have been justified in dispensing the prescription without further inquiry—or even with it? Perhaps some of your readers will say.

℞ Pil. Aloes c. Myrrh. . . . . ʒss.
Ferri Sulph. . . . . ℈ij.
Ol. Pulegii . . . . ♏xvi.
Syr. q.s. ut ft pil. xxiv æquales, quarum sum. ij omni nocte.

℞ Liq. Potassæ,
Tinct. Lyttæ . . . . āā ʒv.
Sp. Lavand. Co. . . . . ʒj.
M. Cap. gtt. xxx. ex cyatho theæ zingib. et hora meridie et vespere.

ISLANDER.

BLEACHED CORKS.

Sir,—A strange occurrence came under my notice a few days since, which I think may be of interest to some of your readers, and may put them on their guard. A prescription was handed in to me, was duly dispensed and sent to the patient's home. The following morning the medical man brought the bottles back saying that one bottle (the acid) smelt so badly that the patient thought that putrid water had been used; on taking out the cork there was no doubt that sulphuretted hydrogen had been generated, but from what cause I was at a loss to know. I dispensed another acid mixture which the medical man wanted, and it appeared, as it should, perfectly free from any taint. Judge of my surprise, on examining it twenty minutes later, to find it just as bad as the first.

Now these two were dispensed in precisely the same way with the same kind of bottle, cork, acid and water (filtered).

I then dispensed a third, using the same kind of bottle, acid and water, but a short vial cork instead of a long dispensing one. This one remained in a perfect state, and not decomposing in the slightest degree.

From these results it seems conclusive that it was the cork that caused the sulphuretted hydrogen to be formed and the only way that I can account for it is that the corks had been bleached with sulphurous acid. The mixtures were simple ones, as follows:—

℞ Sodæ Bicarb. . . . . ʒj, ℈ij.
Liq. Bismuthi . . . . ʒiv.
A. Hydrocy. Dil. . . . . ♏xxv.
Æther. Chlor. . . . . ʒj.
Aquæ . . . . ad ℥vj.
M.

℞ A. Cit. . . . . ʒj.
Aquæ . . . . ℥vj.

F. L.

COMMUNICATIONS, LETTERS, etc. have been received from Dr. Trimen; Messrs. Parker, Brewis, Fairbank, [illegible] Hutchinson, Grall, Martell, Endymion, Inquirer, [illegible] Ignorans, Chemicus, Hughenden, Galen, J. N., [illegible] T. H. D.

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